AN ORGANIZATIONAL CHANGE APPROACH FOR ENTERPRISE SYSTEM IMPLEMENTATIONS

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DISSERTATION

to obtain the doctor's degree at the University of Twente
on the authority of the rector magnificus,
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on account of the decision of the graduation committee,
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by

Christiaan Pablo Katsma

born on 3 December 1970
in Vlaardingen, the Netherlands

This PhD dissertation has been approved by:
Prof. Dr. Ir. D.R Muntslag (Promotor)
Prof. Dr. J. van Hillegersberg (Promotor)

Acknowledgements

This dissertation is about organizational change. It is especially about how people nowadays are confronted with swiftly changing pervasive technologies and how paying deliberate attention to personal development can improve implementation success and organizational acceptance. This PhD research is also a milestone in my personal development. Of course, this is something that one experiences individually, but it is enabled by a group of people. Here I would like to express my words of gratitude to those people.

It all started during my experiences in consultancy where I learned that the introduction of technology into organizations requires more than just overcoming technical challenges. It also requires dealing with the softer human sides of organizations and trying to integrate these two domains with each other. I would like to thank Dr. Udo Schwartzkopff and Arno Brijoux for their coaching during these professional years. Robert Stegwee introduced me into the scientific world and gave me the opportunity to apply my practical knowledge in teaching and research. I am grateful for receiving that opportunity and his trust, despite my limited experiences in this domain at that moment in time. In the beginning especially Diana Limburg taught me a lot about teaching and the ins and outs of IS research.

In 2003 Dennis Muntslag and I intensified our collective interest in the implementation of information systems, but particularly in the application of insights from organizational change and behavioural science. This marked the beginning of a fruitful relationship and exchange of ideas both in this PhD research as well as in our collective teaching. I hope that we will continue our collaboration in the forthcoming years.

During my years at the university, the following colleagues and students contributed to some memorable moments. I would like to thank Peter Schuur for the fun and inspiring sessions in our mutual courses; Ton Spil for introducing me to the world of E-health and our collective work on I-music; Jeff Hicks and Michel Ehrenhardt for sharing and reflecting ideas; Eveline van Stijn, Jeroen Kraaijenbrink and Mehmet Aydin for sharing their PhD experiences; Rick Goslinga and Claartje vd Linden for the inspiring moments during their master assignments; Hans Heerkens and Koos de Rooy for our frequent aviation moments; and Gawin Dapper for our nerd and Mac moments.

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Experiencing how scientific ideas and knowledge are perceived in practice is one thing, but writing it all down in a structured manner is quite another. A number of people especially contributed to the realization of this book. I would like to thank Gert-Jan Schuiling for sharing his work and insights. His thesis is a great pleasure to read and it

made me aware of the possibilities to integrate large-scale organizational change with individual well-being and personal development.
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During these years my professional relations with certain people turned into friendships. I would again like to express my thanks to Jan and Remco. You have become my friends and I hope we will continue our joint chats on our profession on a frequent basis. Dennis, not only for helping me reach my goals, but also for being a friend. May our mutual knowledge exchange on motion pictures and comics go on. The same holds for Ton, my colleague, roommate, co-runner, but above all my friend. I hope that our conversations on literature and music have an inspiring future and that we will continue our musical quizzes until our hearing aids will become the problem.

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And finally Rosemary, from now on I will try not to use the words "design and development" in our everyday lives. Thanks for your enduring support.

Christiaan Pablo Katsma
Ahaus, April 2008

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-- Information is not knowledge; knowledge is not wisdom; wisdom is not truth; truth is not beauty; beauty is not love; love is not music; music is the best. –

Frank Vincent Zappa (1940 - 1993)

Part A.
Theoretical reflection on ES implementations and organizational change.

1. Introduction

---Weise erdenken die neuen Gedanken, und Narren verbreiten sie.---
Heinrich Heine (1797-1856)

1.1 The introduction of ICT into organizations

The introduction of information and communication technology (ICT) and business information systems in particular into organizations has been the subject of extensive research worldwide. This is hardly surprising considering the present era we are living in. Currently ICT plays an important role in our society and many organizations choose to be largely dependent on this technology. Whether people and organizations have a freedom of choice in this matter is a rather philosophical question that is difficult to answer. It seems the ICT push that has been going on for a while has created a snowball-like effect and forces society to follow. From the perspective of the early adopter (Rogers, 2003) new technology should be put to market as quickly as possible. On the other hand, laggards perceive they are almost forced to jump on a train already leaving overdue from platform 9 ¾ (Rowling, 1997). In this perspective we cannot answer the question whether organizations in particular have a freedom of choice. The current vision of most organizations both in the business and public domain is that ICT is indispensable when trying to improve, innovate, or, at worse, keep up with partners and/or competitors.

The vendors of business information systems are still making significant progress in functionalities and capabilities and it is a challenge for various organizations to select that particular technology that contributes to a more efficient, effective, and moreover pleasant way of working for the people involved. Especially this latter aspect seems to be too often forgotten. Nevertheless, in the scientific domain a lot of attention has been paid to the study of the introduction of information systems into organizations. And multidisciplinary research efforts expand this field. One perspective is the relevance and acceptance of business information systems (Venkatesh al., 2003; Spil et al., 2005, Davis & Olson, 1985). Other domains start by building upon information system development (Avison & Fitzgerald, 1995; Hirschheim et al. 1995; Rolland and Prakash, 1999; Baskerville, 1999; Aydin, 2006, Slooten van, 1998). A third group deals with the introduction of specific forms of technology, such as e-work support (Limburg, 2002), ubiquitous technology (Junglas, 2003), or ERP-systems (Robey at al.2002; Markus, 2004; Stein, 2006).

In this PhD research we will focus on the introduction of Enterprise Systems (ES) as the successor of ERP systems. Evaluation research (Gable et al. 2003; Sumner, 2000; Kim, 2005) has shown that the introduction of such systems into organizations is still far from successful. On the other hand, these specific types of business information systems are still popular. The reasons for these implementation failures have been investigated from different angles. This PhD research will focus on the organizational change process that accompanies these ES implementation.

In this first chapter we will explain the relevance of this topic by a condensed overview of literature on the current scientific insights into ES implementations. Firstly, in section 1.2 we will introduce the essentials of ES implementation taken from scientific literature. Typical problems that arise during the ES implementation process will be explained in section 1.3. Section 1.4 will discuss the problems that are labelled in literature as *organizational issues* and show that this topic can be divided into three research patterns. For each pattern the research output , the current scientific knowledge and contributions, and finally the lacunas for each pattern is shown. The chapter is rounded off in section 1.5, which identifies the main problems of the field and deduces the research objective for this dissertation from the three patterns. This sets the stage for the specific research problem and research approach in this dissertation in chapter 2.

1.2 Implementation of Enterprise Systems

In the last decade there has been a transfer from the concept of Enterprise Resource Planning (ERP) systems towards Extended ERP, ERP II, Enterprise Information Systems (EIS), or just Enterprise Systems (ES) (Møller, 2005; Davenport, 2004). In this dissertation the latter term will be used. This change of name comes naturally with the further development of ERP packages by its vendors. In the beginning of the nineties of the last century ERP systems were still very much connected to main operational processes of organizations supporting sales, finance, production, and logistics. These systems have evolved and currently more and more functional modules are available that are applicable to specific branches in industry, specific tasks or projects, or business functions (Robey et al 2002, McLeod en Schell 2001, Davenport 1998). So there has been an increase in functionality but still each module is linked with the centrally guided information architecture (the central ES database) and functionality is driven by integrated business logic (best practices).

The term Enterprise System is also used sometimes from the singular perspective of technology architecture for the entire enterprise (e.g. SUN enterprise system). This dissertation does not cover enterprise systems in this latter perspective, but explicitly focuses on the Enterprise Systems that have been derived from ERP packages. In this dissertation Enterprise Systems include their functionality of seamlessly supporting and integrating a full range of business processes by uniting functional islands and making their data visible across the organization in real time.

A recent significant increase in ES functionality has been the transition from supporting singular organizations to chains of organizations, including a complete supply chain over the formal borders of one or more organizations. In this case the different ES's at least share specific functions and business logic. One of the latest developments enriches the ES with marketplace functionality so that a transition from chain thinking toward network-based collaborations or doing business becomes available. This dissertation focuses on the adoption of ES by one singular organization. I.e. the collaborations and network creation over the formal borders of the adopting organization are not within the scope of this research.

Enterprise Systems are packaged software applications (from vendors such as SAP, Oracle, PeopleSoft and JD Edwards) that connect and manage information flows within and across complex organizations, allowing managers to make decisions based on information that truly reflects the current state of their business. These systems also automate complex transaction processes and thus have the potential to reduce costs". (Davenport, 2004)

1.2.1 *Enterprise Systems explored*

ES are exceptional due to a specific set of characteristics (Table 1). These characteristics also have a larger impact than is perhaps assumed at first sight. Enterprise systems often become hard to modify due to their complexity and size (Davenport, 1998). Large-scale IS such as Enterprise Systems are like an infrastructure. (e.g., analogous to a city's roads and bridges) (Markus & Tanis, 2000). The implementation of an ES is fundamentally different from traditional Business Information Systems, is also distinct from the system user (Volkoff, 1999), and is characterized by a long-term and complex process with a high degree of interdependencies and a mandatory context for its users (Pozzebon, 2000). The implementation of an ES differs from other products in that it explicitly combines strategy, organizational structure, business processes, and IT into a coherent framework (Gibson, 1999). It is the coherent collection of these domains that makes the adoption of an ES by an organization into an even larger multidisciplinary challenge than is the case with traditional information systems.

1.2.2 *The meaning of Implementation*

In the IS and management literature there seems to be an implicit agreement on using the word 'implementation' in the domain of ES introductions. The term itself is nevertheless used ambiguously and several publications show the different meanings of 'implementation'. The ambiguity does not come from a fundamentally different understanding of 'putting into effect'. There is a general understanding on 'doing something to achieve an outcome' in the different domains.

End to End process logic The ES is module wise organized resembling a typically functional IS structure, but the functionality and process logic within these modules relates to the principle of end to end process chains across the different business functions.	*Best practice-based* By collecting implementation experiences, the ES vendors have adopted best ways of doing business into the ES. These best practices represent generic processes that for example 80-90% of the companies in a specific branch use to perform their daily routines. The best practice is incorporated into the end to end process logic.
ES are configurable COTS ES are standard software packages that are developed by the system suppliers before actual use by the customer. Configuration can be seen as: *balancing between the way an organization **wants** to work and the way an ES **can** work"* Davenport (1998). There are two ways in configuration: 1. By using the modularity of an ES: an organization can choose to implement just one or some modules instead of the whole package 2. By correct configuration. In an ES thousands of configuration tables are present that all have to be configured to align the systems functioning with the business processes.	*Customization* It is possible to go beyond setting the systems specifications by customization. In this case experienced programmers change the basic logic in the ES code. However, modification of the system's software codes is highly impractical (Boudreau and Robey, 1999). It prolongs the time of implementation and complicates upgrading of the system. Vendors bring out new versions of the ES, but these are based on the standardized source code. This means that customized solutions cannot be guaranteed to work in a newer version of the package and therefore in most situations a new customization project is necessary to offer the same functionality.
Real Time availability of data/information Due to the integrated database, the accessibility of data or information is easier and in many cases in real time or close to that. This enables monitoring and managing on different levels in an organization. This also increases information transparency across different parts of the organization or indifferent hierarchical layers. This again has social consequences for the way employees interact and collaborate with each other.	*One supplier/upgradeability* An ES can cover organization-wide information needs. Compared with the use of different functional information systems, this does imply a 1:1 supplier: adopter relationship. This has both its benefits as well as its disadvantages. Certainly system management and maintenance during operations can become standardized and organized more efficiently. A singular supplier on the other hand also implies a dependent relationship that in some cases can become problematical.

Table 1 Specific characteristics of Enterprise Systems

But in both IS as well as management science literature there is an ambiguous understanding of the effect itself, of the start and finish of the process to achieve this effect, as well as of the activities the process entails . According to Montealegre (1993), the term implementation is given a variety of meanings in literature. Some examples are given in Figure 1.

Implementation is….	**Source**
a procedure directed by a manager to install planned change in an organization	Nutt (1986)
the process of gaining targeted organizational members' appropriate and committed use of an innovation.	Klein and Sorra (1996)
the adoption of a system during the transition period between the technical installation of a new system and its skilful and task consistent use by a group of the targeted employees	Bondarouk (2004)
the process of completing the projects for application of information technology to assist an organization in realising its goals.	Gottschalk (1999)

Figure 1. Different meanings of implementation

A kind of split can be discerned in Figure 1 between definitions that emphasize the change process and definitions that emphasize the IT or information system introduction. According to Kruithoff and Poll (1991) it is essential to perceive IT implementation as an organizational change process. Implementation is both about the information system definition and introduction, but moreover it is about people adopting the system. This combination is explicitly embedded in their System Implementation Model (SIM). The SIM is based on socio-technical systems theory (STS) and is comprised of seven phases, in which introduction of the system is just one step (phase 5) in the process. This model is more extensive than the merely physical introduction of the ICT artefact. Kruithof & Poll explicitly distinguish between the IT and organizational aspects. They see that two main categories of activities are needed to accomplish a successful implementation of an information system: design and change (Figure 2).

	Design Process	Change process
IT Transformation	Information analysis System design Database design Security plan Layout system administration	Programming Database construction Operating plan Maintenance plan Acquire hardware and software Testing Conversion
Social-organizational Transformation	Task design Design (new) organizational structure Descriptions of processes and procedures Descriptions of tasks and jobs	Information Recruiting and training of IT Personnel Adapt/fitting out organization Training users Organize housing

Figure 2. The four quadrants of an implementation process adapted from: Kruithof and Poll 1991: 211.

In the specific domain of ES this view is acknowledged with an emphasis on a staged-like perception of the implementation process. This field in general describes the implementation process in stage models having three (Parr & Shanks, 2000), four (Markus and Tanis, 2000), and five stages (Ross and Vitale, 2000). According to Robey et al. (2000,) there are several common elements between these process models, but the staging arrangement is different. Markus and Tanis (2000) take a holistic life cycle perspective and define four 'ideal' phases that repeat themselves (Figure 2)

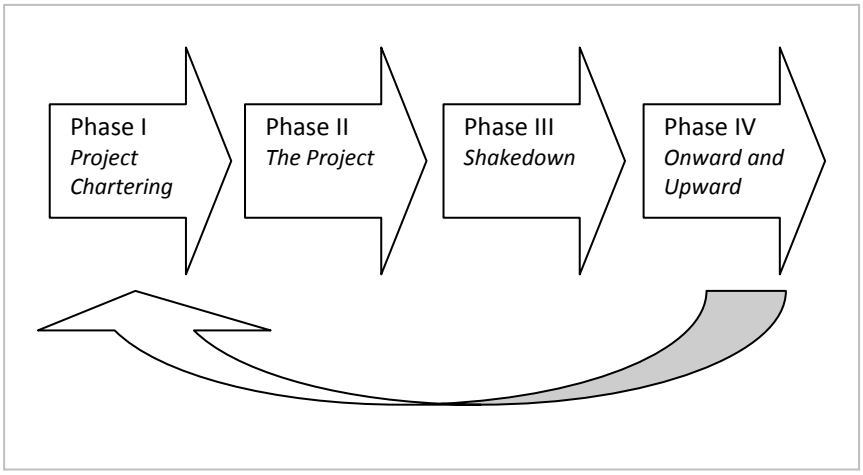


Figure 3. Cyclical implementation notion by Markus & Tanis (2000)

In their view, the implementation process goes beyond the physical introduction of the system at the end of stage 2 (Go Live). Stages three and four will work towards either reimplementation exercises or new implementation initiatives. This is a broader notion of what the implementation process entails (Figure 1).

In another contribution, Parr and Shanks (2000), in their Preparation – Project – Model, focus on the substantial number of significant importance in the entire process. This view can also be found in the work of Teufel and Keller (2000). They describe the significant differences compared with "classical waterfall" approaches of non-packaged information systems.

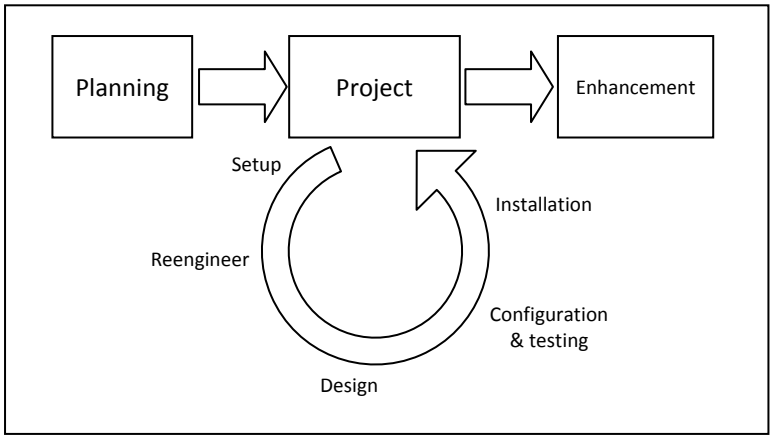


Figure 4 Emphasis on the project stage according to Parr and Shanks (2000)

In the ES implementation domain the emphasis on resources and activities is transferred to the second project stage of the process. In this second stage the main project event is process redesign whereas the system configuration process takes relatively fewer resources than classical coding of non-packaged information systems (Teufel and Keller, 1998). The three stages of the PPM can be described as:

Stage 1 Planning
This stage starts with the envisioning process to adopt an ES. Top management frequently initiates or supports the idea to introduce this type of information system into the organization. External parties use business cases that apply to the organization to explain business. This stage also includes the selection process for the ES vendor and the implementation partner(s). During this first phase, the business goals are formulated including a vision of the system and the adopting organization. Parr & Shanks (2000) describe three different categories that specify the physical, technical, and business scope of the subsequent processes. For an unambiguous definition of the ES implementation process, it is therefore important to be explicit at the start of the implementation process and include this stage.

Stage 2 Project
This project stage covers both the project preparation activities as well as the project execution itself up to Go Live. The baseline project plan as well as project initiation documents are defined. The project organization is selected and set up. This stage encompasses the fundamental redesign and reorganization activities necessary to come up with a formal blueprint of processes and information needs and functionality. The end of this stage is characterized by users training, system configuration and testing, and physical introduction of the system into the organization.

Stage 3 Enhancement
Stage 3 is characterized by an interim period in which the organization catches its breath from the extensive implementation efforts. The error fixing from the first learning experiences after Go Live are the subject. Experiences from system operations are the main input for bug fixing or fundamental redesign of specific flaws. During this stage the adopting organization embraces the new technology if the organizational change process is correctly facilitated during stage 2.

The staged philosophy for the implementation process seems outdated when comparing it with the recent developments in information system design and implementation. In the last decades there have been substantial developments in the domain of system development towards situational-specific, agile approaches (DSDM, RAD, eXtreme Programming) or network-based approaches (Open source, Linux,). These approaches use a substantially different philosophy and management of uncertainties and have shown significant benefits over previous waterfall-shaped methods such as higher system acceptance, better possibilities for participation from the adopting organization, and improved knowledge transfer throughout the project (Fichman & Moses, 1999; Orlikowski & Hoffman, 1993).
Unfortunately, these benefits can only be partially achieved in the specific domain of ES. The current ES technology cannot be used in relation to agile or incremental approaches (Fichman& Moses, 1999) and the ES implementation is therefore forced to be a staged waterfall-like implementation process (Teufel& Keller, 2000). There are variants of this concept such as migration approaches that incorporate site-by-site or module-by-module introduction of the ES. This nevertheless is more like a different breaking up of the structure of work packages into smaller pieces. (E.g. Case 4 in Govindaraju, 2002 pp. 178). The main paradigm behind the smaller work packages still does not reflect the philosophy of agile development. It can be compared with smaller waterfall-based projects one after another that offer both advantages as well as problems.
The learning experiences from earlier system introductions along the project timeline can be transferred, but the final integration achievement of the ES becomes more complicated in comparison with a big bang system introduction.
Prototypes can also to some extent be accomplished by expert ES consultants, but these can only be seen as illustrative to forthcoming end users and as supporting the understanding and design process.

The basic agile principle of the organizational members working with releases, learning, and improving system quality is currently not transferable to the ES domain. The final configuration process for the entire enterprise-wide information system cannot be constructed and configured by these prototype parts. Even in a vanilla type (Parr & Shanks, 2000) ES implementation, this results in a significantly complex integral testing scenario that in normal budget terms is not a feasible solution. Exceptions have shown what a custom developed ES can bring to organizations, e.g. the Dell ES implementation, but these examples are rare (Møller, 2005). The main barrier for the adoption of incremental approaches comes back to the basic concept of the integrated configurable COTS package. This strong dominant aspect influences the course of most ES implementations and prevents truly agile development.

1.3 The problems of ES implementations

Enterprise Systems are organization-wide business information systems that can help entire organizations with their information needs. The ideal situation of one information system as *the* solution without the difficulties of technical interfaces between several functional information systems has increased the popularity of these systems in both profit as well as non-profit organizations. The introduction of such systems is nevertheless a complex affair and 50% of the projects fail (Stefanou, 2001). Exceeding project time and budget, dissatisfied users, and often incomplete systems functionality are just a couple of problems that repeatedly return in yearly implementation studies (Davenport, 1998), some even with disastrous results.
The delay in the SAP-Siebel-Manugistics implementation at Hershey caused a decrease of 10% in its expected earnings (Branch, 1999). Geneva Steel (O'Leary, 2000) declared bankruptcy the day after their $8 million SAP system was implemented. FoxMeyer claimed in litigation that SAP was one of the reasons that ait had gone bankrupt (Radosevich, 1998). It is estimated that at least 90% of ERP or ES implementations end up late or over budget (Martin, 1998). Besides, an equal 90% of ERP implementations fail to fulfil the promise of significant return on investment.

1.3.1 *Financial, technical and organizational issues*

In literature different technological, economic, and organizational explanations for ES success and failure can be discerned (Sarker and Lee, 2003). Technological factors include technical properties (e.g. field lengths, record IDs) that are unsuitable in some organizational contexts (Soh et al., 2000). Software version control and integration with legacy systems is another topic that causes problems during the implementation process (Markus et al., 2000).
The economic factors concern the accuracy and strength of the business case for the ES investment. In the last century many organizations felt motivated to invest in ES to ensure Year 2000 compliance (Sia et al., 2002), to facilitate the introduction of the Euro, or to reduce the business risks of non-integrated legacy systems (Worthen, 2002 and Hirt and Swanson, 1999).

In such cases, the financial and strategic implications of ES implementation did not receive enough attention (Markus et al., 2000).
The last category, organizational issues, is seen as the dominant influence on implementation success (Bingi, Sharma & Golda, 1999; Appleton, 1997) and is also discussed more extensively than the technical and financial issues. This third category, 'organizational issues', in the view of Sarker and Lee (2003) refers to the effects of organizational culture, structure, governance, communication, and conflict between stakeholder groups during the ES implementation process (Krumbholz et al., 2000, Krumbholz and Maiden, 2001, Soh et al., 2000, Scott and Vessey, 2002 and Besson and Rowe, 2001). In most cases, the implementation of an ES requires major changes to the organization (Davenport, 2000; Bingi, Sharma and Godla, 1999; Burns et al., 1991) and a major cause for implementation failures appears to be the fact that organizational issues are forgotten, neglected, or at best underestimated (Appleton, 1997). This is reflected in a 2005 survey carried out among 61 *Fortune 500* companies. Table 2, (Kim et al. 2005) shows the top 5 critical impediments for ES implementation success. Recent research suggests that an ES project team's ability to address these issues, by managing multiple stakeholders with divergent interests, can play a vital role in ES implementation success (Sarker and Lee, 2003). Though we agree with this latter insight, this is only partly a solution to the organizational problems.

Rank	Impediment
1	Inadequate commitment from the adopting organization
2	Lack of organizational change management expertise
3	Resistance of users to working with the new system
4	Conflicts of interest among different functional units
5	Business processes are not redesigned to achieve the full benefits of the ES properties

Table 2 Top 5 critical impediments to ES implementation success (Kim et al. 2005):

It does assume that managing this aspect will significantly contribute to success, but leaves out other contributions. When looking at recent research into these organizational issues, a holistic view seems more appropriate. We will explain this by showing that the organizational issues have become a kind of repository in which a lot of different research efforts have been positioned. This necessarily means looking at the subject from a broader perspective rather than focusing on the management of interests of the different stakeholders. Before further explaining the insights in this rich research field, we will explain why the ES implementation is so strongly related to organizational issues.

1.3.2 *ES implementations drive organizational changes.*

It is important to note that the current generation of ES evolved from technology designed to aid operations in the manufacturing industry (Klaus, Rosemann and Gable, 2000). Still, this software embeds templates of "best business practices" based on a "traditional, hierarchical (and) functional view of organizations" (Kumar and van Hillegersberg, 2000) that limits to what extent the technology can be customized to meet local organizational needs. The vision of most ES vendors even goes beyond that. The essential philosophy behind the Best practices in an ES is to define organizational structure, business process logic, and information needs for the adopting organization. The ES implementation projects are therefore rarely just technical implementations of the software, but instead large-scale transformations that invariably impact business process, organizational design, and human behaviour in the working situation.

Though there are many options for configuring the ES, the business and organizational logic of the ES takes the lead in the redesign process. In practice the amount of customization is limited and the implementation of an ES system more often than not leads to organizational change (Bancroft et al., 1998). E.g. organizations add new process teams or process executives to the hierarchy (Ross, 1998). Furthermore, an ES implementation often results in the standardisation of processes, procedures as well as language. During the implementation, relatively large amounts of organizational and technological knowledge become informally concentrated in relatively few people (Baskerville et al., 2000) who thus gain control over information and processes. The result, centralization, is consistent with hierarchical, command-and-control organizations. However, ES may also trigger its adopter to start a process of decentralisation, by streamlining its management structure and creating a flatter, more flexible and democratic organization (Davenport, 1998). This last example is rarely seen in practice though.

The problem is that many organizations in general fail to take the organizational aspects into account when implementing new technology (Boer and During, 2002), which leads to the so-called 'organizational lag' phenomenon (Damanpour and Evan, 1984) and to, at least initially, suboptimal performance of the system. However, for the introduction of an ES, this aspect is even more important than it is in these other technologies. The organizational impact of the introduction of ES is large and it requires major organizational adaptations in order for the organization to achieve the benefits inherent in such systems. Experience reports from implementation projects frequently state that especially these organizational issues have to be considered more important than technological implementation hurdles (e.g. Sumner, 2000). Nevertheless, during these projects the main focus is on the design activities and correct configuration of the information system itself. This can be explained by the fact that in the majority of ES implementations technical and informational integration aspects, including the redesign of business processes in itself, is a complex affair. The importance of a well-supported organizational change process is widely acknowledged, but topics such as changing social systems, new expected behaviour on the work floor, and the need for different competences within the organization receive the least or no

attention. To summarize, there is a general agreement on acknowledging the importance of the so-called organizational and change management issues in ES implementation literature (Gulla and Brasethvik 2000; Kumar et al 2003; Markus et al 2000). Moreover, people challenges are considered to be more difficult to manage than the technical problems (Kumar et al 2003; Skok and Legge 2001; Aladwani 2001). Yet, in all these contributions the elemental meaning of the organizational impact remains unclear or ill defined. In other words, what then are these organizational issues that are so important? In organizational science different contributions describe the change process induced by new strategic goals and/or technology introduction. Some contributions focus on the different aspects of the organization that are affected during the change process (Leavitt, 1965; Salminen, 2000). Other scholars focus on the change process itself (Boonstra &Vink 1996; Markus, 2004). There is nevertheless a shared agreement that giving holistic[1] attention to the organizational change process is appropriate. A change process thus should always be seen in its holistic form and attention should be given to all aspects of the organization involved.

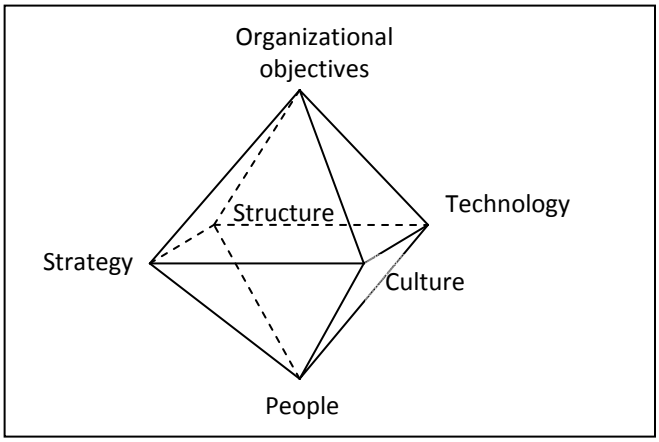


Figure 5.Leids Octahedron (From vdVlist in Boonstra, Steensma, Demenint, 1998)

Figure 5 shows The Leids Octahedron as an aspect model of the organization. The model is a further development of the Leavitt model (1965) by vdVlist (Boonstra, J.J. & Vlist, R. van de (1996) and builds upon the socio-technical school (STS) (Emmery & Trist, 1960). This model pays deliberate attention to the coherent organizational aspects during a change process. Muntslag (2001) continues this line of thought and argues for perception and thus also treatment of the introduction of an ES as a large-scale technology-driven organizational change process. Based on Colthof (1965) and Lievers & Lubberding (1996), Muntslag (2001) divides the organizational impact and the change process into three levels (Table 3). Elements from Figure 5 can be

[1] Holistic means the equal inclusion of diverse aspects of the organization in the organizational change process, e.g. hard aspects such as systems, procedures, but also soft aspects such as culture, values, competences, etc (Dirkx et al. 2004)

recognized in the three levels and are entered between brackets. Strategy and organizational objectives are implicitly embedded in the decision to adopt the ES.

1	**Changes to the business process and systems. (***Technology***)** This level is about the definition of business processes logic and the necessary (technical) systems to support them. This level receives the most attention during current ES implementation practices. From the technical and financial perspective, this will lead to a successful accomplishment on the short run. Such an approach nevertheless neglects the deeper levels of 2 and especially 3. From a holistic perspective, like socio-technical systems theory (STS), it will not result in a successful change process and adoption of the ES. This will have a direct impact on the people and will also have its financial consequences on the long run.
2	**Changes to the organizational structure. (***Structure***)** This level is about the formal definition of the organizational coherence. Adaptations in the organizational structure and role pattern are necessary to optimally utilize the process changes too. The formal role pattern defines authorities, responsibilities, functions, and tasks of groups or individuals in the organization and relationships between them. Current implementation practices pay limited attention to this level, but then even in a deterministic and directive manner. There are situations with minor changes of this level and in such situations these approaches may work, but during the majority of the ES implementations the structure and role pattern are affected significantly. This requires a more participative process and, above all, the necessary changes on level 3 should be taken into account simultaneously with level 2. This will result in higher acceptance of the adopting organization and a smoother adoption process.
3	**Changes to individual and group behaviour in the work situation. (***People & culture***)** This level is about people. It is about new behaviour of individuals both in a group as well as in the personal setting that is required to fulfil their part role in the new business process and the new organizational structure. This new behaviour can only develop if the people are willing, motivated, but also able to learn, develop, change, and act in a new social structure with different colleagues and power structures than before. The adoption and incorporation of new or different competences by the people concerned is of major importance. This requires new skills, at times different values, cognitive schemata, or even attitudes. In the current implementation practice this is implicitly acknowledged and known, but the explicit attention paid to and support to change the aspects of this level is neglected.

Table 3. Three levels of organizational change (Muntslag, 2001; Colthof, 1965)

1.3.3 *A definition of the ES implementation process*

The introduction process of an ES is thus a variant of the staged information systems development model. This variant comes down to the difference between the classical development of software and the configurable ES technology (Keller & Teufel, 1998). System realization in the ES variant means configuration instead of system development. This means that most user influence is not exerted in systems design, but in the (re)design of business processes and functionality definition. Besides, the project is lead by business managers instead of technical managers.

The established ES definitions emphasize the stage model characteristics. They are useful for scheduling and controlling activities in the implementation project and relevant for understanding the sequence of the activities. But this is a general model that only roughly reflects the activities in time. The typical specifics of the organizational change process are omitted in such models, whereas this topic is valued to be one of the most important reasons for implementation failures. ES stage models offer more description than explanation. The descriptions of the various stages do not provide an understanding of the nature of the underlying change processes. Based on the analysis of the implementation definitions and the specifics of ES technology, the implementation process in this PhD dissertation is defined as:

> An ES implementation is a technologically driven organizational change process that requires paying deliberate, equal attention to the technological issues, the financial and project management affairs, but also to the personal development of the participants. The current ES technology causes the implementation process to be staged with a linear dependency between the subsequent stages. The process starts with the decision or envisioning process to use ES technology to improve the organization. This beginning stage determines the characteristics of the subsequent stages in both technology layout and the type of the organizational change process. The implementation process ends when major modifications to the system have been completed and the majority of the organization has accepted the system and is able to work in its new organizational setting. This means the adoption of new working routines, different social interactions, and in some cases new competences and working behaviour.

Figure 6 Definition of ES implementation within this PhD research

This definition perceives the ES implementation explicitly as an organizational change process which distinguishes this definition from other ES implementation definitions (Govindaraju, 2001; Wagner, 2002;). This dissertation follows the line of reasoning that the deliberate attention paid to and equal facilitation on all three levels during the change process brings about a successful ES implementation process including its accompanying organizational change process. The rich, empirical research outcomes show this equal attention paid to the three levels is not the case in practice and, even

worse, that the attention given to the so-called softer or people aspects (Table 3, level 3) is often missing. ES are packaged software applications and the majority of project resources are devoted to outside consultants (Dolmetsch et al., 1998; Oesterle, Fleisch and Alt, 2000). For a typical ES implementation, project costs are broken down into Software Licensing (16%), Hardware (14%), Consulting (60%), and training and other internal staff costs (10%). The consulting part consists mainly of setup, installation and customization of the software. In the next section we will explain how, according to the literature, this approach causes organizational problems and issues.

1.4 An overview of organizational problems during ES implementations.

The previous section explains that the introduction of an ES has a large impact on the organization in all its aspects and that this results in different problems and issues. But what are the current insights into these typical organizational problems in the domain of ES implementations? In literature two main research approaches can be distinguished that investigate these problems (Pozzebon, 2004).

- Variance-oriented research
- Process-oriented research.

1.4.1 *Variance- and factor-oriented research*

A certain number of studies focus on risk and success metrics analysis, sometimes also called CSF (Critical Success Factors) based research. In such studies the implementation process is broken down into very specific variables or factors and their assumed dependencies. The intention of these studies is to identify potential predictors of successful ERP implementation. Due to the newness of the field of research, the majority of the reviewed studies present exploratory research. Studies testing empirical associations between predictors and the desired outcome can rarely be found.

Among the more frequent "outcomes" (dependent variables) are implementation success effectiveness and ERP value, performance, and competitive advantage. In addition, a few studies deal with risk factors (Butler, 1999; Sumner, 2000). Predictors (independent variables) are usually conceived of as factors that vary in degree or intensity (Newman and Robey, 1992). Table 4 gives an overview of some of these factors in the organizational context. One general conclusion from this entire field confirms the problems of section 1.3, the lack of attention given to the organizational change aspects during ERP-implementations.

The basic rationale behind this variance- and factor-based school of thought is that the ex post investigation of a representative number of studies can lead to the prescriptive information on and knowledge of how to successfully manage this change process by critical success and risk factors. But this research domain does not investigate the change process itself and thus also neglects to give any insight into this process. The focus is on '*what'* and '*how to'* seems subordinate.

Dimension	Factors	Authors
People	**Implementation team members:** • Knowledge and skills **Top managers:** • Top management expectations and perceptions • Top management commitment and support • Champion and transformational leadership	Adam and O'Doherty (2000); Baskerville et al. (2000); Bingi et al. (1999); Brown (1994); Markus and Tanis (2000); Markus et al. (2000a, 2000b); Parr et al. (1999); Parr and Shanks (2000); Scott and Vessey (2000); Sumner (2000); Soh et al. (2000).
Implementation	**Management process** • Team building (multi-functional and/or • balanced) • Implementation time and costs	Appleton (1997); Bingi et al. (1999); Markus et al. (2000a); Markus and Tanis (2000); Parr and Shanks (1999, 2000); Parr and Shanks (1999); Bingi et al. (1999).
	Configuration process • Degree of fit or misfit (the gap between ERP functionalities and organizational needs) • Degree of fit to cross functional integration • Degree of customization	Bingi et al. (1999); Krumbholz et al. (2000); Lee and Lee (2000); Markus et al. (2000); Parr and Shanks (2000); Soh et al. (2000); Sumner (2000).
	Mediation process • Software implementer's abilities during intervention (e.g., communication skills) • ERP consultants competence • Nature of process of knowledge transfer	Adam and O'Doherty (2000); Appleton (1997); Bingi et al. (1999); Krumbholz et al. (2000); Markus et al. (2000); Swan et al. (2000); Soh et al. (2000); Sumner (2000).

Table 4. Variance-oriented lessons and ERP implementation factors based on Pozzebon (2004)

The basic idea behind such CSF-based findings is based on functionalistic research paradigms and assumes relatively simple cause-and-effect relationships between independent and dependent variables.

It is questionable whether the complex change processes that take place during the ES implementation can be captured with this perspective. However, this does not mean that this research area is worthless. It may well provide clues to important areas and aspects, but a combination with process-based research helps get a more holistic and sometimes clearer picture. Van de Ven (1993) has provided good examples of complimentary logic, describing how the different dimensions obtained by surveys and interviews (to identify *if* and *what* changes occurred) can be complemented by real-time observations (to understand *how* these changes occurred).

1.4.2 *Process-oriented research*

The factor-based research discussed in the previous section is mostly ex-post quantitative research. Another group of researchers investigates the implementation process from another research perspective. The focus in this field is on empirical case studies and/or action research in which different aspects of the change process are described (Besson& Rowe, 2001). Sometimes special research approaches are employed, such as Actor Network Theory (ANT) (Hanseth & Braa, 1998), narrative or ethnographic research approaches (Wagner, 2002), interpretative hermeneutics (Bondarouk, 2004), and longitudinal case studies (Volkoff& Strong, 2002). Based on an extensive literature review by Pozzebon (2004), three main patterns can be recognized in process-based research on the ES implementation process. Patterns 1 and 2 are mainly concerned with explorative and descriptive research contributions of the implementation process. In pattern 3 both descriptive and prescriptive contributions can be distinguished.

Pattern 1: ERP implementation as a cognitive, knowledge transfer, or learning process	*Pattern 2: ERP implementation as a social and political process*	*Pattern 3: change management and implementation approaches*
• Knowledge management (Baskerville et al., 2000; Chan, 1999; Klaus and Gabel, 2000; Lee and Lee, 2000) • Cognitive change process (Brown, 1994) • Organizational learning (Scott and Vessey, 2000; Robey, et al. 1995; Schimmel, 2007) • Theory of culture perspective (Krumbholz et al., 2000)	• Social-technical (Alvarez, 2000; Stewart et al., 2000; Taylor, 1998). • Social shaping (Clausen and Koch, 1999; Koch, 2000a, Swan et al., 2000). • Political approach (Adam and O'Doherty, 2000; Brown, 1998; Hislop et al., 2000; Koch, 2000b).	• Empirical researched implementation approaches (Scheer et al. 2003, Taylor, 1998, Aladwani, 2003) • Conceptual implementation methods (Stender, 1999, Alleman, 2001; Sieber et Nah, 1999, AlMashari 2003)

Table 5 Three patterns in process-oriented ES implementation research based on Pozzebon (2004)

1.4.3 *Pattern 1. Learning and knowledge exchange*

In this pattern specific attention is paid to the aspects of learning and knowledge transfer during the ES implementation. The ES implementation can become a learning challenge for the adopting organization. Important to this challenge is the knowledge transfer between the implementation partner (ES vendor and/or ICT consultants) and the adopting organization (Robey et al. 1995). In the majority of the ES implementations this leads to a dialectic change and learning process in which opposite forces are competing and the change process develops depending on these forces. (Robey, Ross & Boudreau 2002). The adopting organization is aware of the current working practice and performs its daily routines using its own cognitive schemata and values. The implementation partner, on the other hand, possesses the ES-specific package knowledge and ideally helps co-create future working practices and the configuration of the supporting information system. One important problem during this process is overcoming the knowledge barrier between these two different groups, which is caused by the different perceptions of the situation, different backgrounds, and sometimes even different goals during the implementation process. Though this phenomenon has been described extensively in the perspective of system development and requirements engineering (Rolland &Prakash, 1999; Slooten, 1995), the significant impact on the organization complicates this knowledge transfer process. It now goes beyond defining new system functionality and the support of new working routines.

> *ERP implementations typically require organizations to replace large portions of what they know, not only about technical infrastructures but also business processes. The implementation in that sense can be understood as a dialectic of learning* (Robey et al. ,2000)

The majority of the research contributions use the organizational learning concept (March and Olsson, 1975) as a way to overcome the knowledge transfer barrier. Robey et al. (1995) show fundamental differences between reengineering and learning (Figure 7), but argue for the integration of these concepts by encapsulating learning *and* making it an explicit part of the reengineering process. Schimmel (2007) describes measures to overcome knowledge barriers throughout the implementation process.

The general research outcomes show that organizations that put effort into formal training programs achieve significantly higher success rates of their ES implementation than organizations that spent almost no effort or budget on formal training. The latter are confronted with difficulties in overcoming the knowledge barriers and assimilating change. These results are not surprising, but also show a rather narrow perception of the learning concept to encounter knowledge and change barriers. The contributions in this pattern consider training and learning in a rather functionalistic perspective (Ang et Lee, 1997)

Point of Comparison	Reengineering	Learning
Root Metaphor	Mechanism	Intelligent Organism
Starting Point	Clean Slate	Current Memory
Nature of Change	Radical, Discontinuous	Incremental
Methodology	Quantitative	Qualitative
Risks	Damage and Death	Reversion to Old Patterns
Blind Spots	Implementation, Acceptance	Methodology for Change
Role of Information Technology	Primary Enabler of Redesigned Processes	Enabler and Disabler of Learning

Figure 7. Comparison of Reengineering and Learning as Metaphors for Organizational Improvement (Robey et al. 1995)

From change and learning literature, it is known that a combination of various methods contributes to the learning achievement. For example, action research and situated learning are two methods that in addition to formal training can even increase learning efficiency and help crossing knowledge barriers.

The contributions in this pattern can thus give specific insights into the knowledge exchange process during the ES implementation process. But they are too specific to describe or facilitate the organizational change process in its entire form (the blind spots in Figure 7 show some of these explicit deficits). Learning in change literature is perceived as one important contributor to the change process, but the change and learning process cannot be treated as one and the same (Beer, 1980 ; Beer & Walton, 1990; Schuiling pp 56, 2002). The cognitive and functionalistic perspective on learning can certainly contribute to knowledge growth and possibly changes to cognitive schemata. But an organizational change process is also about structural, social, and behavioural changes (Beer, 1980; Beer & Noria, 2000) that require different instruments and approaches than the rather functionalistic learning approaches from this pattern.

The above analysis is only one of the limitations in this pattern. Another perhaps even larger problem is the focus on mainly explorative research. Most frameworks or models describe the knowledge transfer phenomenon and show the dynamics in the phases of the implementation, but a prescriptive approach to overcoming the knowledge barriers and shape the learning process is scarce in this field (Figure 8).

There is nevertheless recent research that has resulted in predictive knowledge and also widens its perspective to include both the cognitive as well as the social aspects of learning and knowledge transfer (Bondarouk, 2004; Limburg, 2002). Bondarouk, based on Kolb's learning cycle (1981), enhances and introduces a group learning approach to increase the successful adoption of IT artefacts whereas Limburg, based on Munford (1983) and Greenbaum & Kyng (1991), emphasizes the group collaboration process and participative design mechanisms as a fruitful change and learning method during the design process.

Contribution	Knowledge	Source
Organizational learning model	Descriptive	Ang et al. 1997) Robey et al. (1995
Knowledge Transfer perspective	Descriptive	Lee & Lee 2000, Boudreau et al, 2000 ; Souder, Nashar et al.1990 ; Bancroft, Seip and Sprengel 1998 ;Haines & Goodhue, 2003)
Knowledge integration in ERP implementations	Descriptive	Pan et al. 2001
Social learning model	Explorative / Descriptive	Wassenaar & Katsma (2004)
Double loop learning model	Explorative / Descriptive	Stein &vd Bosch (1996)

Figure 8. Learning and knowledge transfer contributions

It is expected that these insights are partly applicable to the specific properties of the ES implementation process. But a more thorough investigation is necessary to confirm this and adapt these approaches.

Concluding pattern 1.
The contributions in this pattern very specifically focus on parts of the behavioural issues during the change process (level 3 in Table 3). The contributions from this pattern can be summarized as follows:

- The research in this field is mainly explorative and descriptive.
- A substantial part uses organizational memory theories or the organizational learning concept to describe the complex process of knowledge transfer between the consultants and participants of the adopting organization. Though these contributions give an insight into how these processes develop, they mainly focus on the cognitive aspects and treat the change process as primarily a cognitive learning effort. This does not specify new behaviour in the working situation and different social interactions between people. It is thus a narrow application of the issues in level three of Table 3.
- The listed theories assume a functionalistic perspective on the change and learning process. This line of reasoning can be easily combined with the current ES implementation approaches (figure 3), but current insights from organizational science have shown multidisciplinary approaches to be more effective with more successful outcomes of the change process (Beer & Noria, 2000)

Figure 9 Main research output of research pattern 1

1.4.4 *Pattern 2. The social and political change process*

Literature that can be classified in this pattern emphasizes the typical dynamics of the change process from the structural, social, political, or power perspective. It focuses on the organizational and social aspects of the changing organizational system during the implementation process, the role technology plays in this process, and how the different stakeholders perceive and undergo the change. In this pattern a few sub streams can be distinguished:

A first approach in this field focuses on the behavioural level, (third level in Table 3). It expands the mainly cognitive learning experiences, discussed in pattern 1. These contributions emphasize the different organizational structures in which people are expected to be working and specify the stages needed to embed and facilitate this structural change. Based on the innovation thinking of Rogers (2003) and the I-space concept of Boisot (1995), Wassenaar & Katsma (2004) define a social-learning cycle in which each stage of the ES implementation process is characterized by having its own social learning dynamics, needing its own situational-specific approach. The idea behind this model is to combine the change initiatives on the structural (second) as well as the behavioural (third) level (Table 3) by putting emphasis on social and situated learning in each stage. In a comparable model, Besson& Rowe (2001) continue the 'motors of change' (van de Ven& Poole, 1990), and specify four different perspectives on the change processes that evolve during the four different stages of the ES implementation (Markus & Tanis, 2000). For example, in the "project phase," designers tend towards either an engineering (Besson& Rowe, 2001) or to a rational actor point of view (Markus &Robey, 1988).

A second large portion of research contributions focuses on the different social structures that emerge when an ES is adopted. In most cases organizations intentionally adopt an ES because of the fundamental organizational changes that will take place due to the system introduction (Boudreau &Robey, 1999). These changes not only occur on a cognitive level (the main research subject of pattern 1), but structures, coalitions and social interactions between people of the adopting organization also change. This so-called social shaping perspective on the implementation process seeks to understand the relationship between structuring organizations and the ERP implementation. In this field it is about identification of occasions for negotiation (Clausen and Koch, 1999), examination of the internal political process and power structures (Koch 2000; Swan et al. 2000).

The implementation process described in pattern 1 from the learning and knowledge transfer perspective here is perceived as a collaboration process between different actors that together shape a new organizational structure. The work of Volkoff and Strong (2002, 2004) focuses on the social process of negotiating and designing between project team members. Typical topics such as negotiations, boundary spanning during the implementation process, or the typical project roles (Volkoff& Strong, 2002) and project formats Robey (2000) are discussed by these scholars. Not only the people involved but also the system is perceived differently as an important

and sometimes even dominant actor (van Stijn, 2006; Braa & Hanseth, 1998). The introduction of the ES then is regarded as the introduction of a rather forced new organizational infrastructure.
A merely critical approach creates awareness, but on the short run will not help improve the track record of ES implementations. The current ES technology is inherently associated with enforcing new organizational structures. When organizations explicitly choose ES technology, they should accept the accompanying necessary changes on this structural level together with all its effects on different social interactions and power structures. This shows the importance of acknowledging the power of the ES itself. In that sense the different theories for resistance (Markus, 1983) must be perceived in a slightly different perspective than is done with standard information systems. The ES enforces social structures and the influence of participants is reduced. This does not mean that the implementation process is a directive one-way affair, but it is important to acknowledge these influences and how they work out on the design and learning process. Markus discerns three resistance theories:

1. People-determined,
2. System-determined,
3. Interaction theory.

Her work shows that education (described in pattern 1, 1.4.3) and participation have positive effects on people-determined resistance (1). The system-determined resistance (2) takes a special place in the field of ES implementations. The adaptability of ES is significantly lower than best of breed or custom-developed business information systems. Therefore, the possibilities to pay attention to this resistance type and create acceptance are limited. It is the interaction theory (3) that is of special importance in pattern 2. It shows user participation is not necessarily appropriate in all cases, but should be adjusted to the specific situation. It stresses the importance of accomplishing the restructuring process at best simultaneously with, but always before, system introduction; this train of thought is also found in Boonstra & Vink, (1996). Last but not least, the relationships between implementation partner and users have a major impact both on the system definition but also on the new organizational structure. A critical over thinking of the ways of working and implementation methods is appropriate according to Markus. The perception of the participants not only stems from the structural changes themselves, but more from how the process is shaped and managed. It is therefore necessary to use insights from organizational science and define ways and approaches to support this change process. Implementation methodologies should not only pay attention to a thorough analysis of system content but also to the entire organizational setting the system will be introduced into. In effect this has great consequences and can contribute to the learning and knowledge transfer theories in pattern 1.

Concluding pattern 2

From the above it can be concluded that a significant part of this literature describes the phenomena of changing social and power structures (level 2, Table 2) due to the special characteristics of the ES technology. The contributions in this pattern can be summarized as follows:

- The contributions in this field mainly consist of explorative and descriptive research.
- A part is aimed at enhancing the cognitive-based research from pattern 1. It explicitly values the contribution of this cognitive perspective, but also mentions its limitations. A real integration between these two patterns is not achieved or only at a rather explorative or conceptual level.
- A substantial part takes a critical research perspective on the IT implementation process and urges to be aware of how the IT artefact and ways of working during the implementation process dominates the shaping of organizational structures. These insights are valuable, but also require further thinking about and development of implementation approaches. The inherent properties of current ES technology require a deliberately attuned change process also aimed at these structural changes (Level 2, Table 3).

Figure 10 Main research output of research pattern 2

1.4.5 *Pattern 3. ES Implementation approaches and methodologies.*

The previous sections on patterns 1 and 2 typically describe organizational problems or parts of it during the implementation process. But is there a clear cause for all of these problems? Or is it the combination of relationships between the problems as described in these sections?

The first assumption tends more towards the variance- and factor-based research as described in section 1.4.1 and assumes rather simple relationships. In the perspective of the second assumption it is nevertheless interesting to question the current change management practice. How is change management currently embodied in the implementation practice? Is no attention being given to this aspect at all or are things being managed improperly? Parts of these questions are also answered by literature from patterns 1 and 2, but from very specific perspectives, mostly resulting in descriptive knowledge. Pattern 3 distinguishes itself from the previous ones in two ways, first by using the experiences from information systems development (Checkland, 1991; Baskerville, 2001; Walsham, 1983; Rolland, 1995; Avison& Fitzgerald, 2004) and project management research. Secondly, in pattern 3 first attempts are made to produce prescriptive knowledge on how to manage the implementation process.

Implementation partners and/or ES vendors have been developing implementation methodologies in which change management has an important place. But a further inspection of the used change management practice, including its tools and methods in the perspective of current insights from organizational change literature, raises some questions and leaves room for discussion.
Based on the BPR and process modelling experiences, Scheer et al. (2003) present an integrated change management and process-redesign approach. In this work the extension of the ARIS toolset and the process approach to change management results in a design-based project management approach in which ARIS is the leading method to manage the change process through project and process management. This approach is dominated by information and communication plans in order to prepare for the introduction of the ES. But these communication and training programmes are unbalanced in their composition and suffer from the same problems as described in pattern 1 (section 1.4.3). Only a relatively small number of participants from the adopting organization receive extended training programmes about the ES and process modelling in the early stages of the implementation. The dominant part of education and training is spent on system use and the functional impact of the system on the end users (Mahapatra and Lai, 1998). These training programs are moved to the end of the implementation process shortly before the actual system introduction.

In the similar work of AlMashari (2003), a process-oriented change model is derived from empirically based evidence. Nevertheless, this change approach is a collection and listing of "*do's"* and *"don'ts*" in the classes strategic management, project management (process improvement and ERP deployment), and change management. The model does explain how to act and how to achieve the effects from the lists. This is presented rather implicitly. Aladwani (2001) takes the same fundamental perspective but stresses a different focus. The approach that is used is mainly based on the foundations of Organizational Transformation (Porras and Silver, 1991). There are resemblances between the ES implementation process and this top-down change philosophy that aims at strategic and transformational changes of organizations. But OT pays less explicit attention to bottom-up competence development and learning of the participants involved.
In the work of Aladwani, which cannot be compared to an elaborated method, different change management strategies are listed. These strategies mainly aim at helping top management and creating a change approach in order to overcome resistance and motivate key and end users. Resistance is seen as a blockade for successful implementation or as unwillingness to change. This perspective is under debate and recent insights show resistance should not be seen as an impediment preventing the process to continue, but as signals and potential critical sources for the organizational members (Boonstra, 2000). These members often have a good argumentation for being dissentient. To cope with resistance by push-oriented communication and the organization of information fairs cannot be compared with a deliberate dialogue in which different participants *really* have their say.

This also requires a more problem-oriented approach rather than the solution-oriented approaches as currently is the case. A way of working that tends to this line of thinking is the combination of BPR and socio-technical design applied in the context of ES (Taylor, 1998) This approach explores the application of STS (social technical systems), with its local participation in organization design, to a centralized and autocratic application of BPR and SAP enterprise-wide software. This concept is a step in the right direction, but the application of STS in this work is still rather deterministic. Later insights have shown the deficiencies of this 'classical' appliance of STS (Scarborgough, 1995) and further research insights developed substantially. One of the main arguments against classical STS is the merely design-based approach used to define both technological artefacts but also the softer human and social aspects. Especially the latter aspects should be embedded in a more interpretative manner (van derZwaan, 1990).

Some scholars in IS literature explicitly argue for this aspect in conceptual change approaches in the ES context (Stender, 1999, Alleman, 2001; Sieber et Nah, 2000). The latter scholars, based on the improvisational change model by Orlikowski& Hofmann (1997), describe a conceptual change model for ERP implementations. The main argument of this approach is the combination of the ES implementation's critical success factors and a further specification of the three types of change from the Orlikowski and Hoffman model. Stender (1999) uses the experiences from incremental CRM implementations to describe a conceptual incremental ERP implementation methodology. Alleman (2001) follows the same route from agile development and extreme programming experiences. The fundamental problem with all three contributions is their conceptual status. None of these three concepts move beyond the conceptual stage and none have been further developed into sound and proper methods or tools, let alone that empirical insights are available.

The problems described in this pattern can be said to result from one primary rationale behind the ES implementation process. In the present change management perspective during ES implementations, both the technology and the organization itself are primarily seen as things to be designed, i.e., as being completely controlled by and a product of human activity.
This mono-perspective can be compared with the line of reasoning of some literature on how technology changes the world, for example technological determinism, which holds that the development of technology follows its own logic and that the technology determines its use (Winner 1977). Contrary to these concepts are social reductionism or constructionism (Woolgar 1991), which hold that society and its actors develop the technology it "wants" and uses it as they want, implying that technology in itself plays no role. Although the application of social constructionism has been fruitful in the domain of organizational change (Boonstra, 2000), it seems that ES implementation partners are either not convinced of this paradigm or don't know it exists.

Recent publications do not show a change in the use and perception of the typical 'design approach' or functionalistic paradigm in practice. There seems no room for new ways or finding a balance between both extremes. As Chae (2001) describes empirical data on an ERP implementation:

> *"The case revealed that management had neglected the complexity of organizational change and reinforced rigid organizational changes without considering many human factors. Still, many managers and leaders view an organization as an "economic" system and information systems as "technical systems" or "appliances."*

There seems to be a logical explanation for the current use of this approach of technological determinism. From the beginning period, ES implementations have been associated with complex project structures and large investments. The projects are met with tightly engineered project management approaches in order to limit uncertainties and increase control, or at least the perception of both topics. The high number of failing ES implementations that have been described has not resulted in a search for different approaches. The disappointing figures on exceeding budgets and project duration in the last decade, including unexpected outcomes and the lack of predicted benefits, have led to the desire to(over)manage and control ES implementation projects even more than before.
This can be compared with first order learning, in which no alternative paradigm is put to the test to overcome the problems met over and over again. So, although scientific research clearly reveals the problems, the answer of practitioners is exactly opposite. One elegant example is the concept of rapid or flash ES implementations that has become rather fashionable (Shields, 2000). The main idea behind this concept is to significantly accelerate the implementation process and although certain accelerators may result in effective design sessions and cooperation, it will not result in personal development or increase of competences. These phenomena take time (Schein, 1987; Schuiling, 2002).

Concluding pattern 3
A significant part of the literature in this pattern describes the current change management practice during ES implementations. This change management practice is based on project management in which the introduction of the IT artefact plays the dominant role. The introduction of a change management approach that also aims at developing people's social, learning and change capabilities during the ES implementation process may contribute to a more successful implementation of the information system. But this requires a different change approach, one that incorporates various facets of the change process (Table 3).
The contributions in this pattern can be summarized as follows:

- The proposed approaches mostly stem from other IS domains and a 1:1 transfer from these concepts to the ES domain is not possible,
- The change management practice in these methodologies is best practice-oriented from earlier implementation experiences and it focuses on the investigation and management of critical success factors, resistance and risks.
- The number of theories used from the organizational science domain in these contributions is limited and not appropriate to fully support the aspects from patterns 1 and 2 in the organizational change process.
- A significant number of proposed models that tend to agile ways of working remain on a conceptual level.

Figure 11 Main research output of research pattern 3

1.5 Analysis and formulation of the research problem

Generally speaking the impact technology has on people is large and our current society seems to put more and more energy into creating technology and thus being dependent on it. Some philosophers see technology as the current means to free ourselves from the historical omnipotence (Nature, God) and in this way achieve control over our lives or the perception of it (Sloterdijk, 2000). The majority of organizations in both the public as well as the commercial domain have currently been adopting or planning to adopt large-scale information systems that integrally support the daily routines of the people involved. The introduction of these ES's has an essential and great impact on this daily work, the necessary competences, required behaviour, and the social interaction between the people.

If we agree on especially valuing the technological artefact, it goes without saying that the adoption of such a technology by people should at least also deserve its time and attention.

Nevertheless, during the introduction of this type of technology, also called the ES implementation process, the human factors are currently only taken into account to a minor extent, but the predominant focus is on the correct and rigorous introduction of the technology and its accompanying functionalities. Although extensive research has shown that the sometimes called 'softer' part of the implementation process is neglected, the number of attempts to introduce deliberate methods, interventions, time and space for both organizational change and technical design during the ES implementation is rare. There is a large knowledge base of various insights into organizational affairs during ES implementations. Upon one aspect all contributions agree: the successful outcome of the ES implementation depends heavily on the organizational change process that takes place during the implementation.

This is quite surprising considering how long scientists and practitioners have been struggling with this topic. Although the topic organizational change is acknowledged as critical in the implementation process, the change management strategies and approaches presented in this domain are mostly without a well-established foundation from organizational science or sometimes they are at a very conceptual level. The thoroughly researched contributions are luckily in the majority in this domain, but these contributions paint both a rather fragmented picture of the organizational change and learning process and also mainly provide descriptive knowledge. It seems that IS researchers continually shift their attention to new and fashionable topics in a world in which emergent IT-based innovations are overwhelming.
This does not lead to corroborative knowledge, but, even worse, does lead to the repetitive reinvention of concepts and descriptive empirical evidence. Klein asks for the identification of core problems or subjects persisting in emergent research topics (Klein, 1999). We agree with his vision that although the consequences of technology use are always situated and emergent, this does not mean that each situation involving technology use is completely unique. On the contrary, because problems and solutions associated with the same technology tend to be recurrent, patterns can be recognized (Orlikowski, 2000). Pozzebon (2004) elegantly summarizes this phenomenon with regards to the ES field:

> *What is happening with ERP research is illustrative of what has been troubling the advance of the IS discipline as a whole: a general dissatisfaction with the existing lag between practical concerns claimed by practitioners and normative knowledge produced by academic research (*Pozzebon, 2004)

The knowledge that has been created in the three described patterns is only a piece from a complex puzzle that can be solved when looking more holistically at the implementation process. The holistic notion means organizations are complex entities and the investigation of its parts can explain its behaviour only to a certain extent. A holistic view treats the organization as a whole to determine how the parts behave. In the organizational change domain this led to the adoption of systems thinking and the application of the so-called systemic notion on organizations.
Based on this idea the implementation process is to be considered as a technologically driven organizational change process not only focusing on either cognitive aspects of the knowledge transfer process, or on the power and politics relationships between the participants (patterns 1 and 2).
Souderet all, 1990 state that implementation is a continuing, complex process of human interactions. It is necessary to broaden the focus from a mono-functionalistic approach (based on formal training and cognitive knowledge transfer) to a process of dialectic change during which simultaneously cognitive, social, and behavioural competences will change and receive attention.

In other words, the knowledge and organizational memory bias should be seen in a broader context of social, affective and cognitive aspects that the organizational members will reframe overtime. These are the typical characteristics of a holistic view on the organizational change process in which learning and knowledge transfer play their parts.
Summarizing sections 1.2 until1.4 it can be said that:

- The majority of the contributions argue that there are substantial problems during ES implementations with regards to the organizational change process and the human aspects in particular.
- One part in literature concerns mainly explorative or descriptive research and adopts a cognitive perspective on the change and learning process during the ES implementations
- A second somewhat smaller part of the literature takes a critical, emphasized, but again merely descriptive, research perspective on the social and structural parts of the organizational change process. This literature is mostly supported with sound theories from organization science and often takes a hermeneutic research perspective.
- The prescriptive research in the field of implementation methodologies is the smallest in output and mostly results in propositions or conceptual frameworks or models. It is conceptual and in a small number of cases well-supported with sound principles from organization science.

A continuation of the work in one of the three patterns towards more detailed insights is not appropriate. This will only increase the fragmentation and create partial knowledge of a problem that is holistic by nature. It is argued that the organizational change process is a complex and versatile affair that should be approached accordingly (Beer & Walton, 1990; Beer, Eisenstat & Spector, 1990; Boonstra et al., 1998). Based on this line of reasoning, two main research issues can be derived from these four conclusions :

I. The integration of patterns 1 and 2 in this specific field is scarce although established research results from the organization science domain are available that argue for addressing both aspects during the organizational change process in a coherent way.
II. The total amount of sound prescriptive research beyond the conceptual level is limited, although both scientists and practitioners encourage these contributions.

Based on the conclusions and research issues, the objective for this dissertation is:

> *To design a change approach that fits the current ES implementation practice so that it contributes to a successful organizational change process of the adopting organization.*

This research objective can be subdivided into three main themes. These research themes are the main topics that this PhD research contributes to with its knowledge and research output.

1.5.1 *Current ES implementation practice*

The IT/IS domain is a swiftly changing research field, induced by swift innovations and rapidly changing business models. This also applies to the ES domain in which new technology enters quickly. On the other hand, this domain also displays the same stability and repeatability phenomena as described by Orlikowsi (2000). Technology may drive new innovations, but some fundamental phenomena keep repeating and only the context in which these phenomena appear seem to change (Klein, 1999). This research acknowledges the above line of thinking. It also pays attention to Pozzebon's (2004) appeal for performing persistent research and diminishing the gap between practitioners' needs and the scientific urge for renewal. Therefore, this PhD research aims at creating an approach that fits the current implementation practice by investigating its generic organizational change and project management principles, the feasibility in the field, and, last but not least, the practical relevance. This objective is realized by the creation of a typology of different ES implementation types and the assessment of their practical validity.

1.5.2 *Change approach*

Sections 1.2 to 1.4 explain the perspective on the ES implementation process. The importance of perceiving the implementation process as technologically enabled organizational change process was stressed. This research continues this perspective and combines it with the significance of the current implementation practice described above. The implementation is mostly executed by an implementation partner. This partner supports the adopting organization during the several stages of the project with specific expertise on implementation approach, process and organizational design, system configuration, and other related activities. These partners mostly come from ICT solution providers, consultancy industry or some ES vendors themselves.
In most cases the implementation partner uses an implementation methodology. These methodologies present a full package of methods, project management approach, several templates, instruction and training material, and a variety of tools. The current implementation practice is dominated by the use of such methodologies.

This research will not start from scratch and create a completely different and new implementation methodology. In the current implementation practice these methodologies have proved their worth in the design process, the tasks for system configuration, and the support for project management.
The main pitfall is the insufficient facilitation of the organizational change process in such methodologies and their employment in practice. Therefore, the main focus of this dissertation is on the organizational change aspect during the implementation process and the creation of a sound and practical approach that fits these methodologies and their use in practice. This can be realized as both the scientific as well as the professional field of organizational change have formed an extensive body of knowledge. Different scholars in the previous decades have already transferred research outcomes to or even harmonized them with the field of technological innovation and IT implementation (Rogers, 2003; Boonstra & Vink, 1996; Limburg, 2002; Bondarouk, 2004).

1.5.3 *Successful organizational change*

To define a successful organizational change we will use the three-level characterization of a technologically induced change process in Table 3 (pp.25). The realization of a successful organizational change process will include all three levels. To specify these three levels we will use existing concepts from the organizational change domain. We will elaborate on these specifically in chapter 2 and 3. The main foundations of the change approach include:

- The concepts from organizational development (French & Bell, 1995; Lewin, 1952; Cummings & Worley, 2005)),
- The increase of competences, personal development and change capabilities (Schuiling, 2001, Boonstra, 2006),
- The creation of a new social and formal organizational structure (Beer & Walton, 1987, Mastenbroek, 1987)
- The adoption and acceptance of the information system (Rogers, 2003; Venkatesh, et al. 2003) together with its new ways of working and related organizational roles by its organizational members.

Based on these concepts, a successful organizational change process in this research is defined as:

> *A change process in which the organizational members increase their change capabilities and competences, feel convinced and motivated about the new social interactions, report the perception of a successful change in the organization, and express their support for the enterprise system including its accompanying ways of working and the organizational structure.*

1.6 Research questions and research approach

The research objective can be broken down into three research goals:

1. Generating descriptive knowledge from organizational science and technology implementation literature on the organizational change process in the specific situation of the ES implementation process.
2. Generating prescriptive knowledge of applicable change approaches, interventions and methods during the ES implementation process
3. Generating evaluative knowledge of the change approach in practice, including its effects

1.6.1 *Research Questions*

To generate this knowledge and guide this PhD research process towards its objectives, the following research questions will be answered:

1 What theoretical and empirical knowledge can be derived from IS literature, the organizational science, and the organizational change domain in particular, in order to develop an integrated change approach for an ES implementation?

The following sub questions will be answered as part of the main question:

- What is a relevant characterization of ES implementation methodologies that can be used as analysis and design instrument?
- What current knowledge is available on the interaction between technology implementation, the ES implementation process in particular, and the competence development of groups and individuals .
- What practical change approaches, interventions and change methods from the organizational change domain are relevant to the typical dynamics of the ES implementation process?

2 What is a relevant and feasible change approach that fits the current ES implementation practice and implementation methodologies?

The sub questions that support the specification of the main question are:

- What are the degrees of freedom in the current implementation practice and implementation methodologies?
- What are the criteria for introducing and integrating interventions or change methods in the generic implementation methodology or vice versa?
- What is an effective way to introduce a change approach as organizational change practice in the current ES implementation practice?
- What are validated instruments to assess the organizational change process and its outcomes?

3. How does the change approach function in practice and what adjustments can be made based on these practical experiences?

The following sub questions help answer the main question:

- What are the effects of the application of the change approach?
- What are the typical and relevant events during the change process?
- What are general outcomes to define a generic applicable change approach?

By answering the first and second research questions, this PhD research combines two objectives into a preliminary change approach. By answering the last research question, evaluation and improvement of the approach is aimed at. How the researcher will go about and act during the investigation process is defined by the research approach. In the next section an in-depth discussion and explication of the used research perspective, methods and instruments can be found.

1.6.2 ***Research Approach***

At the core of each research lies the knowledge it will produce. In science there are different roads to finally delivering insights and knowledge and it is the conscious and sound approach of creating this knowledge that separates science from experiences passed on by craftsman and artisans. The quality of scientific research depends on relevance and rigor. Relevance tells us about the applicability of the produced knowledge and its effectiveness. Rigor tells us whether the knowledge product is obtained according to scientific rules and criteria (Van derZwaan, 1990). The different roads tell us how the researcher has come up with the knowledge product, i.e. the approach used, research methods, the assumptions made and the founding paradigm.
The debate on research paradigms is inextricably connected with science and thus this debate will endure. In this section we will try not to reiterate this discussion or parts of it, but clarify how this research is executed and how it can be placed in the perspective of paradigm, methodology and research methods.

The ambition for this dissertation is to create practical, applicable knowledge of a specific problem. *To facilitate the organizational change process during a specific technology implementation*.
In sections 1.3 and 1.4 we have elaborated on the problem domain and explained the objective of creating an approach that can help practitioners cope with these problems. In order to create this approach, this PhD research is a design study. The founding assumption behind this objective is that it is possible to create such an approach and that practitioners will benefit from it in practice.
Different research methodologies can be found in theory to create a design. These methodologies make implicit or explicit assumptions about the nature of the world and of knowledge. Since Kuhn (1970) particular combinations of assumptions are often called paradigms.

According to Kuhn, paradigms are ways of seeing the same things differently, or of seeing the world differently. Kuhn's original work was in the natural sciences and assumes that paradigms generally succeed one another. In the social sciences, Burrell and Morgan (1979) alternatively construct a set of antithetical paradigms that can exist simultaneously. Although the ideas of Burell & Morgan (1979) are still used widely in both the social sciences as well as in the IS research domain, there is a debate about the antithetical basis of their typology (Klein and Myers 1999).
In this debate different propositions are postulated, discussed and further explored. For example, the deliberate exploration of the borders between the antithetical paradigms is advocated, the introduction of new or alternating paradigms, the extension of the number of paradigm's (Blaikie,1991) is debated or even the rejection of the entire paradigmatic thinking is discussed. In our opinion, this last approach is extreme and unfavourable. A deliberate application of paradigm thinking sometimes also enables depicting phenomena sharply. One should nevertheless always be conscious about this application and see paradigm thinking as simply one possible looking glass. Different perspectives may reveal unnoticed phenomena or relationships and therefore should be used complementarily.

Much of the design research in the IS field is based on the positivistic paradigm. There are also other approaches that are based on other paradigms (SSM Checkland, 1981; Checkland & Scholes, 1990), ETHICS (Mumford, 1983), and Multiview (Avison& Wood-Harper, 1990). Some see these methodologies as belonging to the interpretative paradigm (Oates Briony J, 2006). There are nevertheless others, including Checkland himself, who question this classification (Rose, 2002). When asked, he viewed the soft systems methodology as being part of critical realism. This already makes clear that even sometimes dedicated research methodologies are interpreted differently and therefore used differently by researchers. Hevner et al. (2004) argue for using two paradigms in IS-based design research. The foundation of their research approach differs somewhat from the former paradigmatic classifications. According to Hevner et al. (2004) design science is about 'what is effective' and behavioural science about 'what is true' (Hevner, 2004).
Good and applicable design research in their point of view uses the insights from both the design paradigm as well as the behavioural paradigm. In our opinion the addition of the behavioural paradigm is already a valuable contribution to IS design research, forcing researchers to look further than some would do. Nevertheless the prescribed dualistic thinking between exactly these two paradigms also has its weaknesses and an adding other paradigms and research method(ologie)s in our opinion is appropriate. This line of thinking is shared by a group of researchers who do not want to be bound to one specific research paradigm and use multiple research paradigms within one research effort (Galliers, 1995, Landry and Banville, 1992, Lee 1991). For example, in 1985 Lyytinen and Klein argued for the combination of the hermeneutic and empirical-analytic traditions. This school of researchers proposes a more situational-specific selection and disconnects research methodology from one paradigm. This line of thinking is continued by Goles & Hirschheim (2000) and Mingers (2001).

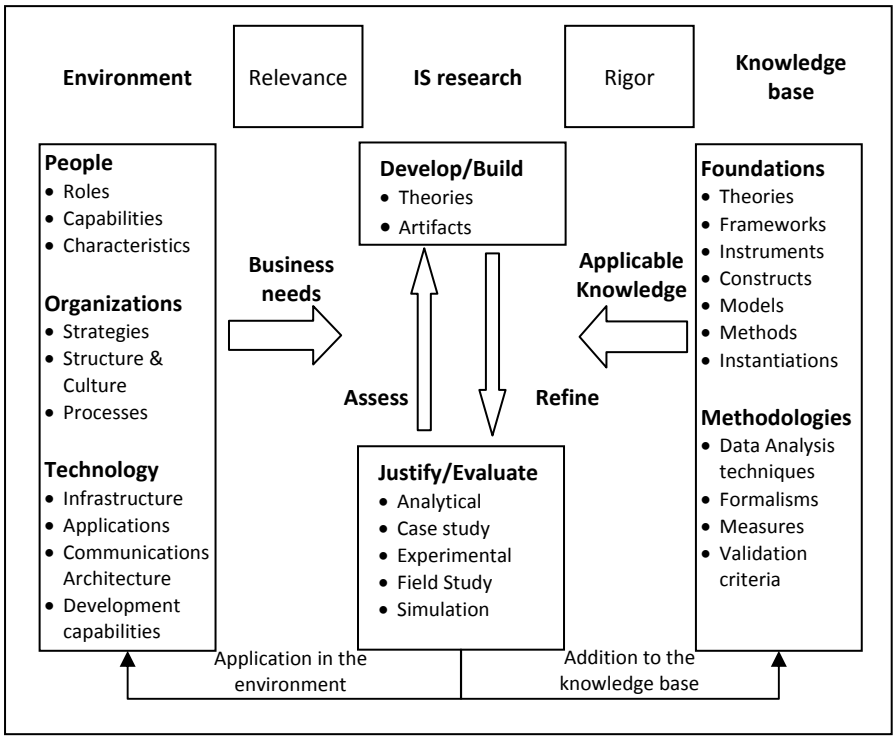


Figure 12 IS research framework (Hevner et al. 2004)

This deliberate 'paradigm spanning' is also the basis of Weick's sensemaking theory (1995). Weick argues that researchers may 'alternate' ontologically - on the issue of fluctuating or alternating between paradigms.

> *Rather than advocating a single paradigm, be it interpretive or positivist, or even a plurality of paradigms within the discipline as a whole, it suggests that research results will be richer and more reliable if different research methods, preferably from different (existing) paradigms, are routinely combined together.* Mingers (2001)

In this view research methods (especially from different paradigms) focus on different aspects of reality. Therefore, a richer understanding of a research topic will be gained by combining several methods. For example, the use of quantitative data need not imply the acceptance of a positivist, objectivist epistemology. Rather, such data can (and should) be interpreted in the light of relevant social meanings, and their production as a social construction. In another perspective Nau (1995, p. 47) refers to the Tripp-Reimer study (1995) and shows how qualitative questions can be used to add to the quantitative ones. Qualitative and quantitative methods can be combined and may provide complementary data sets, which together give a more complete picture than can be obtained using either method singly.

From our own experience this is an appropriate line of thinking and a valuable addition to the dualistic thinking of Hevner et al. (2004) for design research.
Besides, in our view the problem statement of this research requires this multidisciplinary approach to generate the objected knowledge. Or to use Trauth: *"what one wants to learn suggests how one should go about it"* (Trauth, 2001: 4).

1.6.3 ***Multimethod design research***

The above ideas explained above leave some room for the researcher to deploy different methods and approaches. Though on the one hand this clarifies its strength, on the other hand this also characterizes one of the major pitfalls for design research in our opinion. Different research methods tend to be more useful in relation to some phases than others, so the prospect of combining them has immediate appeal, but a format or structure can guide the researcher towards its goals. Therefore, in our search for an appropriate research approach, taking into account the prior explained insights, we state two main requirements:

i. The approach should offer sound and scientifically accepted guidance in order to produce relevant knowledge using rigorous research methods,
ii. The approach should not be directly bound to one specific research paradigm and leave room to use the appropriate method during the different stages of the research methods scientifically.

From different incremental and cyclical research approaches we select the regulative cycle (Van Aken, 1994, 2004; van Strien, 1986) as basic research foundation and combine this with the evaluation research cycle (Swanborn , 1999) The combination of these research approaches suits practice-based learning and scientific knowledge generation.

The regulative cycle has proven its effectiveness as a design research instrument to researchers, but also leaves room for the researcher to fit the appropriate research methods to his needs. According to van Aken, the aim of design-oriented research is developing knowledge for the improvement of social systems (Van Aken 2004). This knowledge is developed from an actor's perspective, i.e., via clinical interventions in the social systems under investigation.

The evaluation stage greatly resembles the induction stage from the empirical cycle (de Groot, 1961; van Aken, 2004). Nevertheless, there are also fundamental differences between these two approaches. One characteristic aspect of the empirical cycle is that the researcher is a spectator who is not a part of the problem being studied by being personally involved. This implies that there is a separation between the researcher and the research object. The regulative cycle aims at intervening in practice by an approach in which the focus is on solving or helping a problem in a particular situation. This means the researcher and the problem situation mutually interact. Embedded in the regulative cycle, we deploy the three-tier evaluation cycle of plan, process and product evaluation (Swanborn, 1999; Hullscher et al. 2003).

We will use different research methods in the different stages to arrive at the ambitioned knowledge level. In the following section we will describe the methods for each stage. In the individual chapters, the detailed conception of these methods will be further disclosed.

1.6.4 *PhD outline "Research methods in the regulative cycle"*

This dissertation will proceed with eight chapters. The chapters can be positioned in the regulative cycle. Figure 13 shows the different chapters of this dissertation. It positions the research questions in the cycle and shortly explains each chapter's contents.

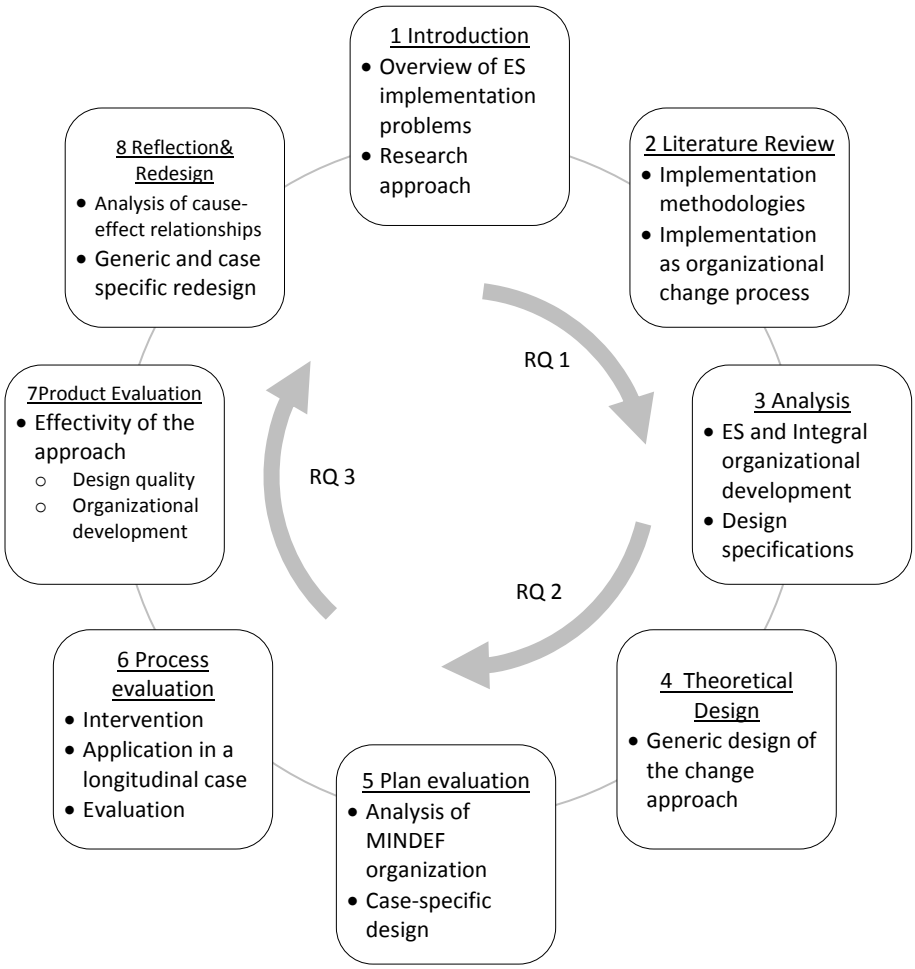


Figure 13 PhD outline in the regulative cycle

Research question one (RQ1) will be answered by an extensive literature study in a nested approach. First the current implementation methodologies are analysed using a generic model from ISDM literature. The ES implementation methodology model (ESIMM) is adapted to the specific setting of ES. The outcomes of this analysis are put into the perspective of an in-depth analysis of the change issues phrased in sections 1.3 to 1.4. Next, the lacunas of present implementation methodologies and the latest developments in organizational science are investigated on their applicability in the specific situation of the ES implementation process. The combination of both research outcomes results in a delineated foundation for a change approach that fits the current relevant ES implementation practice.

The second research question (RQ2) is a logical continuation of the outcomes of the first research question and will be answered in chapters 3, 4 and 5.
By analysis and deduction, the specific deployment of applicable change interventions in the specific domain of the ES implementation process is investigated and explicated. The analysis is based on the three layers of the ESIMM; *philosophy, framework, and methods and instruments*. In Chapter 4 first a generic design is derived for the change approach.

Chapters 5, 6 and 7 include the application of the designed change approach in the case setting of the Dutch Ministry of Defence. The chapters are based on the three-tier evaluation model of Swanborn (1999), defining plan, process and product evaluation.

I. **Plan evaluation** concerns the ex-ante devising or designing of a single intervention or approach in order to realize a specific objective in an organization. This form of evaluation is primarily carried out by the analysis and deduction of theory or applicable concepts combined with the analysis and charting of the specific case setting
II. **Process evaluation** concerns the assessment of the deployment of the approach or intervention. This can be done during the process itself or ex post and it mainly includes the qualitative description and explanation of the process. The differences between the intended process and how it actually is deployed are explicated, together with the unexpected events and side effects during the process.
III. **Product evaluation** concerns the ex-post evaluation of the effectivity of the approach or intervention(s). This is mostly deployed using both quantitative and qualitative research methods.

In chapter 5 plan evaluation is applied by first investigating the MINDEF organization and the case-specific implementation setting. Chapter 5 results in the MINDEF specific design of the change approach.

The last research question (RQ3) will be answered by deploying the process and product evaluation. During a longitudinal case study in the MINDEF organization, the designed construct is applied in practice. Chapter 6 focuses on the process evaluation, whereas chapter 7 includes the product evaluation. In chapter 6 the change process will be observed and charted by focusing on how the change process is organized and managed, and how participation is organized. This chapter will also describe the use of interventions and methods and explicate contextual factors. Chapter 7 explicates the outcomes of the case study and focuses on the quality of the designs and the organizational development, specified for different participating groups. The used research methods in this case are action research, participant observation, document inspection, questionnaires and interviewing. The detailed deployment of these research methods is clarified in chapters 6 and 7 respectively.

The final answer to the third research question is given in chapter 8. First the findings from chapter 6 and 7 are combined in an analysis of the relationships between the change process and the outcomes in the perspective of the deployed change approach and the influence of the case-specific context. This outcome is accompanied by the evaluative analysis of a sounding board group with specific members from the case organization in order to assess the employment of the approach. Based on these combined findings the change approach is adapted and enhanced. Chapter 8 concludes with the distinction between the redesigned conceptual approach and case-specific recommendations for the further deployment in the MINDEF process. Chapter 9 rounds off this dissertation with concluding remarks on the research and further recommendations.

2. The ES implementation process in the perspective of organizational change

---No problem can be solved within the same consciousness which created it---

Albert Einstein

2.1 Introduction

The main objective of this chapter is to collect relevant knowledge from both IS and change literature and to create a sound foundation for the ES*i*OD change approach. This foundation is arrived at step by step in 6 sections, which are presented in Figure 14. In order to scrutinize the issues sketched in chapter 1 and specify the organizational problems in the current implementation practice a set of implementation methodologies is analysed. In scientific research current comparisons of ES implementation methodologies are lacking.

Therefore first a generic implementation methodology comparison framework is developed in section 2.2. This model, called the ES implementation methodology model (ESIMM) is presented in section 2.3. This section features a comparison between methodologies and an in-depth analysis of their change lacunas. Together with the findings from chapter 1 this gives an elaborate insight into the facilitation of the change process in the current implementation practice and the use of its accompanying tools and techniques. Based on these results section 2.4 creates a foundation for the enhancement and adaptation of these methodologies. It gives an overview of different change theories and strategies that can be used in the specific domain of ES implementations.

In order to structure the findings from sections 2.3 and 2.4 a typology of ES implementations is arrived at in section 2.5. This typology characterises three distinct ES implementation types classified according to different organizational change aspects. Each type theoretically matches a distinct change strategy.

The three types are assessed on their scientific and practical relevance in section 2.6. Based on these findings the philosophy and ideas behind the ES*i*OD change approach round off this chapter. This marks the first design specification and further shapes the main foundation for the analysis part in chapter 3.

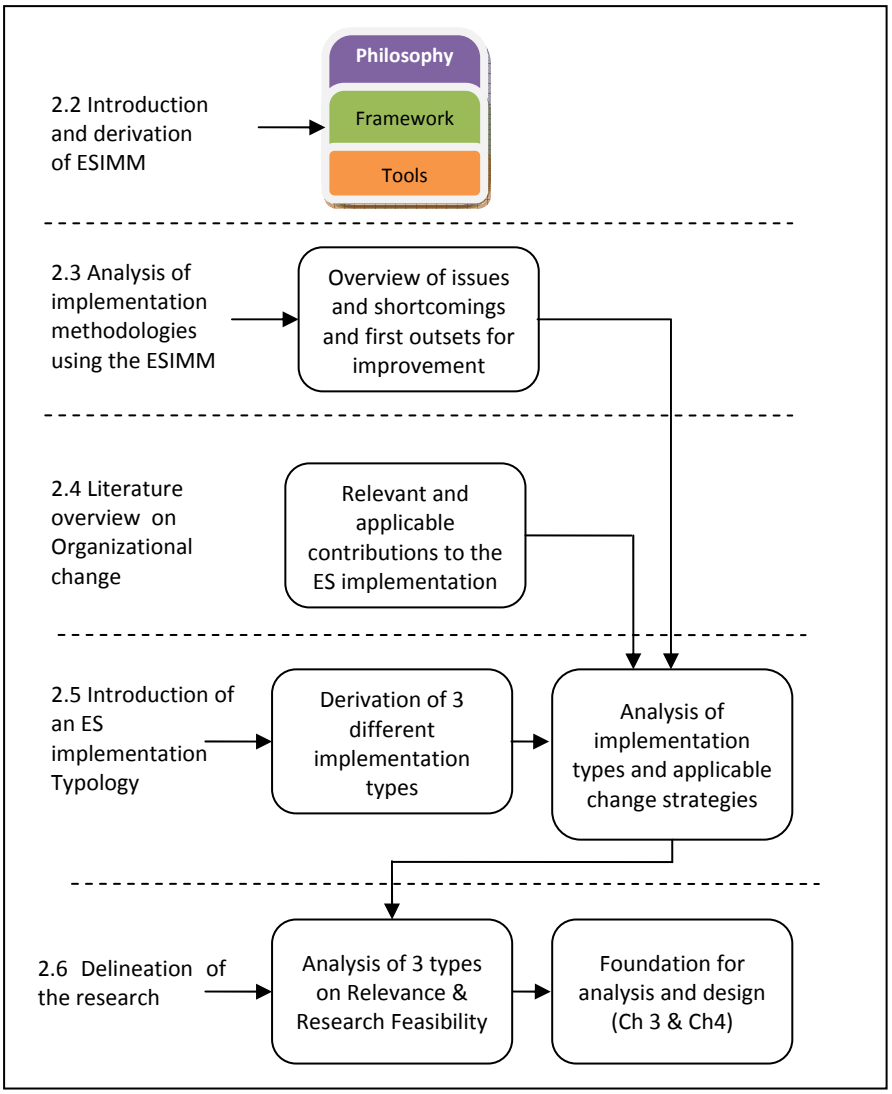


Figure 14 overview of main elements in chapter two

2.2 A generic ES implementation methodology model (ESIMM)

Only few of the more than a thousand brand-named information system methodologies (Jayaratna, 1994) are applicable to application software packages (Nilsson, 1999). During the rise and development of Enterprise Systems its vendors and substantial consulting organizations have been simultaneously developing a portfolio of methods, tools, practices, etc. This has resulted in the creation of complete implementation methods, or methodologies as the vendors call them.

A few commercial examples are :

- Value SAP (SAP AG, 2005)
- Deliver (2004, Cap Gemini)
- Fasttrack (2000, Deloitte & Touche)
- Applications Implementation Methodology (Oracle, 2003)

Sometimes the methodologies that aim to facilitate the different activities during the implementation process are computerized to a high degree. These applications for example include an automated “dashboard” that enables the users to navigate through the entire methodology and start up methods and tools accompanied by an extensive knowledge base or central repository.
The implementation methodologies significantly influence the actual accomplishments of the ES implementation process, how specific activities are executed, and, thus, the specification of the subsequent stages (Estevez & Pastor, 2000). In the IS field extensive research is available on methods and methodologies, but the specific characterization of or comparisons between ES implementation methodologies is scarce in literature. The major body of ES literature seems to concentrate on the description of the ES implementation process and not so much on the used methodologies themselves. Some comparisons between implementation methodologies (Estevez, 2001) and only a handful of in-depth studies of one specific implementation methodology are available (Hedman, 2003). Yet this knowledge base is too small for a thorough comparison between ES implementation methodologies. A generic framework is needed for such an investigation. This model should be able to analyse present implementation methodologies on the specific degrees of freedom in design and project management, as well as on the organizational change deficiencies. The next section investigates the way of working and the outcomes of the implementation process by looking into ES implementation methodologies. The investigation specifically focuses on the support to and facilitation of the organizational change process during the ES implementation.

The terms “methodology” and “method” are used inaccurately within the IS domain. Both terms are repeatedly interchanged in literature as well as in practice, but their meanings differ fundamentally. A method is subordinate to a methodology and consists of a well-defined sequence of elementary operations that more or less guarantee achieving certain outcomes if it is executed correctly (Hirscheim, Klein & Lytinen 1995). The methodology enriches the method with a specific perspective on reality also called the philosophy. In line with research methodology a good definition of this notion in the perspective of the IS field can be found in (Avison & Fitzgerald, 1995):

> *"A methodology is a collection of procedures, techniques, tools and documentation aids .... will consist of phases, themselves consisting of sub-phases. But a methodology is more than merely a collection of these things. It is usually based on some philosophical view, otherwise it is merely a method, like a recipe" (Avison & Fitzgerald, 1995)*

In the IS domain the use and creation of methods and methodologies (Tolvanen 1998, van Slooten, 1995) as well as comparisons between several methods and methodologies are research subjects (Wynekoop & Russo, 1993; Avison & Fitzgerald , 2006; Wijers, 1991 Jayaratna, 1998; Aydin, 2006; van Slooten, 1995).
In this latter field different approaches are used to explore the concept of methodology in the specific domain of information systems development. Most scholars in this field create a classification or framework to describe and analyse the fragments of a methodology in a logical order. This way of working can be recognised in the work of Aydin and Harmsen (2002), Avison and Fitzgerald (1995; 2006), and Wijers (1991). The body of knowledge coming from these scholars and their contributions are a relevant and applicable research instrument for the analysis of and comparison between ES implementation methodologies. The generic classification format enables the further elaboration of the ES specifics. Figure 15 shows the generic ESIMM used in this dissertation. The basic structure of the framework stems from the work of Aydin en Harmsen (2002). Their model is a continuation of the work of Wijers (1991) and situated method engineering (Van Slooten, 1995) and it creates a methodology from three elements; philosophy, framework and tools. Each methodology can be represented by these three elements. Each element in Figure 15 is extended for clarification purposes using the analysis aspects of the work of Avison and Wijers.

In order to investigate a methodology the elements can be analysed separately, but the methodology to a large extent is also characterised by the interactions between the three. The three elements can be described as:

Philosophy
Philosophy is the principle or set of principles that underlie a methodology. These principles form a set of assumptions and constraints that together make up the way this model depicts reality. The philosophy therefore is most important for the way the activities will be conducted. This aspect can be found in for example the work of Hirschheim, Klein & Lytinen (1995), IIvari, et al. (1998) and Goles & Hirschheim, (2000).

Framework
The framework shows how the assumptions and boundary conditions set by *Philosophy* are realized. It encompasses different aspects. Way of working or practice structures the tasks and defines participation. For each phase or increment it explains the accompanying activities and how results can be achieved, e.g. in a waterfall or spiral model. Controlling is about project management and organizes cost, resources, scope, quality and progress control, planning, and monitoring. Scope specifies the extent of the project. It defines the start and finish of the process in time and the distribution of the number of stages. And finally framework is also about outputs that specify the deliverables to be produced during the phases.

Tools

A methodology consists of several instruments, tools, methods or method fragments to support its practitioners and to deploy the framework (Aydin, 2006). They are used to accomplish the various activities and to deliver the outputs of the framework. This third layer of ESIMM defines how the practitioners are supported by characterizing the tools in its objectives, but also in its product nature. This may include physical documentation, software-based tools, training courses, online help, etc. An important aspect of the tools is the deployment of several models or modelling techniques to support the diagnosis and design process.

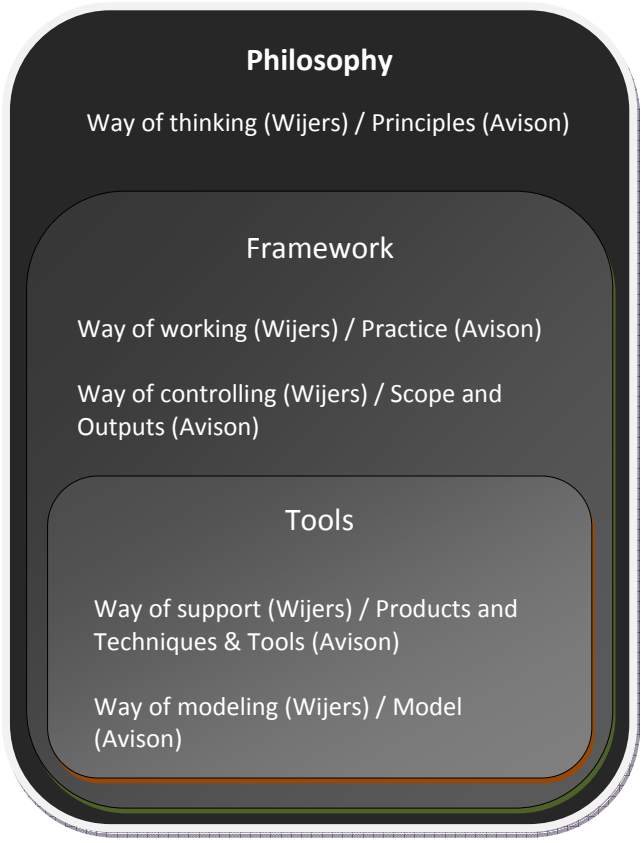


Figure 15 Implementation methodology framework (ESIMM)

2.3 Analysis of current ES implementation methodologies

The analysis of commercial implementation methodologies, using the framework from Figure 15, is based on literature study and explorative research by the researcher. In the IS field comparable contributions (Pastor & Estevez, 2002;) and in-depth analyses of singular implementation methodologies in particular can be found (Daneva, 2003; Gulledge & Simon, 2005; Hedman, 2003; Fleisch et al, 2004; Hedman, 2003; Borell & Hedman, 2000; Kirchmer, 1999). The following methodologies from this literature review are elaborated upon: AIM (including its predecessor Compass), Summit, Method Blue, Fasttrack and Value SAP/ASAP™. The explorative investigations concern two commercial implementation methodologies, Value SAP/ASAP™ and Deliver (Including its predecessor PER). The presentation of this analysis is separated using the three principal layers of the ESIMM: philosophy, framework and tools.

2.3.1 ***Philosophy***

Philosophy
Framework
Tools

←*Way of thinking and principles*

The ES implementation methodologies, like most IS development methodologies, can be placed in the functionalistic paradigm (Goles & Hirschheim, 2000). The methodologies can be described as being technically oriented and have as their main goal creating a sound design and installing a technological artefact in a user organization. ASAP, which functions as archetype for almost all other ES implementation methodologies, is based on socio-technical principles (Hedman, 2003; Daneeva, 2003). Nevertheless the application of these principles is mainly deterministic and the focus is on a design-based employment of both the technical system and organizational or contextual factors. No explicit attention is being given to the development of peoples' social skills, change capabilities or competences. Let alone that an explicit rationale is formulated to strive for attitude or behavioural changes in the working situation of the participants. From a philosophical point of view none of the methodologies take the perspective of a self-critical development process (critic rationalism) or offer room for an interpretative perspective on the organization, its members and the technological artefact. In all the methodologies the main bias is on this last determinant and a deterministic, objectivist perspective (Burell & Morgan, 1979) is chosen to redefine and recreate the new social system around the new technology. The outcome of the analysis on the philosophical level presents us with a strange paradox:

A substantial amount of IS development methodologies lately focuses on a merely constructionist application of socio-technical or agile/incremental principles. These methodologies are mostly used in implementations with a limited impact on the organization and respective organizational change processes.
ES implementations on the other hand are accompanied by more rigidly and deterministically employed methodologies, although extensive research shows that exactly these implementations have significant impacts on organizational structure, social interactions, culture and behaviour.

2.3.2 *Framework*

Philosophy
Framework
Tools

←*Way of working, Way of controlling, Outputs and Scope*

The investigated ES implementation methodologies are structured by a staged time and activities format. The methodologies use waterfall-shaped staging comparable to the classic Systems Development Life Cycle (SDLC) (Grenci & Hull, 2004). All investigated implementation methodologies borrow heavily from generic project management methodologies like PMbok or Prince, which have evolved from the IS implementation domain in general (Cadle & Yeates, 2008). The methodologies embrace a functionalistic approach to planning and monitoring of cost, time and quality (Metaxiotis et al., 2005). This can be seen in the detailed description of tasks, outputs and timing in prescriptive elements like deliverables, work packages, yardsticks, milestones, time boxes etc. The detailed assigning of activities to stages especially results from the extensiveness and the complexity of Enterprise Systems. Entire implementation projects or programmes are divided into a number of smaller dependent projects. The part project scope is then decreased until individual projects can be completed and overlooked within a limited period of time. The investigated methodologies divide the stages differently. This essentially comes down to a difference in the number of stages and a slightly different way of embedding the activities and deliverables in these respective stages. Nevertheless the overall division of activities and deliverables does not differ much between the investigated methodologies.

In the investigated methodologies the use of scope and outputs is also similar, as the defined deliverables do not differ substantially from one another (Estevez en Pastor, 2002). In the investigated methodologies scope focuses on an efficient selection, design and definition, and introduction of the ES. The methodologies emphasise the amount of activities and outputs that are related to the project phase (Figure 4). The typical operations management of the ES during its operational life after Go Live receives only minor support from the implementation methodology. This also holds for

the envisioning or package selection stage. The latter seems logical as most methodologies come from ES vendors or are constructed on these methodologies.
Change principles do appear in the scope of the methodologies, but these items are not elaborated upon equally as the definition of the information system and the management of the projects' course. In the perspective of the organizational change process the methodologies remain rather unclear about the scope, deliverables and relating activities as well as the development of capabilities and competences. In the view of the methodologies these deliverables can be limited to the understanding and acceptance of process and system knowledge. It is assumed that the waterfall-shaped staging fits training, education and communication activities best to accomplish these goals. The methodologies focus on knowledge exchange in a 'schoolish' push setting, whereas little attention is given to feedback loops or the creation of collective learning and development. This lack of attention is also caused by the linear organization of activities and ways of working according to the waterfall model. Table 100 (Appendix, pp. 482) gives an overview of the general terms for the activities and outputs as they are defined in the different implementation methodologies.

Way of controlling
The methodologies adhere to the distinction between planning and controlling and clearly separate a steering board or committee from a project team. The steering board includes the initiating sponsor or executive that gives formal instructions to start up the project, a senior counterpart from the implementation partner(s), and possibly senior (line) managers from the affected departments where the ES will be introduced. In all methodologies the project manager is not formally part of the steering group or committee, but is responsible for the daily project management affairs during the implementation. Way of controlling is mainly focused on management by exception. The steering committee is asked to decide on project or programme deviations from budget, time or scope in case of substantial deviations or escalations. The steering committee also formally approves the closing of stages and initiation of subsequent stages throughout the project.
The investigated methodologies thus substantially orchestrate the realization of changes. Changes are biased towards requests for change in budget, scope or project time. At first a separate group or authority often called the change authority makes these changes. This groups is able to make minor changes without interference of the steering committee. Then again the latter is responsible for substantial or far-reaching changes. These concern mainly functional or scope changes and do not facilitate the human aspect of the organizational change process throughout the project. This is a formal instrument in the change process and does not really encourage innovative ideas and organizational learning during the implementation process.

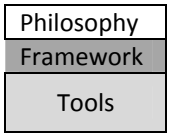
Way of working
The staged project management rationale also significantly influences the participation principles. Installing different teams, possibly divided into subgroups or task groups, is suggested by all methodologies. Extensive participation or end user involvement is limited.

The so-called key users are selected using at times blurry criteria. There is no or only limited assistance for assessment of participants in the methodologies. Most user involvement is mainly focused on information system and business process definition. This results in a low number of actual participants together with a low level of participation influence (Passmore & Fagans, 1992).
The involvement of the organizational members in the broader *organizational* design is limited. The elicitation of possible organizational impact or issues is realized by risk management that takes an important position in the methodologies in the perspective of scoping and controlling. Risk assessments help investigate especially resistance, acceptance and expected knowledge problems (Aloini et al., 2007). This is a direct influence of the adopted *philosophy* in these methodologies.
The focus of most methodologies is on cost, time, and return on investment (Atkinson, 1999) or even the reduction of project time and the cost of implementation (Metaxiotis et al., 2005).
The methodologies offer no activities in which end users can actively participate to suggest specific organizational issues or plan the implementation process itself. The significant number participants that should embrace the new system and its new organizational format receive their training shortly before the real change takes place. This way of working offers little possibilities for experimental learning and reflection. This is a missed opportunity when taking into account the extensive time and resources invested in the project.

Concluding
In the perspective of *framework* the organizational change process is never of primary importance. The technical design decisions as well as business/economic drivers are most important and it is assumed that the organizational issues or impact will follow. How to accommodate to these issues or impact is left to the adopting organization or eventual external change experts. Value SAP explicitly focuses on covering the complete cycle of project management business analysis and information system definition. It explicitly chooses to leave out the methods and instruments for change management. This is also observed in other methodologies. The explicit rationale behind this decision is to let change experts cover these aspects and introduce their own methods and principles. This at first seems a just decision in the perspective of 'Cobbler, stick to thy last', but it cannot defend the missing holistic or integrated approach to the IT-driven organizational change process (Markus, 2004). Besides, in practice the ES implementation methodologies divide and rule to adopt an effective project management approach in which a lot of change initiatives are either disregarded or left out completely due to time issues (Dolmetch et al., 1998).
The sensitive aspects of the change process are thus not dealt with in the methodologies. This deployment of *framework* shows great resemblances to the planned and top-down directed Organizational Transformation (OT) or a functionalistic deployment of socio-technical design (STS). The explicit formulation of the necessary outputs and the appropriate room for the activities to realize the change process is omitted though. STS and OT literature itself argues for the facilitation of this change process by defining activities and outputs as well as the necessary instruments and

interventions (Porras & Silver, 1991). Nevertheless the ES implementation methodologies seem to embrace these change philosophies, but fail to offer the time and activities. How this is carried out is explained in the next section, which presents the methods and instruments that the investigated ES methodologies include.

2.3.3 *Tools*



← *Way of modelling, Way of support, Products, Techniques & Tools*

The investigated methodologies offer a wide variety of methods. A distinction can be made between stage-specific tools and tools that can be employed during the entire implementation process. The basic rationale behind the use of tools in the methodologies is that they assist in the creation of multiple representations of the current (IST) and the future situation (SOLL).. Tools exist in different forms such as handbooks, templates, simulations, and in many cases specific applications or software.
The tools can be simple and accessible to non-professionals, but an large number of tools and instruments is complex and requires either professionals or training for the involved laymen. Creating an exhaustive list of all tooling within the investigated methodologies is outside the scope of this research. By classification and deduction an overview of the generic classes of tools that can be found in most implementation methodologies is presented in Table 101, Appendix pp. 482). This overview also shows the direct relations to the activities and outputs in the related stages (Table 100).

For the project stage (Figure 4) the toolsets focuses on facilitating the redesign activities. The project management toolset (templates, handbooks, etc.) that dominates all stages during this stage is accompanied by extensive design tools, mostly embedded in collaborative applications (shared modelling tools and workspaces). The way these tools and techniques are modelled is focused on three main topics:

- Process-based analysis of the business events in the organizations
- Charting architecture and legacy systems
- Elicitation of relevant information and data analysis

The emphasized business process perspective can also be recognized in the aspired products. The aspired products from the redesign stage are a portfolio of different types of process models accompanied by a limited set of data models. Products that define the organizational aspects are limited to skill descriptions and organograms depicting the new organizational structure. The latter charts are often accompanied by future system-defined authorizations and roles. Roles are directly linked to the necessary skills of the organizational members. The skills in this context focus on the interaction with the information system. The way of support in the investigated methodologies concentrates on a competent project organization in which external

consultants add ES-specific knowledge and prior project experiences. The internal project members are supported by organized training sessions or training on the job with external consultants as their counterparts. The explored topics are general knowledge on information system development projects and the specific broadening of skills in process redesign and deployment of design methods.
Change management support by external consultants is suggested in all methodologies. There is nevertheless a significant difference in the amount of detail on how this change support is defined compared with the staffing and knowledge requirements of Enterprise System specific consultants. The main focus is on managing the information system definition project, whereas change management is merely seen as a helping minor aspect.

This phenomenon can also be seen in the investigated methodologies dividing their tools into three generic categories: project management (i), (re)design (ii) and OCM (iii). The first two types give a great amount of detailed specific methods aimed at very specific tasks. The first typical PM tools that return in all investigated methodologies are business case development methods, Gannt & PERT tools, Plan boards, Critical path analysis methods and risk management aids.
The second redesign category includes business Process analysis and design methods, information analysis tools, Architecture analysis, ES configuration methods and ES test systems. Almost all methodologies group the third category under the name of OCM (organizational change management). An in-depth analysis of the OCM toolsets explicates how they relate to *framework* and *philosophy* (Table 6).

Tooling included in this category embraces training and communication material, workshop templates and prefab questionnaires to detect potential change issues. In most methodologies the specific OCM approach or toolset is implemented as risk management or risk mitigation tools. In for example Value SAP, the OCM manual states: "*OCM activities are only recommended if directed at a clearly measurable risk"* [VSAP02]. This rationale behind the organizational change process is in line with the previously stated functional paradigm in *philosophy.* In most methodologies this is called a planned change effort. Nevertheless this cannot be compared to the Planned change concept of Kurt Lewins' theories on change.
This is a planned, prescriptive and practitioner-centred approach that heavily relies on foundations from behavioural science (Burnes, 2000; 2004; Dunphy and Stace, 1993). Most investigated methodologies depend on STS, but the appliance of these principles comes down to the design of the organizational aspects as though it is the design of mere technological artefacts. This is a direct influence of the adopted functionalistic *philosophy* behind the methodologies. Several authors in the field of organizational science criticize this 'classical' appliance of STS (Zwaan,1990; Boonstra, 2000). The OCM methods deploy a one-size-fits-all approach including its accompanying methods. These are top-down, planned, coercive and measurement-based in the way they handle change. An investigation into the implementation type or organizational impact including the appropriate adjustment of the change approach and its methods is not available in the methodologies.

Methodology	Change Approach	Tools & interventions ready for use	Knowledge transfer	Support for Behavioural change
Value SAP/ASAP	Social Technical Systems theory (STS)	• Organizational Risk management • Templates, Presentations • Training documentation • Questionnaires	• Education & Training on ES and project characteristics for project team and limited functional end user system training	Not available. Referred to external partner
Deliver/ PER	STS	• Communication plans • Training plan • Questionnaires • Risk assessment • Town hall meetings,	• Education & Training on ES and project characteristics for project team and limited functional end user system training	Not available within the methodology itself. Reference to change methods from consultancy company itself
Compass/ AIM	STS	• Town hall meetings, Web cast demonstrations • Presentations • Newsletters	• (N.a)2	Not available. References to company itself
Fast Track	Organiza-tional Transforma-tion (OT)	• Change • readiness assessment, Risk assessment • Leadership, commitment program, • Organizational design, policies and procedures, performance measurements.	• Training and Documentation (Needs assessment, training design and delivery for project team, management, end-users, operations, and helpdesk. • Scripting of end-user and operations documentation	Not available. No explicit references

Table 6 Main findings of OCM methods in implementation methodologies

[2] Insufficient material was available for this methodology to make a comparable analysis on this aspect.

2.3.4 *Conclusions*

The ES implementation methodologies influence the dynamics of the implementation process significantly. They plan time and course according to the staged classic waterfall approach. The methodologies offer a well-conceived range of design methods as well as project management approaches. The methodologies are very clear about their implementation course and the choices of tools depending on ambition level and technical specifications. But all investigated methodologies lack a conscious attention and support for the organizational change process.

On the one hand the methodologies offer a rich palette of tools and techniques for the technical and project management activities, but on the other hand the philosophy of the methodologies focus the change management tools to cover a limited part of the organizational change process.

All the investigated methodologies adopt a functionalistic, also called design-based perspective on the change process. Different scholars criticize the approach for its lack of support to change cognitive schemata, social interactions and organizational behaviour (Zwaan, 1990; Boonstra et al., 1998). All investigated methodologies take a sort of one-size-fits-all change approach and focus their change approaches on communication and training assisted by a leadership program to facilitate this functionalistic change approach. This uniform way of working is too generic to serve the specific dynamics of the implementation process.

First, no deliberate attention is being given to identifying the change process dynamics in relation to the implementation ambition. ES implementations follow a generically staged path, but it is known that the ambition level determines the subsequent change process during the implementation process (Stijn, 2006). Secondly, the number of selective change methods and tools is small. Specific interventions such as coaching, gaming, role playing or simulations do not appear in the methodologies. Learning is mainly emphasized on skill-based instructions. Competence or personal development (McClelland, 1973; 1974) and reframing of cognitive schemata (Bartunek, 1987; LaBianca, 2000) is not covered explicitly in the investigated methodologies. The latter is mentioned as an important prerequisite to supporting frame breaking changes such as business process redesign (Orlikowski and Gash, 1992).

To summarize, the current methodologies have a limited one-size-fits-all perspective on the change process and also lack essential elements to address the specific change issues if required by the dynamics of the implementation process or by the characteristics of the adopting organization. On the basis of the analysis of these implementation methodologies, the next section will introduce relevant concepts and theories to enhance or adapt to the methodologies from the organizational change domain.

2.4 Contributions from organizational change literature

Organizational change has been the subject of extensive research in both the professional as well as the academic field. Management studies, behavioural science and social science all deal with it. The problem attached to this diversity is the incoherent format of research results and different practical insights. Contributions sometimes come from different settings. The insights into the organizational change process during for example marking a shift in a corporate strategy, are not necessarily applicable to a forced reorganization, human resource development programs, or mergers and acquisitions. In the academic field some authors criticize the problem of verifiability (Huy, 2001) and the lack of corroborative research (Porras & Silvers 1991).

On the other hand recent valuable scientific results are presented and the solely critical perspective on the field is exaggerated (Schein, 1987, 1999; Beer & Eisenstat, 1996; Werkman, 2006; Bennebroek, 2002; Schuiling, 2001; Norrgren, 1996; Nonås, 2005; Boonstra, 1992, 2006). An elaborate knowledge base is available on organization theory, but the awareness of the different perceptions of the change process has resulted in a shift from singular focus on the content to the process side of the change process. In the first, content-oriented organization theory, the phenomenon organization itself and the description of its entities, typical aspects and variables establishes how the model of the organization is defined (Table 7).

Organization theory	Organizational change
Describing and analysing	Shaping of process
Normative perspective	Actual change
Static aspects	Dynamic aspects
Accent on structure	Accent on culture
Design criteria	Perspective on interventions

Table 7 Organization theory and change theory (Boonstra, Steensma & Demenint, 1997)

The organizational change literature focuses more on the dynamic properties of the organization and the process it undergoes. This domain encompasses the change process in itself, initiation of change processes, different types of change processes, methods and techniques (interventions) to create such processes, individual and group learning, and behaviour change. The background of this domain is in the psychology, social and organization science. One of the earliest contributors to this field is Lewin (1952).

2.4.1 *Planned versus emergent change*

A format often used to describe this process of organizational change is distinguishing between change that is episodic or planned and change that is continuous or emergent (Porras & Silvers 1991). Dunphy (2003) proposes a framework, with a more detailed comparison of episodic and continuous change. The distinction between the two is also sometimes formulated as incremental versus radical change. Dunphy has a striking view on this subject: *"Planned change is usually triggered by the failure of people to create continuously adaptive organizations.* In the IS field similar descriptions of the dynamics of the change process can be found in for example Orlikowski and Hofmann (1993). A recent framework is depicted on Figure 16.

	Episodic	**Continuous**
Metaphor	Reach new equilibrium	Constant adjustment and growth
Tempo	Short time-span development of radical change	Sequence of events in the development of incremental change
Analytical framework	Change is intentional and has dramatic impact	Change is a pattern of endless modification in work processes and social practice. People are attracted to new situations that gradually evolve
Intervention	Change is created by intention and Lewinian: linear and requires outsiders Intervention	Change is a redirection of what is already on the way, and cyclical, without an end state
Change agent	Transactional leadership Role: Prime mover who creates change, replaces Focus on inertia and seeks points of central leverage. Builds coordination and commitment	Transformational leadership Role: Sensemaker who redirects change, attracts recognition, Makes salient, and reframes current pattern. Unblocks improvisation and learning

Figure 16 Episodic and continuous change (Nonås, 2005)

2.4.2 *The Orders of change theory*

Another concept used to describe the change process is the orders of change theory. This theory differs from the rhythm of change characterisation in the previous section because of its focus on the cognitive challenges for the participants during the change process. From the beginning of the 1970's scientists and consultants became interested in the effect of interventions that are aimed at changes of the organization.

One school of thought uses this concept to measure the amount of change in the organization brought about by an intervention. As an example Golembiewski, Billingsley and Yeager (1976) introduced alpha, beta and gamma change. This concept was improved later on by Armenakis & Zmud (1978) and put into the perspective of Organizational Development (OD) by Golembiewski and Billingsley (1980).
Alpha, beta and gamma change are often seen as being related to the learning theory of Argyris and Schön (1978). According to Argyris and Schön single loop learning means the capacity to discover errors and correct these errors within the set of values and norms. This complies with alpha change. With alpha change the goal is to improve without changing the norms of the individual and/or the organization as a whole. Double loop learning not only assesses the errors with the existing norms but also evaluates the norms themselves and eventually changes these. Double loop learning is comparable to gamma change. Porras and Silvers define the alpha, beta and gamma change as follows:

> *"Alpha change is a perceived change in objective circumstances, while beta change is that type of change coupled with changing standards of individual interpretations. Gamma change is a radical change shift in an individual's assumptions about causal relationships, the values attached to various dimensions of reality, and the interpretative frameworks that describe reality"*

The alpha, beta and gamma framework can be extended with the work of Bartunek and Moch (1987). Building on cognitive psychology they introduce the concept of cognitive schemes. Cognitive schemata are interpretative frameworks of individuals or organizations. Individuals or groups use these frameworks to give meaning to and put into perspective events, experiences etc. They can be compared to theory in use (Aryris and Schön, 1978) Paradigm (Kuhn, 1970) cognitive map (Bougon, Weick and Binckhorst, 1977). In short three orders of Bartunek & Moch comprise:

1st Order Change:	"The tacit reinforcement of present understandings";
2nd Order Change:	"The conscious modification of present schemata in a particular direction";
3rd Order Change:	"The training of organizational members to be aware of their present schemata and thereby more able to change these schemata".

The first two orders describe the change process itself, whereas the third order also indicates a "mental" state of the organization. Third order change attempts to help organization members to develop the capacity to identify and change their own schemata as they see it. Third order pays specific attention to the awareness and competences of the people to continuously challenge their schemata. This is comparable to the so-called change capabilities of participants along an organizational change process (Boonstra, 1997). The three orders of change theory has also been used in the domains of IS, Learning and knowledge management. The popularity of this

theory in these fields can be explained by its cognitive fundaments that emphasize the information processing character of peoples change processes (Bartunek & Moch, 1987). An example of the technology-driven change process in the perspective of the orders of change theory can be found in the work of Orlikowski and Gash (1992). In this work so-called technological frames are further developed from the schemata.

2.4.3 *A historical overview of change strategies*

The previous two sections discuss theories that characterize the organizational change process from different perspectives. A different approach is classifying the different strategies to actively shape the organizational change process. Based on the work of Cozijnsen en Vrakking (1995) Figure 17 shows relevant and recognized scientific contributions in the historical perspective from 1950 until recently. As can be seen in Figure 17 until the nineties the change management practice and literature is dominated by two main approaches of which the Organizational Development School is also seen as the beginning of organizational change research.

Period	School of thought	Change targets	Philosophy	Order of change	Authors
1950-1969	Organizational development Planned change STS	- Individual behaviour - Group behaviour	- Diffusion adoption theories	1st or 2nd order	- Lewin - Rogers - French
1969-1973		- Individual behaviour - Group behaviour	- Innovation models - Change strategies		- Barnes - Schein
1974-1985		- Individual behaviour - Change of structure - Cultural change - Group behaviour	- Implementation strategies - Consulting approaches - Intervention methods		- Argyris - Baldridge - French
1985-1995	Organizational Transformation	- Individual behaviour - Structure - Culture - Management - Technology - Processes - Group behaviour	- Integrated change strategies and methods	2nd order	- Cummings - Bennet - Sadler
1999-..	Learning organization Learning renewal	- Culture - Processes - Group behaviour - Group learning	- Learning and innovation models	3rd order	- Senge
2000-..	Integral organizational development Design and Development Theory E versus Theory O	- Individual behaviour - Structure - Culture - Management - Technology - Processes - Group behaviour	- Integration of paradigms - Extension of organizational development	2nd order	- Beer & Noria - Boonstra - Cozijnsen. - Binney - Torbert - Norrgren

Figure 17. A historical overview of change management strategies from 1950 – recently based on Cozijnsen en Vrakking (2003)

It is in the eye of the beholder whether breaking the code of change (Beer & Noria, 2000) is seen as a combination of these two paradigms or a further development of OD. Other sources perceive these movements as the continuation of the OD philosophy (Marshak, R. J., 2004). We will nevertheless separately discuss OD, OT and the latter insights on integral organizational development. We will not elaborate on learning renewal or the learning organization. This incremental concept is not or only limitedly applicable to the current ES technology (§1.2.2).
OD and OT are capable of describing and catching the phenomenon of change within an organization, but both also provide specific models and suggestions for how to carry out or affect organizational changes. In that sense OD and OT are both theories in the organizational change domain, but primarily describe how the change process can be realised. Nevertheless both view the change process in a completely different way. In short, OD theories look at the change process from the behavioural point of view, whereas theories of OT focus on radical and large-scale change (for example aligning the organization with the corporate strategy). However, they also overlap in several ways (Bartunek & Louis, 1988).

Organizational development (OD):
Organization development is a process in which behavioural science knowledge and practices are used to help organizations achieve greater effectiveness as well as improve the quality of work life and increase productivity (Cummings, & Huse, 1989). Organizational development, also known as OD, is a well-defined school of thought in the organizational change domain includes several core components, such as emphasis on humanistic, democratic values, the use of action research, a focus on changing an organization's culture and the use of consultants to facilitate change (e.g. Burke, 1994; French & Bell, 1995; Cummings & Worley, 2005). OD has a long tradition which began with the work of Kurt Lewin (1952) and it systematically applies behavioural science knowledge at various levels (group, intergroup, and total organization) to bring about planned change (Newstrom & Davis, 1993). It generally concerns step-wise and planned change processes using a bottom-up approach with a participative management style (Burnes, 2000). OD can be classified as a 1^{st} or 2^{nd} order change process (Bartunek & Louis, 1988). For further reading on the roots of Organizational Development, the chapter by Ott in *classical readings in organizational behaviour* (Ott, 1989) is referred to.

To summarize, OD theory suggests implementation ideally to be:

- Based on a designed description of the future state which arises from a diagnosis and assessment of the line organization
- Managed top-down by top management and /or external change agents
- Sequential process plan defined at the first phase of the project

The Planned change approach

The planned change approach has its roots in OD. In the OD domain several mid-range theories derived from specific interventions have been developed. In their review, on the basis of a synthesis of over thirty models of planned change, Bullock and Batten (1985) suggest that OD interventions exist of four separate phases: exploration, planning, action and integration. The ES implementation phases greatly resemble these planned approaches (Muntslag, 2001). Other "phase-based" models are the Lippitt (1958) 7-phase model and the Cummings & Huse (1989) 8-phase model.

Sociotechnical systems theory (STS)

The term sociotechnical systems (or STS) was coined by Eric Trist and Fred Emery (1960), founders of the Tavistock Institute in London. It is a further development in the field of OD. In organizational development, STS is an approach to complex organizational work design, that recognizes the interaction between people and technology in workplaces. STS is a well-elaborated concept and has also been used in practice successfully, but since the end of the nineties also critical opponents have pointed out the shortcomings of this approach. One of the basic ideas behind STS is the transition from simple tasks in a complex structure to complex tasks in a simple structure. In the perspective of STS the team is the smallest individual unit of organizing. It would benefit the quality of work life, the flexibility and effectiveness if teams can regulate their own tasks, shape their own work organization, have a high measure of control and have the ability to solve their problems independently.

Organizational Transformation (OT)

OT has a younger tradition than OD and distinguishes itself by focussing on planned, large-scale, discontinuous changes. Other terms for OT are second generation OD (Porras & Silvers, 1991), strategic change (Dunphy and Grifiths, 1998) or real-time strategic change (Jacobs, 1994). By definition OT is a 2^{nd} order change (Bartunek & Moch, 1987). During OT-oriented change processes, leadership and project control are mostly top-down. OT is not as well-defined and elaborated on as the theory of OD (Porras & Silvers, 1991). Nevertheless OD is seen as having focused too narrowly on the internal efforts of the organization, thus neglecting the role of environmental factors (Beer and Walton, 1987). On the contrary OT is initiated or at least affected by external factors and is also often connected with a crisis situation. While the scope and magnitude of change are considered to be characteristic of OD, the process of transformational change commonly applies to similar phase models (Kotter, 1995; Nadler et al., 1995; Porras and Silvers, 1991)

OT implementation can be summarized as follows:

- Initiated because of a vision based on strategic need, often due to external changes
- Led centrally by top management
- Sequential and linear process, although more responsiveness is called for
- Involves most parts and elements of the organization at once.

Both OT and OD have their shortcomings when it comes to the application of technology introduction and organizational change. OT offers good fundaments for large-scale, top-down and complex projects, but does not have a good track record when it comes to acceptance and development of the organizational members. OD on the contrary focuses to the latter, but does have its deficiencies with regards to complex project structures. The Planned change approach, which has its roots in OD, does offer compensations and is a good initiative to introduce development in a planned and staged manner. In the last decade there have been different initiatives that continue work on the planned change concept in order to come up with new approaches or change strategies that combine the best of both OD and OT worlds.

2.4.4 *Integral organizational development*

Similarities can be observed between the recent developments in both the American organizational change literature (Beer & Noria, 2000; Binney, 1997, Shani & Sena, 1994), the Scandinavian learning strategy for change (Norrgren, 1996, Nonås, 2005) as well as in the Dutch "design and development" ("ontwerpen en ontwikkelen") research school by Ganzevoort 1985, Zwart, 1986; Boonstra 1992, 2000, Werkman (2006), Limburg (2002) and Bennebroek (2004). The basic foundations of these contributions amount to two different paradigmatic views on the change process (Burrel & Morgan, 1979). These contributions present two extremities:

Design-oriented approaches (Theory E) are based on a functionalistic view on reality. These approaches originate from the engineering environment, and many approaches use the principles of describing and/or modelling the so-called "Soll" (to be) and "Ist" (as is) situations. Most often the starting point is an analysis of a restricted problem domain, after which a set of design solutions is formulated to move from the initial state to the desired state. After the selection of the best design solution the design is implemented. This is sometimes based on quantitative methods(comparing technical, economical and operational criteria). Managers, decision makers, as well as the system integrators tend to prefer formal design approaches to cope with project uncertainties in the decision making process.

As a contrast to this functionalistic design approach, there are also authors who completely deny that social structures, such as organizations, can be designed at all. In their opinion, social structures develop while people interact with one another, and these developments can hardly be controlled or steered. In this development approach (Theory O), organizational problems and shortcomings are first analysed . The organization's ability to change is improved by involving members of the organizations in the problem analysis. Changes are realised gradually and all members are involved during the several phases of change. Figure 18 gives an overview of the typical characteristics of design and development.

The discussion about whether to use a design or development approach has caused a passionate debate and insightful results (Beer & Noria, 2000). In a setting with clear and well-defined problems and a low complexity a design approach (Theory E) may be

preferable to the development approach (Theory O). Also, in reorganization settings in which time is critical the design approach offers better results or the development approach would inherently fail due to lack of time and other forcing contextual factors. But in situations in which time is less critical, problems or solutions are unclear, and the situation is rather complex, a development approach shows better results. The earlier mentioned scholars go beyond the merely paradigmatic perspective. Instead of finding the "right" approach from the two extremities these scholars propose an integral use of both paradigms. This integral approach deals exactly with paradigm spanning and in that respect challenges the theory of Burrel and Morgan, but acknowledges later multiparadigmatic contributions (Feldman & Pentland, 2003; Mingers, 2000).

Characteristic	***Design approach***	***Development approach***
Perception of organizations	Formal system and reservoir of grown deficiencies	Integral system and source of knowledge, insight and experience
Problem orientation	Directed at solution	Directed at problem
Objective	Stable end situation	Increase ability to change
Process	One time, linear process	Iterative, on-going process
Rationality behind process	Economic-technical	Social-political
Process control	Initiated, co-ordinated and controlled from the top. Tight norms and planning	Initiative in one of the power centres. Control is appointed after consultation with parties involved
Decision-making	Structured and formalised, with much influence from the top	Negotiation and consultation with all parties involved
Differences of opinion	Denied or ignored	Openly discussed
Change method	Task structure	Combination of process, negotiation and task structure
Work method	From abstract model and descriptions of the organization to concrete ways of working	From concrete ways of working and problems to general objectives and abstract models
Role of the consultant	Expert, who uses empirical-rational strategy	Changing roles with several strategies
Implementation	Division between design and introduction. Implementation is aimed at making the new situation acceptable	Fluid transition from problem diagnosis to goal setting and change
Participation	Difficult	Good possibilities

Figure 18 A comparison between the design and development approaches. (Boonstra, 1997.)

This integral organizational development (Boonstra, 1992, Beer and Noria, 2000) can be compared to "hopping" between two paradigms of the Burell and Morgan framework. It is important to note that the Burell & Morgan theory is mainly used to position the individual perspective on the organization and the change process. The basic idea behind design and development broadens this notion and puts the interpretative (development) and functionalist (design) paradigms at the outset of an active process of changing and learning. It should thus be seen as the point of departure for the change process that follows. It is based on dynamic system theory (Stace & Dunphy, 1996) and social constructionism (van der Haar & Hosking , 2004) and should not be confused with teaching organizational change (DeCaluwe & Vermaak, 2003). We agree with Boonstra that the latter is a planned change approach in which participants either are taught the different aspects of organizational change or the participants involved reflect on the change process with hindsight.

This perspective on the change process is a too limited. To use the terms of Argyris and Schon (1978); *the involved practitioners not only need to reframe their "espoused theories" but also their "theories in use*". It is thus important to strive for an approach in which the individuals are not only taught the basics of organizational change, but also start practicing them. Boonstra calls this "*meandering between design and development*" (Boonstra et al., 1998, pp. 169). It is a change process in which conflicts and resistance are not seen as barriers to an effective change process. It is a process of sense making (Weick, 1995) between several participants to progressively get a clearer picture of situations and problems that from the start of the process may be perceived as blurry or undefined. But it also is a change process in which design principles are important to guiding the change process.
These design principles are not to be misunderstood as *the* solution to work towards (the design). Design and development are often initiated with a planned, mostly top-down, formulated concept or vision that the organization should try to achieve. What this vision will look like in the end and the process during which this vision is operationalized can be achieved in fundamentally different ways (i.e. development).

This is how it essentially differs from a complete emergent development process. Such processes intend to work from existing problems towards solutions that are completely developed bottom-up by the organizational members themselves.
This difference requires the awareness and capabilities of paradigm spanning between letting go and monitoring. There is no recipe of how to balance these paradigms. Depending on the situation, each change process will go "*to and fro"* between designing and developing. From a design perspective this requires incorporating more matters than the merely technical design. Behaviour, competences, social interactions, the organizational structure and, last but not least, the development of the change process itself should be defined and shared by the organizational members. From the development perspective this means recognizing that during these processes first finite principles and sometimes compromises are required. Secondly, it may require making decisions more quickly than the majority of participants feels is appropriate.

Boonstra, among others, has elaborated on this concept in order to a develop the situational-specific change approach. In this integral organizational development there are different perspectives on the balance between designing and developing and how this balance evolves from the start of the process. This integral approach for organizational change has been put to the test in different technologically driven change processes with good results. (Boonstra & Vink, 1996; Limburg, 2002; Offenbeek & Koopman 1996). Integral organizational development has its roots in organizational development, uses combined principles from the planned change approach and STS, and continues the ideas of (Ganzevoort 1985). It is a pragmatic approach in which guidelines are presented on how to deal with change processes in different situations. According to Boonstra et al. (1998) STS is a good basis for the design of tasks, teams and organizations, but insufficient attention is paid to the change process from the development perspective.
One of the critical comments on STS is the underestimated opportunities of information and information technology. According to Zwaan (1990) the critical comments can be attributed to one holistic principle behind STS. The approach in its entirety focuses too much on the design approach that uses participants in their expert roles. The idea behind sociotechnical systems theory does not pay any attention to the acceptance of or support for the change process itself. The line of thinking behind integral organizational development is a situational-specific approach that uses both development as well as design-based elements that fit the situation at hand best.

2.4.5 *Conclusions*

The literature review in this section confirms that the change strategies in current implementation methodologies (§2.3) emphasise a rather functionalistic and design-based application of STS and OT. The organizational change domain provides an extensive body of knowledge, shows different applications of those change approaches and, more importantly, also the progress towards new change strategies. In the last decade developments are made towards forming more situational and integral change approaches. These approaches offer both the design-based top-down creation of goals and visions as well as room and explicit attention for participation, the development of peoples' competences, and behavioural change. These integral approaches are not merely theory, but have shown a relatively good track record in different situations (Boonstra, 2000; Werkman, 2005; Bennebroek, 2004) including in the specific situation of information systems introduction (Limburg, 2002 ; Boonstra & Vink, 1996).
The analysis of current implementation methodologies (§2.3.4) and the findings from chapter 1 (§1.4, pp. 29) show that the deployment in the current ES implementation practice does not suffice. The ES implementation process requires a better integration between designing technological artefacts as well as the development of human competences and social structures. The possible application of these integral change strategies in the ES implementation domain requires an in-depth analysis of the match between the dynamics of the ES implementation process and characteristics of the

different change strategies from section 3.3. In the next section this is realized by the derivation of an ES implementation typology.

2.5 A typology of ES implementations

In this section a typology is developed to describe the ES implementation as a technologically driven organizational change process. The aim of this typology is to describe different types of ES implementation processes each initiated by different ambition levels. The differences between these implementation types can be described using the theories from the section 2.4 and the characteristics of the ES implementation process from section 1.2

Fundamental work has been done on the use of information technology and the related change process (Scott Morton, 1991). In this work the MIT framework (Henderson and Venkatraman, 1990, 1993), a typical aspect model comparable to the Leids octahedron (Figure 5, pp. 19), is used to describe the technologically driven organizational change process. The conceptual integration of the different change factors are identified and one 'classic' route that organizations may follow is demonstrated (Scott Morton, 1991). On the basis of this work Yetton et al (1994) demonstrate three alternative paths while Ormerod and Hsiao (1998), taking a dynamic approach, suggest four further change patterns or archetypes. These types describe planned or emergent modes of change, driven by different change elements under various circumstances (Figure 19). The model distinguishes driver, lever and impact.

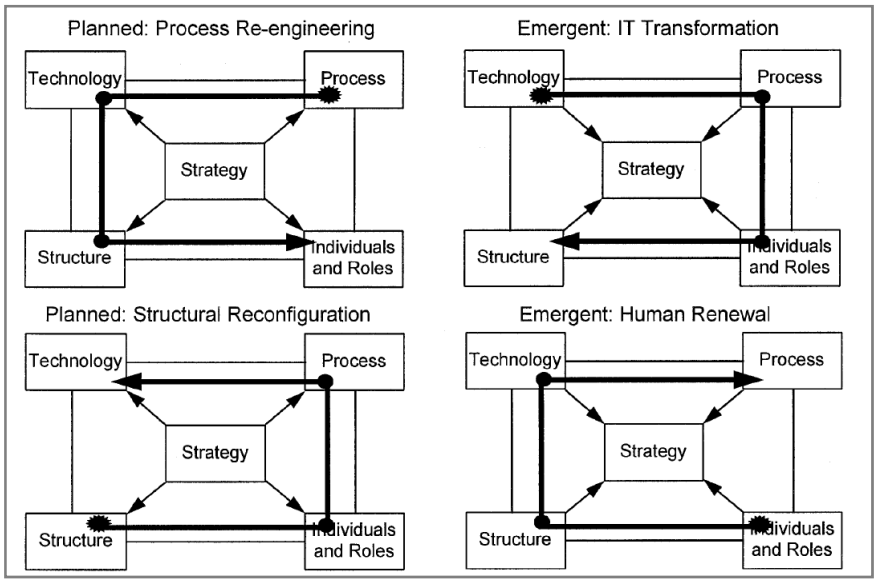


Figure 19. Four archetypes of strategic IT-enabled change (Ormerod and Hsiao, 1998)

The framework in Figure 19 characterises four archetypes independent of the used information technology. With the help of insights from section 1.2, the generic framework is adjusted to the domain of ES. This requires again focusing on the definition of the ES implementation as was explained in section 1.2.2 (Figure 6, pp. 28). The ES implementation is a technologically driven organizational change process in which the ES technology itself and the ambition level formulated in the beginning stage play the dominant role in the subsequent change process (Parr & Shanks, 2000a; Brown & Vessey, 2003 and Markus & Tanis, 2000).
The driver behind the ES implementation is developed in the first chartering phase. This driver has an important influence on the implementation process and also on the accompanying organizational change process. In this first stage, during a so-called envisioning process (Swanson & Ramiller, 1997; Stijn, 2006), business goals and strategies are often formulated and aligned with the system properties. Parr & Shanks (2000a) describe three different categories that specify the physical, technical and business scope, but these are typical information system-related characteristics. Ambition level goes beyond this notion. A properly defined ambition level takes the holistic perspective on the organizational change process. It incorporates business drivers, strategy, and technology as enablers for the change, but also influences organizational culture, the people involved, their mutual social interactions and behaviour.
Different ambition levels thus not only differ in their physical, technical and business scope, but also in their organizational impact especially on required structural changes and on development of the participants. The actual driver is thus of essential importance for the type or character of the change process that will take place. This explains the logical relationship between ambition level as driver of the IT implementation process and its organizational impact. Both Yetton (1994) and Ormerod and Hsiao (1998) (Figure 19) define the driver-impact relationships and suggest different appropriate levers that match the dynamics of the change process.

Our analysis in 2.3 shows the current ES implementation methodologies take a uniform approach. In our opinion this selected “lever” in the current implementation methodologies does not match the respective combinations of driver and impact.
We therefore will realize the typology by first elaborating the basic driver behind the implementation process. This driver depends on ambition level and the contextual setting for the organization. Secondly we will explain the subsequent change process with the orders of change theory as well as the dynamics of the change process. This will define the organizational impact. Finally we will explain the lever by relating the appropriate organizational change strategies to the respective types based on the insights from §2.4. The thoughts behind the typology are depicted in Figure 20.

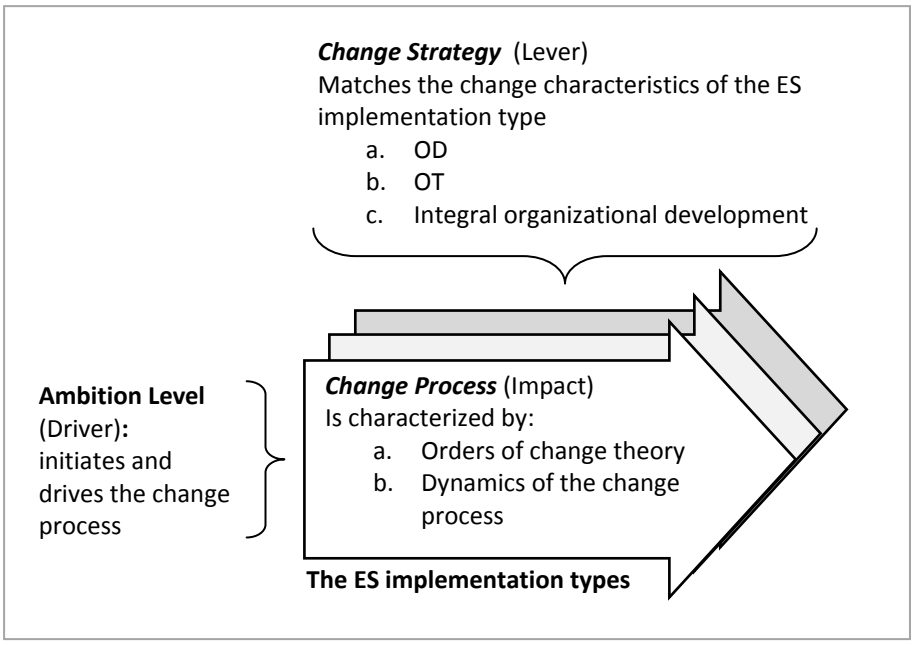


Figure 20. Line of reasoning behind the typology

2.5.1 *Structural reconfiguration implementation (SRI)*

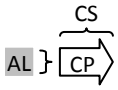
On the basis of the so-called "structural reconfiguration archetype" (bottom left corner of Figure 19) we assume that in this type the need for change lies the in organizational architecture (i.e. *the driver*). During the change process the organizational members themselves (*the lever*) are capable of achieving the internal changes and integration. This process finally influences the technology (*the impact*). It can thus lead to the adaptation of an already existing ES, the integration between multiple existing ES, or the replacement of existing information systems with a new ES. The change process is planned and mainly top-down oriented.

The ES is not so much the driver of the change process, but merely a result of the change process. According to Muntslag (2001) this type is not relevant in the specific perspective of ES implementations and organizational change, because the change process is initiated with a different rationale than the ES implementation. The change process leads to a different information system (in some cases already existing ES) and this impact is more a result than the explicit driver. In the specific case of the ES-enabled technologically driven change process, the perspective of this PhD dissertation, it will not be taken into account any further.

2.5.2 *It-Driven Replacement (IDR)*

On the basis of the so-called “IT transformation archetype” (upper right corner of Figure 19) this type stresses that a part of the organization needs to experiment with or intend to adopt new (information) technology (*the driver*). On the basis of contingencies or emergent experiences it is decided that it is necessary to adapt to procedures and organizational culture (*the lever*) to achieve a different organizational structure (*the impact*). According to Ormerod and Hsiao this change process is emergent and bottom-up. Transferring this emergent notion to the ES domain requires some further explanation.

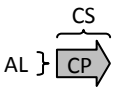
Ambition level



The recognition of the needs for the IT enabled transformation may emerge, but in most cases the realization of the actual ES implementation is a planned effort. The experimentation with the Information Technology is somewhat diverse. Either an IT department recognizes the need for new technology because of contingencies (the year 2000, EURO introduction, or the end of official support for existing information systems) or internal departments experiment with information technology in the form of one ES module to support its tasks. Typical examples are single business functions that adopt a specific ES module because of its appropriateness. A sales or HRM department for example introduces one specific module from an ES package. After experimentation with and the organization-wide adoption of the ES package beneficial results can lead to implementing different modules such as financial and logistical planning modules in the concerned departments.

In the work of Hsiao and Ormerod (1998) a bandwidth is presented from minor improvements of existing procedures to transformation of organizational structure and culture. This latter transformational reorganization is not appropriate in the case of the ES implementation. In view of rationale and ambition level this type of ES implementation is mainly an IT-replacement affair and concerns either the replacement of standing legacy information systems, or the module-by-module adoption of an ES. The result of an IDR implementation is finally an organization-wide ES implementation that influences the organizational structure, processes and people to a limited extent. Project management and ownership often belong to the information service department.

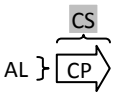
Change process



Ormerod and Hsiao speak of renovation of existing processes and the introduction of IT to enhance organizational effectiveness. IDR is not aimed at reengineering working processes or activities. In that sense it can be classified as a 1st order change process with no changes within the existing cognitive frame of the employees.

> *"In extreme but not rare cases, the implementation of ERP's simply automates the exiting procedures" Beretta (2002).*
>
> *"Not all companies wish to make massive changes to their business processes" (Bancroft et al., 1998)*
>
> *In the IS-oriented approach, a company chooses to implement an ERP system rapidly on the basis of current processes—that is, without systematically analyzing the processes ahead of time. The objective is early availability of a live ERP system through pragmatic implementation using the standard and with minimal process changes*. (Fleisch et al. 2004)

Change strategy

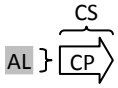


This implementation type is a 1st order change process. The organizational impact, adopting a non-reengineering rationale, is limited to major changes on the system level (Table 3, pp.27). Organizational structure, culture, believes and behaviour are not affected by this implementation type. The current implementation methodologies fit this design-based perspective and deliver sufficient tools and techniques to train people to adapt to new information systems supporting existing working routines and structures. Therefore design-based OT or "classic" STS-based change approaches are appropriate for this implementation type.

2.5.3 ***Package-Enabled Reengineering (PER)***

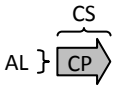
On the basis of the so-called "process Re-engineering archetype" (upper left corner of Figure 19) this type we assume that the ES package (*the lever*)a facilitates a business process reengineering effort (*the driver*) . The change process tends to navigate through technology and structure resulting in a significant cultural change that affects the human participants (*the impact*).

Ambition level



Business Process Engineering (BPR) originally takes a holistic view on strategy, structure, process, people and technology (Davenport & Short, 1990; Grover et al., 1993; Holm Larsen & Andersen, 2001), but its commercial application soon was limited to the use of IT as the main enabler for BPR. In this typology this is called Package Enabled Reengineering. During this type of ES implementation a new situation is designed and often best practices and an individual business case are used along the project time line to realize the intended situation. The ambition level broadens the prior IDR type. The starting point is fundamentally different. IDR is about system replacement. The PER implementation starts with the idea to reengineer the processes and organizational structure with the ES as enabler. This results in a fundamentally different change process that affects all three levels of systems and processes, organizational structure and behaviour of the people (Table 3, pp.27).

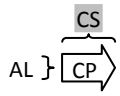
Change process



The PER type is a top-down directed, planned change effort. To adopt the new ways of working in the different organizational structure, the organizational members are required to adjust their cognitive frames. In the context of the orders of change this is a typical 2nd order change process. It requires a change approach that pays attention to changes of technology and structure (new information systems, different business processes, different organizational structure including other authorities and tasks). But it also requires people to change, both individually (competences, behaviour, attitude, social interactions and cognitive schemata) as well as in groups (culture, shared schemata and values). In a 2nd order change process all these aspects need specific attention (Bartunek & Moch, 1987). Essentially the BPR concept supports a holistic notion of frame breaking redesign of multiple aspects of the organization. Nevertheless during current implementation practices this PER type is often seen as similar to the IDR implementation. It is then simplified and reduced to an IT affair and the other aspects in the holistic picture of change are forgotten.

> *In package driven re-engineering, the idea is to redesign the business processes before implementing an enterprise resource planning (ERP) system, but to limit the process changes to those that are supported by the "best practices" built into current ERP packages. (Larsen & Myers, 1999)*

Change strategy



This is a complex large-scale organizational change process in which the composition of all organizational aspects is subject to change. At first hand the appliance of OT seems a logical combination. But as we have seen in chapter 1 and section 2.4.3 OT as approach has significant drawbacks. The organizational learning aspects in a PER implementation are considerable and it is questionable whether OT can pay enough attention to the social learning and behavioural aspects. Secondly OT will not succeed in creating broad and durable participation. Large Scale Interventions (Jacobs, 1994; Dannemilar & Jacobs, 1992) have shown positive results, but they also require careful preparation. Alternating smaller-scale interventions is often required since especially the participants are also offered the chance to undergo their reframing experiences themselves. The impediments to initiating substantial individual and group learning are similar for OT and BPR.

An inspection of the insights and approaches from the OD domain on the other hand paints a very diverse picture. A mere application of development seems even more out of reach. Though purely participative development will initiate and stimulate learning and personal development, at the same time it interferes with the change process because people will find it difficult to be objective about the present situation and to imagine a completely new organization (Boonstra, 1998; 2000). Besides, development is about creating the opportunity for the people involved to undergo a process of consciousness development and this interferes with a planned project in which milestones and targets are tightly set.
During such an unplanned development process participants will repetitively shift targets and the definition of system and process requirements will start to wander. According to the basic principles of competence development this is absolutely necessary. Let us be clear that in these situations we adhere to such approaches, but in the domain of a transforming organization that intends to implement a complete ES, such merely developmental approaches are inappropriate. Therefore different views on development are necessary to deal with the typical dynamics of the PER ES implementation.

A starting-point can be found in the work of Orlikowski (1996) and for ES implementations in particular in Besson & Rowe (2001). In their view reengineering an organization does not mean that technological determinism, planned change or engineering, or even punctuated equilibrium are less important than emergence, improvisation, or situated change. On the one hand technological determinism and planned change play a crucial role in enacting and creating results. Senior management can impose their power to organize this interaction process and social game, but sometimes with limited authority. A full determination of the action of participants, or the anticipation of how their project enactment will develop is not possible. If views on

organizational systems change during projects, this is both because ruling actors differ and also because, together with external events, they can alter the social and economic definitions of a technology, even in ES implementations (Besson & Rowe, (2001). The result is uncertainty about the course of projects and how organizations are shaped. A start towards such multifaceted change approaches can be seen in the work of a number of leading authors in the OD domain (Cummings & Worley, 2005), (French & Bell, 1995), who argue that the planned change approach has adopted a number of aspects to support transformation in the organization and has thus developed into a more flexible and holistic approach. In their article Bartunek & Louis (1988) present empirical findings of a very probable relationship between and exchange of elements between OD and OT. The planned change approach (Bullock & Batten, 1985; Porras & Robbertson, 1987) rooted in OD offers sufficient focus on the human aspects and participation at the group and individual level, but unlike the essentials of development it is planned and accompanied with a prescribed sequence of activities, techniques and interventions. The process of transformational change commonly uses similar phase models as OD (Kotter, 1995; Nadler et al., 1995; Porras and Silvers, 1991).

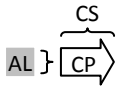
As seen in 2.4.4 these concepts have been developing into contingency approaches, such as integral organizational development in the last decade. These later strategies offer sufficient possibilities to be adapted to the ES implementation and are able to support complex organizational change processes as well as a successful definition and adoption of IC technology (Boonstra & Vink, 1996).

Typical methods that can accompany this strategy are a steering and facilitating management that is visible. They monitor the entire change process and set goals. But self-steering teams execute the essential performance with the help of conferences, participative design workshops and democratic dialogue. (Mohrman & Cummings 1989, Axelrod 1992, Weisbord 1992). When such change strategy is adopted extending the implementation practice in time with extra activities is not intended. On the contrary the adding of extra methods and time to facilitate the change process is not the main philosophy behind an integral approach that combines design and development. Design and development is about doing things *differently* than before. The basic idea is to initiate a process in which both paradigms reinforce each other and the activities result in both a qualitatively good design *and* a simultaneous change process that lasts and results in a development in the competences and change capacities of the organizational members.

2.5.4 *Human Driven Renewal (HDR)*

Based on the so called "human renewal archetype" (bottom right corner of Figure 19) in this type we assume that the typical bottom-up initiatives of either individuals or small groups in the organization are *the driver*) behind the change process. During this process innovative ideas are formulated to alter the organizational structure and suggestions are made for (information) technology enhancements (*the lever*). This finally leads to a broader adoption of these innovations and different ways of working by the entire organization (*the impact*).

Ambition level



The rationale behind human driven renewal is the emergent change practice in which the organizational members innovate and adapt the system including its accompanying working processes to their needs. There are several different ideas of how the adaptation process unfolds (DeSanctis and Poole, 1994; Majchrzak et al., 2000; Orlikowski 1992, 2000). Even though these studies differ in terms of their views on the specifics of technology adaptation, they share the same assumptions. The implementation and use of new technology are not deterministic: technology has interpretative flexibility and its users are engaged in its formation during development or use (Orlikowski, 1992). Users of a technology are a source of innovation (von Hippel, 1998) and reinvention (e.g., Johnson and Rice, 1984). The technology is emergent, improvised, and used in multiple ways by diverse users. These models tend to assume that the process of technological adaptation is ongoing and continuous rather than discontinuous, radical, and, often, periodic (Orlikowski & Hoffmann, 1997).

This corresponds to the core fundaments of OD or development in its pure and essential form. A transfer of this notion to the ES domain means either incremental improvement of existing ES implementations or incrementally approached new ES implementations (Robey, Ross and Boudreau, 2002). Results from recent empirical research (e.g. Adam and O.Doherty, 2000; Sumner 2000) strongly recommend using iterative, incremental methodologies for implementing enterprise systems. In Chapter 1 (pattern 3 §1.4.5, pp. 37) we have shown that besides arguing the needs for such approaches no real initiatives are developed for such implementation methodologies. This is similar to the ES technology that currently does not allow real incremental ways of working. The existing so-called incremental implementation approaches from the major application vendors focus on the idea of implementing one predefined functional module of a standard application after the other. This is merely a migration strategy and not the basic idea behind HDR. It is not the incremental methodology in itself, but a competent self-learning organization continuously challenging its own systems, processes, structures and behaviour.

Change process	AL	CS CP	

This type reflects a 3rd order change process. By definition this bottom-up, emergent change process describes not only the change process itself but also the organizational form and capabilities. The organizational structure enables experimenting, self learning and innovation.
The organizational members themselves are able to recognize the needs for change, have enough skills, competences and change capabilities to shape the change process, and the ES technology helps them to gradually realize their ambitions. This can be compared (Figure 17) to the learning organization (Senge, 1999) or learning renewal (Boonstra, 2000).

Change strategy	AL	CS CP	

The prescription of one unique change approach beforehand is not appropriate for this type. In this situation the organization is characterised by a high change capability. In emergent organizational development the organizational members themselves will choose tools, techniques and approaches that suit the problem or situation at hand (Boudreau and Robey, 2005; Feldman and Pentland, 2003; Moorman and Miner, 1998). This situation resembles the improvisational mode of Orlikowski and Hoffman (1997) (Figure 21). They suggest that organizations are able to select and experiment with three types of change:

- Anticipated: Changes that are planned and happen as intended;
- Emergent: Changes that arise spontaneously from local innovation and that are not originally anticipated or intended;
- Opportunity based: Changes that are not anticipated, but are introduced purposefully and intentionally during the change process in response to an unexpected opportunity.

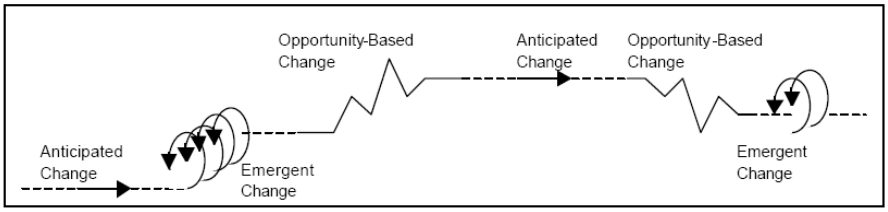


Figure 21 An improvisational Model of Change Management over Time (Orlikowski & Hoffman 1997, pp.13)

2.5.5 *Conclusions*

This section classifies three different implementation types, IDR, PER and HDR, which are presented in table 8. This typology is created to define the fundamentally different change processes that accompany different types of ES implementations. It shows that in theory three different implementation types can be supported by three distinctive change strategies.

- Current implementation methodologies are established on principles from ISDM (Pastor & Estevez, 2000) and STS (Hedman, 2003). A typical IDR implementation can be supported by current implementation methodologies.
- From the change perspective the PER type is significantly different than the 1st order change process of IDR. This BPR-driven type has increased in popularity since the rise of the BPR concept itself. An extensive number of issues explained in chapter 1 (§1.4, pp. 29) stems from the application of IDR-related change approaches in a PER setting. A PER implementation requires an extensive and deliberate change strategy during the implementation process. Section 2.5.2 shows that in theory current implementation methodologies are able to facilitate the IDR change process, but lack principles and methods to support the 2nd order change process.
- The HDR type is a rather hypothetical one since current ES technology obstructs the practical realisation of this type .

Type	Ambition level			Change process		
	Cause	Main driver	Impact	Change approach	Change structure / Mode of Change	Change Order
IDR	Department improvement programmes	Explicit non reengineering approach, or	Limited impact on existing working routines and activities	Design-based, engineering approach or STS	Bottom-up, Emergent	1st
	Contingencies (Euro, year 2000, information system landscape outdated	Replacement of present information systems	Possible gradual adoption of an ES			
		Incremental ES introduction (Module by Module)				
PER	Vision or strategy change,	Reengineering perspective (BPR) using a predefined ES package	Complete reorganization of processes, working routines and activities	Integral organizational development	Top-down, Planned	2nd
	designed reorganization ambition,					
	Integration or mergers with reengineering/ integration ambition					
HDR	Emergent scenario's	Innovation and/or organizational culture transformation	Relatively Continuous adaptation of ES,	Development, Learning renewal	Bottom-up, Emergent	3rd
			Gradual adaptation of working routines and processes.			
			Learning organization.			

Table 8 ES implementation typology (based on Muntslag, 2001, Katsma & Muntslag , 2003)

2.6 Foundation for the change approach

In the preceding section three different implementation types are combined with applicable change strategies from the organizational change domain.
This classification is a sound foundation for a further investigation into how the different contributions from change literature can be applied to the different ES implementation types and to come up with different specific change approaches that can be applied to the different described types.
Nevertheless this dissertation is a design study and we have argued in chapter 1 that the current prescriptive literature is conceptual and the these concepts lack depth. This dissertation does not intend to generate proof of concepts but aims at creating an applicable approach that is empirically validated. In the following sections this objective is realized by first the analysis of practical and scientific relevance and secondly of the research feasibility in the light of this research objective.

2.6.1 *Analysis of the three implementation types in practice*

Chapter 1, section 1.3.5, explains that the current ES technology is a barrier for real agile implementation approaches (Fichman & Moses, 1995). Current salami tactic approaches or project subdivisions cannot be compared to agile approaches or the experimental or improvisational introduction process of technology. Therefore, the HDR implementation type is a theoretical option that is currently not seen in practice. It is also not to be expected that ES vendors will come up with a technology that is able to realize this objective in the very near future. Fundamental research is being done into business model-driven and configurable enterprise system applications (Meijler et al., 2006). But the results are far from feasible or operational. The recent directions in the ES domain aim at the adoption of the Service-oriented architectures concept by the large ES vendors.
This may improve the interoperability between different software packages and information systems of possibly different vendors (Spil, Katsma & Stegwee, 2008), but the current direction of the large ES vendors does not indicate that lightweight or agile approaches will fit this technological innovation.
The IDR type, on the other hand, can be seen, but currently does not represent the majority of ES implementations. This type was popular in the beginning era of ERP during the middle of the nineties of the previous century. The major group of ES adopters can now be divided into two main groups. Firstly, a group consisting of organizations deliberately choosing a reengineering ambition as their first implementation experience. Secondly, a group of first-wave ES adopters that originally chose an IDR implementation. These organizations now start with re-implementing initiatives. During these initiatives they opt for a reengineering focus (PER). A substantial number of organizations deliberately chose this route (Fleisch, et al., 2004) to diminish complexity and first experience with and learn from the first implementation process. Presently most organizations strive for PER in practice, which makes the PER type the most relevant from the perspective of practical occurrence. Table 9 compares the practical relevance perspective and the complexity of the change

process for each of the tree types. The IDR type is losing its popularity. Extensive scientific case material is available on improvements of implementation efforts in this type, but their practical relevance is low as organizations mostly start up PER-based implementations. The same low practical relevance holds for the HDR type. Although scientifically this type deserves thorough research, the deployment of approaches or methodologies is far from realistic as current vendors and even conceptual contributions from scientific institutes lag behind the minimum requirements to formulate a deployable change approach. The PER type fits the research objective of this dissertation best since this type is currently widely adopted and present implementation methodologies insufficiently support the accompanying organizational change process. There is also sufficient applicable scientific and empirical knowledge from the change domain that contributes to the specific problem domain of the ES implementation process.

Type	***Status around 2008***	***Scientific & practical relevance***
IDR	• This type is known to have been popular at the end of the previous century • Currently its popularity is decreasing • The current implementation methodologies theoretically suffice to support this implementation type	• Possibilities for improvement based on extensive case material
PER	• Currently this type is seen most often in practice • The accompanying organizational change process is significantly more complex than IDR	• Current implementation methodologies cannot facilitate this change process sufficiently • Extensive contributions from the change domain show possibilities for improvements
HDR	• The current implementation practice and implementation methodologies deviate from the ambitions and line of thinking of this implementation type. This implementation type assumes a high change capability of the adopting organization • There are no practical examples of this implementation type.	• Conceptual models and approaches that fit this type have been obtained. • A further definition of approaches and deployment can be specified, but the current ES technology is a significant impediment to the realisation of this implementation type

Table 9 Assessment of practical and change relevance of three implementations types.

2.6.2 *Application of IOD in the staged ES implementation process.*

Section 2.5.3 explains that the multiparadigmatic change approach, integral organizational development (IOD), theoretically fits the PER implementation type.
IOD can be taken as a foundation to create a sound and applicable change approach for the PER ES implementation, but the extensiveness of the ES implementation process requires a further analysis into the efficacy of the different elements within IOD in the respective stages and its research feasibility for this dissertation.
This is realized by a comparative analysis of the three generic stages of the ES implementation and the IOD approach. The planned and staged adoption of integral organizational development (Boonstra et al. 1998) greatly resembles the generically staged ES implementation process model from Parr and Shanks (2000) (Figure 4, pp. 21). Figure 22 shows the combination of both models. In the analysis the following criteria are compared for each stage.

1. The typical implementation dynamics that are restricted by the current ES technology,
2. The expected change processes in the perspective of the PER type implementation
3. The typical approaches, dynamics and tools from integral organizational development.

The goal of this assessment is to explain where parts of an integral change approach are expected to fit best and thus to select the timeframe that offers the best opportunities to adapt to integral organizational development during a PER type ES implementation.

Stage 1 (Planning):
During this stage the idea to adopt an ES arises. In the integral organizational development approach this phase is similar to the orientation and diagnose phases (Boonstra et al. 1998 pp. 74). The combination of integral organizational development with the current implementation practice during this stage is substantially obstructed by the implementation practice. One of the main principles of the integral approach is to directly create acceptance and invite different coalitions from the adopting organization to participate during these two phases. Secondly, the intention is to create an integrated vision for all change aspects (Leids octahedron). The current ES implementation dynamics of stage 1 are determinative and therefore obstruct these two principles. First and most importantly the freedom of choice and vision development in the perspective of integral organizational development is significantly limited.
Only a small number of people is involved in this decision process In most cases top management together with external advisors set out an information strategy that implies that an ES will be adopted. A package selection process takes place and the reengineering ambition is defined. This both obstructs a broad participative approach and already defines the outcome of the diagnose phase. The solution is an ES package. Normally during the integral organizational development approach the diagnose phase would result in both an integrated set of problem areas as well as a first learning experience for a substantial part of the organization during this diagnosing phase.

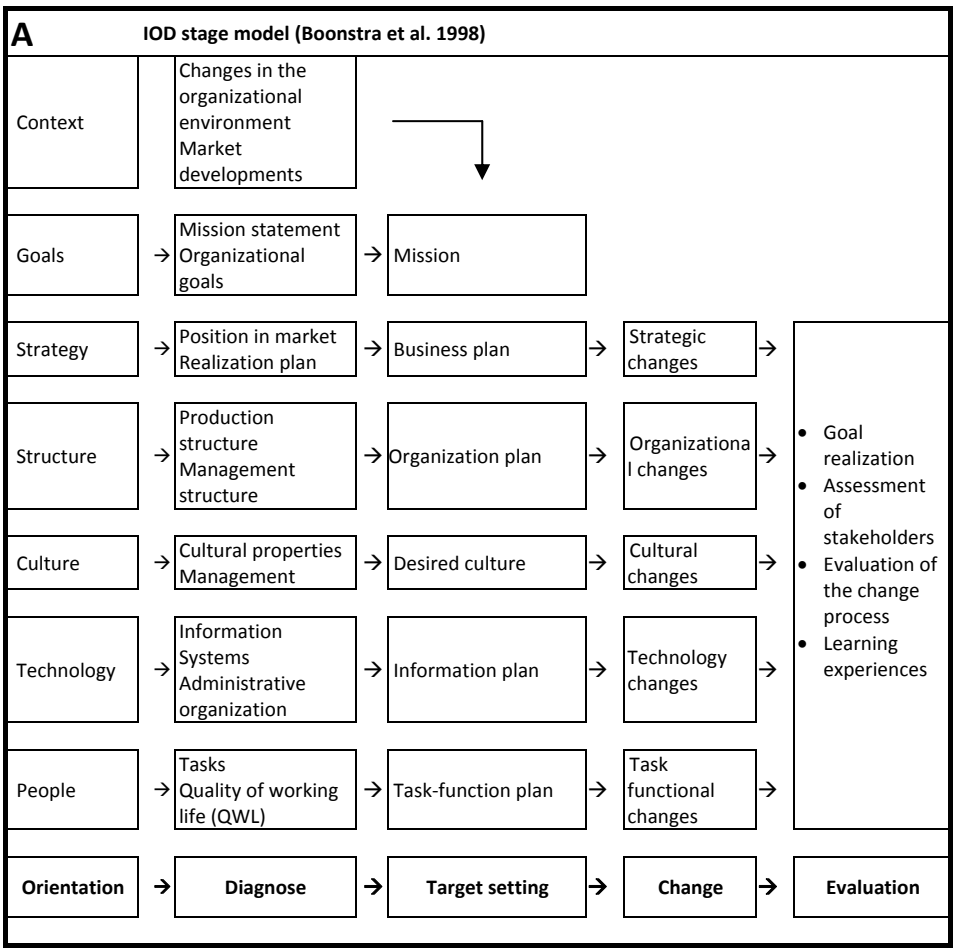


Figure 22 Comparison of integral organizational development approach (A) (Boonstra et al. 1998) with the stages of PPM (B) (Parr & Shanks, 2000)

From a scientific perspective it is recommended to alter this approach in the first phase. Nevertheless the feasibility of this research objective is low in the current ES implementation practise.

Stage 2 (The project)
This stage in time and activities is the most extended of all three. In the phased perspective of integral organizational development this stage resembles the target setting and change stages from Figure 22. In current ES implementation methods this stage is dominated by change activities such as communication and training programmes for the end user population. This stage depends on the decisions made during the first phase though and therefore the target setting (Figure 22) has its limitations on the possibilities of the current ES practice. At the end of this phase the ES is configured and tested. In the current implementation practice the majority of the people involved are external technical consultants and programmers. Only few internal experts are concerned. Prior to go live, the end of this stage, the internal organization is extensively involved by end users training.
This project stage opens up possibilities for significantly larger-scale participation to work through more concrete topics than the prior phase. Experience from the IS field has revealed the positive outcomes of participation during this stage (Mumford, 1995 Offenbeek, 1999). The subjects dealt with are closer to the experiences of a large part of the organization (processes, working routines, information needs). Due to the complexity of current ES technology and the implementation process dynamics this requires carefully organizing this participation process.

The duration of this stage provides the time necessary to really work out and go through the necessary changes of the different aspects in the systemic octahedron model (Figure 5) and contribute to the frame-breaking change process of 2nd order change. A significant part of the integral organizational development approach goes well with this phase in time, activities and goals. These contribute to a participating design process.

Stage 3 (Enhancement)
This stage starts after go live of the enterprise system. The activities during this phase focus on technical rework, bug fixing and, if necessary, retraining a select group of organizational members. In these activities the majority of the people involved are external technical consultants and or programmers. This phase can be compared to the evaluation stage from Figure 22. From the change perspective this phase comes too late in the process to initiate a fundamental change approach that focuses on behaviour and change of social interactions. One important lesson from organization research is to reorganize before or at least during the introduction of the information system (Boonstra & Vink, 1996). The fact that we see the opposite too often in today's practice is proof of the fact that scientific contributions are often not adopted by practitioners. This dissertation means to pay attention to this phenomenon.
The time span is short and possibilities of participation in this phase are relatively scarce in comparison with phase 2. This does not mean that during this phase an organization could not gain insights and continue learning, but from an organizational development perspective it is a too late to start an integral change approach. These contributions can best be made during the former phase. Nevertheless this phase is

important to continue the initiated change and communication process and adopt training and communication plans that relate to the insights of the project phase.

2.6.3 *Comparative analysis of the three stages*

Mapping the individual stages from the current implementation practice and integral organizational development shows the following results:

Stage 1 (Preparation & Planning)
is dominated by a selected group of mostly top and middle management that is involved in package selection and the definition of the implementations vision and strategy. This phase makes it possible to introduce integral organizational development as a way of paying more attention to the softer aspects of the change process and intensifying participation. The business benefits case can be enriched with large-scale interventions (Jacobs, 1993) as a means to initiate a sensemaking process (Weick, 1995) which leads to a broadly generated and accepted vision. This is a significant improvement compared to the now smaller base of participation. This first stage nevertheless also has its limitations when it comes to the application of vision and strategy creation in the perspective of IOD. An important bias is the decision to adopt the reengineering rationale and use ES technology as a means to change the organization. This is a compromise since the philosophy behind IOD means to enable a large group of organizational members to think freely about the organizations' vision and future state independently from technology. The deployment of IOD in this stage can improve the current implementation practice, but a mere application in this stage will not suffice. A successful and lasting effect in the change process certainly requires a continued use of IOD in the subsequent second stage.

Advantages	*Disadvantages*
1. Deployment of IOD during this stage can support a broader participation process.	1. The free vision and strategy objective in IOD is limited by the bias for the ES as main solution to the organizational problems. 2. A follow-up deployment of the IOD approach process is required to realise lasting change objectives.

Table 10 Analysis of the application of IOD in the 1st stage of the PER ES implementation

Stage 2 (The project)
Stage 2 offers an even better outlook than stage 1. The extensive duration, the typical design activities, and the opportunities of a larger-scale of participation make this stage very relevant for the adoption of IOD. Nevertheless, the application of IOD is also limited by the typical characteristics of the planned and finite design process. In some cases IOD may cause the change process to develop towards different outcomes as was originally intended or towards an extension of the time plan. This does not apply to the ES project stage. The number of iterations during this stage is also limited. IOD prefers an extensive iterative setup, but the dynamics of the ES design stage focus on a one-time system configuration. Iteration within the design and development process is possible but not with the availability of a real ES. Other aids are necessary to facilitate this iterative design and development process, such role play, simulation or partly deployable ES prototypes.
By deduction of the activities from the integral organization development model and the activities in the PP model (Figure 22), the best sub stages are the reengineering and design stages (Figure 4, pp.21). During these sub stages a substantial part of the internal people can be freed from their daily routines and be enabled to co create the future situation based on their internal expertise. This latter approach emphasises thinking about visionary process solutions. Enabling the organizational members to participate and give them influence can initiate a development process during the ES-based design process.

The beginning setting of this stage is fixed by the ES package, the Business benefits case and the Reengineering rationale. Nevertheless a collaborative design process which works towards new business blueprints can substantially help in creating acceptance, and it both initiates as well as shapes the change process itself. During the end of this stage most participants are expected to change when they are able to actively participate in the design and development process (Boonstra, 1992).
The idea of IOD is to simultaneously design and change the organization. During such a process there is a gradual change in different organizational aspects such as systems, formal structure, competences of the organizational members, and their social interactions. This ambition is also not realistic in the 2nd project stage of the PER ES implementation. The 2nd stage ends with the physical ES introduction. The employment of extensive participation will positively influence mutual learning and development of competences amongst participants, but the transition to a different organizational structure will happen instantaneously due to the one-time ES introduction. This causes a predestined change dynamics which is different from the ideal IOD objective.
On the other hand IOD in itself is already an integration of design activities and organizational development activities. The philosophy of IOD is multiparadigmatic and it is consistently incorporated into the way of working and instruments and tools. To a large extent IOD in itself incorporates the design assignment for people involved during the change process. This means it can be elegantly integrated with the design-loaded reengineering assignments and activities of the PER implementation process.

The appliance of integral organizational development requires a deliberate reframing of the philosophy behind ES implementation methodologies. This does not automatically mean a complete overhaul of the existing methods but a deliberately different application and organization of the existing fragments in the methodologies (Aydin, 2006). This includes the acceptance and awareness of both internal and external participants to do so. This can be achieved by adapting current ways of working and method fragments, but sometimes also by adding specific method fragments.

Advantages	*Disadvantages*
1. Extensive process stage in time enables lasting participation 2. Broad participation from several layers in the organization improve acceptance 3. Systemic perspective improves design process (alternating paradigms facilitate 2nd order change process) 4. Concrete design objectives enables participants to quasi-experience the new situation and contribute to the new situation, working routines, and organizational structure 5. Dynamics of the ES project stage facilitate the movement and change possibilities of organizational members	1. Limitations in number of iterations due to set project plan 2. Limitations in realising structural change before the ES introduction

Table 11 Analysis of the application of IOD in the 2nd stage of the PER ES implementation

Stage 3 (Evaluation)
Adopting the IOD approach in stage 3 will not solve the problems explained in chapter 1. The current implementation practice is often confronted with this situation and a strong focus on the change process after the actual system definition and introduction stage cannot repair what has been omitted earlier in the implementation process. Such an approach causes low acceptance and incomprehensibility.

Advantages	*Disadvantages*
1. Evaluation more focused on the entire change process	1. Application in this stage is useless as critical mass and significant contributions are in the preceding stages 2. Due to increase in new operational tasks less opportunities for large-scale participation 3. Almost no possibilities to alter the system functionality and accompanying working routines.

Table 12 Analysis of the application of IOD in the 3rd stage of the PER ES implementation

2.6.4 ***Conclusions***

Stages 1 (preparation) and 2 (the project) of the PER ES implementation individually offer possibilities for the combination with integral organizational development. Considering the research objective, time and research feasibility it is not realistic to incorporate multiple phases in this PhD research. A feasible research setting requires a choice between both stages.
Though stage 1 is an important precursor of stage 2, the essential contributions and change process of an integral organizational development approach are situated in stage 2, the project stage. The above analysis shows that the deployment of integral organizational development during the project stage offers the following advantages over the application in stage 1:

- There are better possibilities for participation,
- The stage is more extensive in time,
- It shows higher dynamics in the design process than the preparation stage (Keller & Teufel, 1998)
- It shows better opportunities to bring a significant part of the organizational members in movement (Boonstra, 1998).
- It enables creating a systemic design and initiate a development process

2.7 Deployment of the ESIMM for the design objective in this thesis

The main objective of this PhD research is to create a relevant change approach that supports the organizational change process better than the present implementation methodologies. The delineation arrived at in sections 2.3 to 2.6 specifies the objective of the design assignment in this PhD dissertation.

> *To design a change approach based on integral organizational development that can be applied during the project stage of a PER ES implementation*

§2.2 (pp. 56) introduces the ESIMM as analysis instrument. The ESIMM also can be deployed as a generic structure to construct an implementation methodology. The analysis of section 2.3 shows that the functionalistic philosophy of the implementation methodologies hinders the organizational change process, but also the rather implicit deployment of philosophy in itself in the current methodologies. This later observation is important since philosophy significantly influences the shape and use of the methodology. Philosophy should not only define framework and tools, but should also be defined in the methodology itself in such a way that the line of thinking and principles are clear to the practitioners. It is not recommended to separate the interventions from its objectives and its founding principles (Boonstra & De Caluwe, 2006).

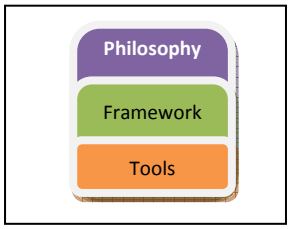


Figure 23 ESIMM structure as instrument for analysis and design

For the adoption of an integral organizational change approach to succeed it is essential to start a process in which an awareness of both designing and developing is created, one that is incorporated by the organizational members. The technology and the reengineering vision cannot be downplayed in the specific context of Enterprise Systems and they should be perceived as determined beforehand and fixed. This makes sure the design activities are not underrated or changed drastically. This requires leaving room for the development process, but also for again and again returning to the basic questions and rationale behind the start of the process without neglecting the insights gained from the development process. It means that the development process should be executed fully, but at explicit moments results of the process should compared to the questions, problems and vision that started the process. These thoughts are not new and can already be recognised in both the IS and

organizational change domain (Goles & Hirschheim, 2000). In practice blending of paradigms does occur. Such multiparadigmatic approaches can be discerned in the IS domain, in which practitioners adapt to a different way of working and thinking as a way to mitigate the rigidity of the functionalist approach (Hirschheim & Klein, 1989; pp.1213). This is nevertheless not explicitly defined in the current methodologies as line of thinking and therefore the support to way of working and tools are lacking.
The situation in current ES implementation methodologies is even worse. The philosophy behind the methodology is seldom defined. Therefore this research will first pay attention to the principles and line of thinking behind the change approach.

Design and development is not about creating a sound balance between two paradigms. Or in a more practical context: It is not important whether the majority of the participants starts with a mainly functionalistic perspective. In the majority of organizations this is to be expected (Boonstra et al., 1998 and Beer en Noria, 2000). There is not just one way to describe this philosophy either. That is where it differs from the ideas behind the paradigm descriptions of Burrell and Morgan. The rationale behind design and development is that it should lead to a situation-specific application of either design or development perspectives in the implementation process. Participants should not look for the perfect balance between design and development either, because there is none. Design and development in the context of ES implementations is the acknowledgement of development principles in a highly functionalisticaly dominated design process. Then gradually a process of true paradigm hopping could take place.

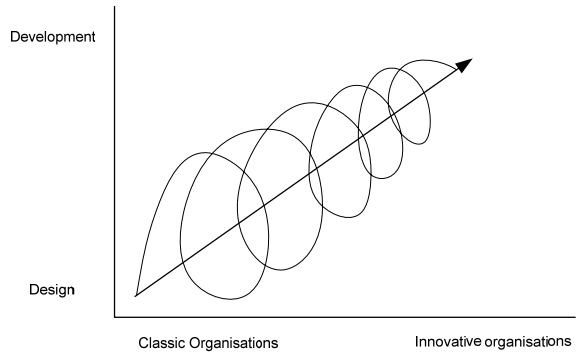


Figure 24 Alternating design and development (Boonstra et al. 1998)

This dissertation will use the generic ESIMM structure as analysis and design instrument to create a change approach based on IOD that fits the specific situation of the PER implementation during the project stage. The in-depth analysis and design of the change approach will deploy this generic structure in chapters 3 and 4.

Figure 25 presents the outcomes of chapter 2 and explains the way of working behind the analysis and design process of chapters 3 and 4.

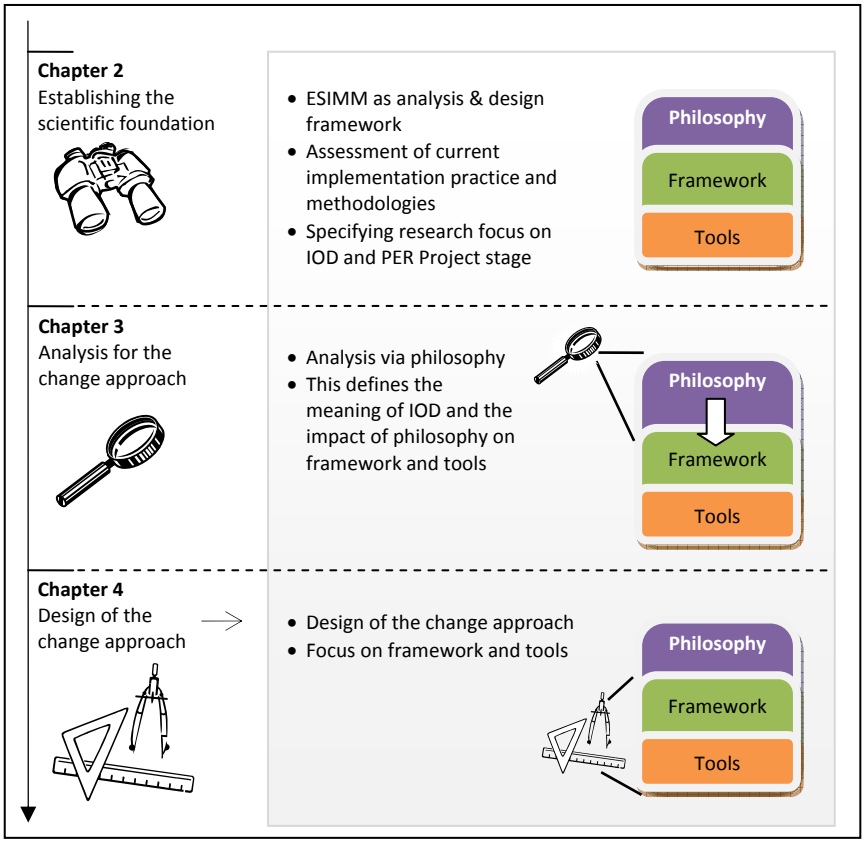


Figure 25 Way of working in chapters 3 and 4

Chapter 3 includes an in-depth analysis of how IOD can be applied in the specific context of PER. It will especially cover philosophy since that is the main foundation for the approach and the philosophy behind IOD is fundamentally different from the present implementation methodologies. The analysis defines the specific line of thinking and principles behind integrating design and development during the project stage of the PER ES implementation. This philosophy should be incorporated into the different elements of the methodology itself. This means the way of thinking should be explained in documentation and training material and should be a part of the discussion and dialogue between the practitioners during the employment of the methodology. These aspects are absent in the current implementation methodologies.
Chapter 4 deals with the design of the change approach. This design assignment focuses on the ESIMM elements *framework* and *tools*.

Part B.
Analysis & Design of an integral change approach.

3. Analysis for an integral change approach

--- Science cannot solve the ultimate mystery of nature.
And that is because, in the last analysis, we ourselves are part of nature
and therefore part of the mystery that we are trying to solve. ---
Max Planck (1858-1947)

3.1 Introduction

The preceding chapters present a focused research object as well as a foundation for the design of a change approach based on the integral organizational development concept. This chapter will proceed with an in-depth analysis of how integral organizational development can be achieved during the project stage of the PER implementation. The analysis process is divided into three parts:

I. *Analysis of the philosophy behind integral organizational development*
First, in section 3.2 the philosophy of integral organizational development is explained and applied to the PER situation.

II. *Impact of this philosophy on ESIMM elements framework & tools.*
Secondly, the main elements of philosophy from section 3.2 are translated in to the generic design requirements for these ESIMM elements. Philosophy is applied to framework in 3.3 and to methods and instruments in 3.4. This analysis is carried out case independently and in a generic format.

III. *Explication of the design requirements*
Finally the chapter is rounded off in section 3.5 with a combination of the generic analysis results. It combines the analysis of the three ESIMM elements into the design requirements for chapter 4.

3.2 Analysis of the philosophy behind IOD

This section elaborates on the principles behind IOD and applied it to the PER ES context. IOD is introduced in chapter 2 (§2.4.4, pp.74) as a situational-specific planned process approach in which interventions based on theory E and theory O (design and development) alternate in order to initiate and continue a change process. In order to explain the way of thinking behind IOD, the meaning of design and development and its influence on the generic elements of this process approach are subdivided in separate sections (Figure 26). The basic idea behind this process approach is that interventions initiate an organizational change process (alternating design and development processes), which then results in certain outcomes. Outcomes during the process may initiate processes to alter an intervention mechanism, which explains the reverse movement in processes in Figure 26.

This explicates learning and feedback during the change process and opens up the discussion about beginning and end, but for clarification purposes the generic rationale in Figure 26 is from the left to the right; intervention mechanisms initiate processes to realize aspired outcomes.
First section 3.2.1 explains the meaning of the design and development principles. This is done by an analysis of the founding principles behind IOD and its historical development.
The outcomes of this section are then used to explain the IOD-specific intervention mechanisms (3.2.2), the elemental processes (3.2.3) and its outcomes (3.2.4). These sections define the way of thinking behind IOD from a process perspective. This is specified to the specific PER context in section 3.2.5

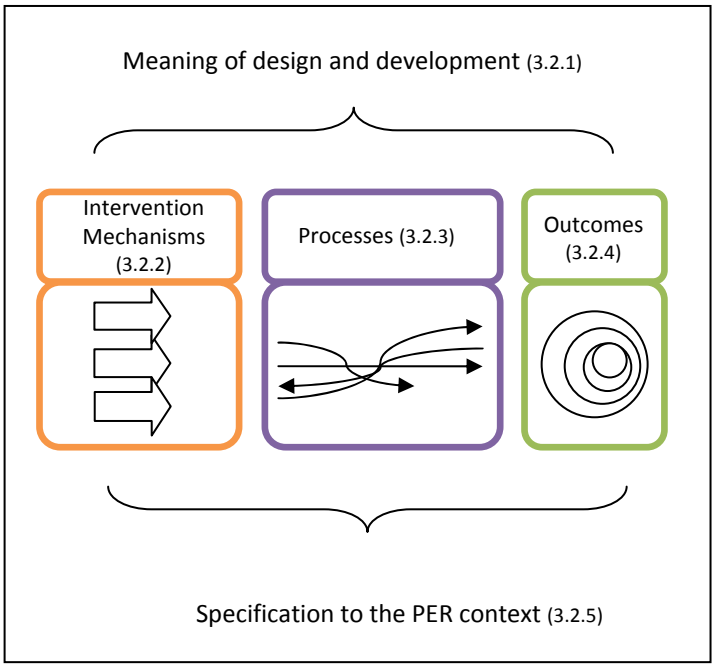


Figure 26 line of reasoning in section 4.2

3.2.1 *IOD as synthesis of design and development*

One of the essential principles behind Integral Organizational Development is the alternating concept of "*designing and developing*" (Figure 18, pp. 75). A good understanding of these notions is essential to create a generic change approach by way of the ESIMM structure. This becomes even more important since the notions for *design* and *development*, in both the organizational change domain and the IS implementation domain, are used ambiguously and often cause confusion. Therefore an explanation of the how these terms are used in this dissertation is appropriate.

Design

The meaning of design as first principle in the perspective of IOD includes three notions; perspective, activity and output (Figure 27).

- First, design stands for a functionalistic perspective on the process and its outcomes (Hirschheim et al. 1995). It assumes that organizations and the change process have a concrete tangible existence which can be objectively analysed (Burrel & Morgan, 1979). Rigorous methods are applied to specify the design content. The functionalistic perspective influences the process and its results;
- Secondly, design is about the activity of organizational members who collectively **design** the future state of the organization. Design is the process of creating a new definition of the organization in concrete and tangible outcomes. It assumes that the change can be realised by implementing the organizational design. An example can be found in the early contributions of socio-technical design (STS) (Emery and Trist 1960). STS includes principles like user involvement and participation, but original STS principles adopted a prescriptive way of working (Schacci, 2004).
- Thirdly, design represents the result of this process of creation. As result this notion of **design** has a prescribing quality. There are different formats to describe this design, but the functionalistic perspective influences the format and characteristics of the design. It may include drawings, models, descriptions, quantifiable measures, and sometimes results from simulations. In the IS domain the design artefact emphasises the information system in its organizational context in different levels of detail. This can be e.g. the conceptual design, functional design or the physical data design. In the change domain the STS school stimulates designers to include technological as well as social aspects into the design. The outcomes include optimisation of work output and quality of working life.

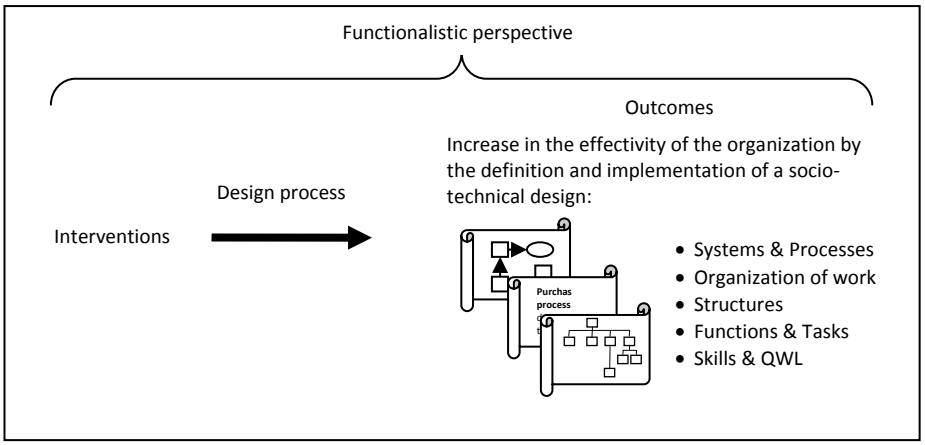


Figure 27 Design principle behind IOD based on STS.

Development

The meaning of development as second principle in the perspective of IOD includes three notions; perspective, activity and output (Figure 28):

- First, development is about taking an interpretative perspective on the change process and its outcomes. In this view the future state cannot be prescribed by a functionalistic perspective. It assumes that organizations have to be understood from the participant's point of view. A collective diagnosis, sharing and experiencing of the current problems and collective ambitions will initiate the change process itself. During the development process new insights, changes in behaviour and different social interactions will grow.
- Secondly, development is about the activity of organizational members who collectively **develop** towards a future state of the organization. The development concept in the domain of organizational science stems from Organizational Development (Lewin, 1952). Development in this school is described as an integral process to systematically apply behavioural science to people on different levels (individually, group(s) or the entire organization). This process includes the previously described design activities, but especially by using an interpretative perspective (Glock, 2003). In the IS domain this notion is closely connected to information systems development (van Slooten, 1995). To complicate matters, scholars in this IS domain, understand the previous notion, design, mostly as equal to or part of this information system development process or life cycle.
- Thirdly, development is the realisation or the result of this development process. In the OD school there are several ideas of the result of development, but there is a general agreement that the individual development of the participants during the change process will lead to more efficient organizations. This **development** is characterised by increased productivity, new social interactions, improved capabilities of the organizational members and a better quality of work life (Schuiling, 2001; Cummings, & Huse, 1989).

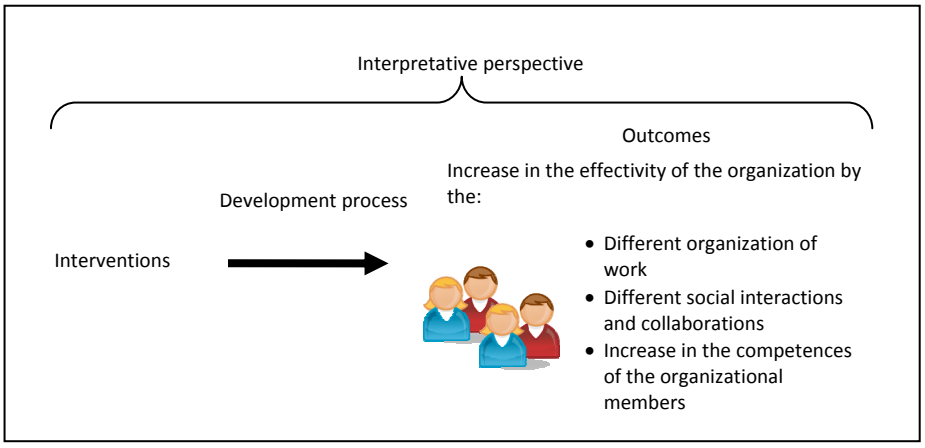


Figure 28 Development principle behind IOD based on OD

Integral organizational development

IOD can be seen as an evolution from scholars in both the previously described paradigms and goes dates back to the 80's of the last century. It is elaborated upon by Dutch, Scandinavian and Anglo-Saxon scholars. IOD is the synthesis of different developments in the change domain (Cozijnsen & Vrakking, 2003). It is the further development of STS scholars who criticised the design rationale and looked for an integral deployment of socio-technical design (Ganzevoort, 1985; Zwaan,1990; Beer, 1987). It also is a continuation of the original principles from OD (Lewin, 1952; French & Bell, 1995) and planned change (Bennis, 1984).

IOD incorporates action learning (Revans, 1980) and systems thinking (Stacey, 2007) as two theories to facilitate the socio-technical design process but simultaneously connect competence increase (Boonstra, 1992; Schuiling, 2001). And finally IOD uses the principles behind the 2nd order change process (Bartunek, 1991) by its paradigmatic approach of alternating between design and development perspectives. IOD and its deployment are continuously in progress, as it also was in the last decade (Binney & Williams, 1997; Beer & Noria, 2000; Boonstra & de Caluwe, 2006; Cacioppe & Edwards, 2005; Nonås, 2005).

IOD (Figure 29) on the one hand acknowledges that participants take a functionalistic perspective on the change content and process. The organization and its environment are perceived as open systems and the participants define and create a systemic organizational design. On the other hand IOD stimulates and helps the participants in their development so that during the design process social structures, competences and behaviour will also start to change.

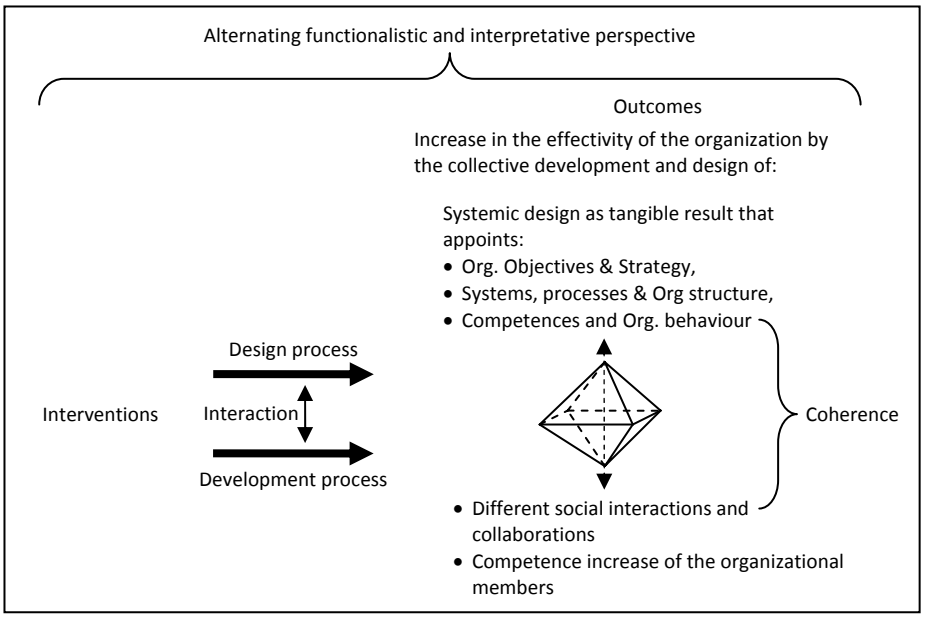


Figure 29 Synthesis of design and development principles in IOD.

Ideally these design and development processes interact with each other and run almost simultaneously. This means when participants design they also increase their competences and create different interactions. In Figure 29 this is indicated by the coherence between the results of the design and development process: organizational improvements, competence increase of the organizational members, and the systemic design that explicates these aspects as tangible artefacts.

Coherence portrays this integral way of thinking behind IOD. The systemic design is a result of the design activities. The competence increase is a result of development activities, but the interaction between both processes also mutually influences both their outcomes. The systemic design includes descriptions of organizational and personal improvements. Its different versions during the process help the participants in their design and development process. It helps 'designers' think about social interactions, competences and behaviour in the working situation. Reversely, the different or sometimes new interactions between designers and their increase of competences facilitates the realization of the systemic design.
Coherence can be perceived as the Ourobouros[3] between the results and the process.
Nevertheless IOD has a planned and finite nature so the Ourobouros is figuratively broken when the participants collectively decide that the systemic design is finished and ready to be introduced. "Figuratively" because it marks the formal ending of the interaction between the design and development process, whereas the informal processes induced by IOD will proceed.
Nevertheless some substantial aspects of the systemic design are of a structural or tangible nature and require a planned transfer moment or formal introduction phase. Figure 30 displays two generic stages, I and II, in which the interaction of design and development processes is shown in the generically planned stages from IOD (Figure 22, pp. 93).
During stage I the participating organizational members focus on diagnosis and target setting in which the development and design processes can interactively evolve and do well. A substantial part of the organizational change is already starting to be embedded in the organization during this stage I. By extensive participation social structures and competences of the participants are already changing during the interacting design and development processes. This can be seen as the invisible introduction of the change. It is a precursor of the visible introduction, which formally introduces the physical and official artefacts of the design into the organization. Stage II includes procedures, information systems and the formal organizational structure that defines hierarchies, authorizations and functions. These latter aspects require an official transfer moment or phase as the systemic design from that moment is 'frozen' and the accompanying new systems, processes and structure need to be introduced and deployed. During this stage the design and development processes informally continue as the change competences of the organization have been increasing and members will continue to come up with ideas and innovations.

[3] Ouroboros is an ancient symbol depicting a serpent or dragon swallowing its own tail and forming a circle. Through the ages it has been used to represent many things, but it in general symbolizes ideas of cyclicality, unity, or infinity.

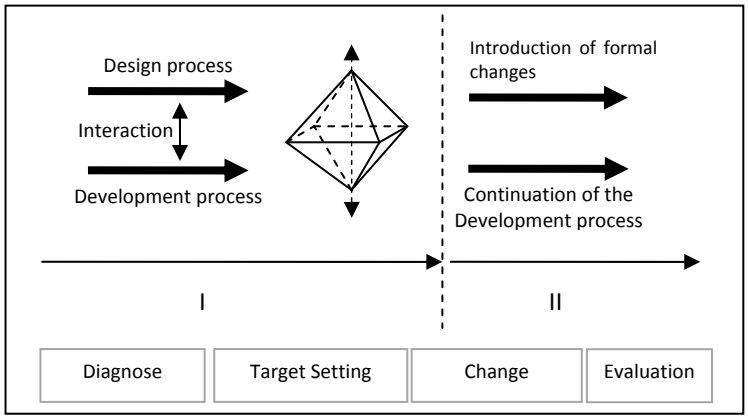


Figure 30. Design and development processes in the perspective of informal and formal introduction of changes

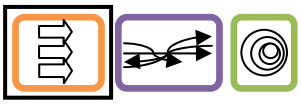
Nevertheless the competence development process during this stage II is influenced by different dynamics and contexts because the formal parts of the systemic design are fixed. Though small changes may be made if necessary, in general the formal artefacts are defined and fixed . This does not mean that the development process stops. IOD suggests different ways of working and interventions for continuous competence development during this stage in the process, but the dynamics and objectives differ from the beginning and also the suggested way of working. This generic division into two stages fits the typical dynamics caused by ES technology. During the analysis and reengineering stages participating members can help define the new settings of the organization, business process and information requirements. A substantial part of this systemic design can be embedded in the ES, which requires a fixed transfer moment after it is configured.

IOD suggests a support for both generic stages. This is done, also based on planned change, by suggesting different interventions in a clearly staged approach (Figure 22, pp. 93), a systemic perspective on the change content and process (Salminen, 2000), and external support for competence increase or consultation during the process (Schein, 1987; Hackman, J. R. & Wageman, R. (2005). According to Boonstra et al. (1998) and Cacioppe & Edwards (2005) the main principles behind IOD can be summarized as follows:

1. Design and development /Alternating paradigms / 2nd order change
2. Planned and staged process approach
3. Extensive participation /Action learning / competence increase
4. Systemic perspective / systems thinking
5. Process consultation / relationship building

In the following section we continue with our explanation of the generic process model (Figure 26) and explain the intervention mechanisms that match these principles.

3.2.2 *From IOD principles towards intervention mechanisms*



An extensive number of interventions, tools and instruments are available to initiate and facilitate the design and development processes (Rothwell et al. 1995; French & Bell, 1995; Table 102, pp. 484). The different change strategies synthesised in IOD each bring several methods, techniques and interventions based on its founding principles. Figure 17, (pp. 71) gives an overview of the principles behind different change strategies through time. The foundations of IOD, explained in the previous section, can be applied to deployable intervention mechanisms that initiate and facilitate the design and development process towards the outcomes:

1. A situational-specific approach with the alternation of design and development interventions.
2. Planned and staged process approach as concrete grip for the participants
3. Stimulation of a high level of participation from the client organization and attention for the action learning process.
4. Adoption of a systemic view on the change content.
5. Support to increase competences of the organizational members.

These five intervention mechanisms *and* their mutual relationships (rephrased in Figure 31) represent the way of thinking behind IOD. This philosophy is not only represented by the plain sum of the five respective parts since explicit relationships between these principles also contribute to and enforce this way of thinking behind IOD.

1 The situational-specific process approach with the alternation of design and development interventions.

This is the main principle behind IOD. It stems from the understanding that successful and enduring organizational change cannot be achieved either by a merely interpretative interventionist approach or by functionalistic interventions. This idea is stressed in Beer's individual work (1980) as well as with Noria (2000) and can also be found in the explanation of integral organizational development by Boonstra et al. (1998) (see section 2.5.2). In complex change processes the functionalistic perspective is necessary to monitor, manage and canalise the organizational initiatives and the interpretative perspective to let go and use the internal diagnostic and creative development force of the organizational members themselves.
The adoption of alternating paradigms acknowledges the typical characteristics of the 2nd order change process (Bartunek & Moch, 1987), in which paradigm spanning helps the participants to free themselves of existing cognitive schemata and come up with frame breaking proposals or ideas.

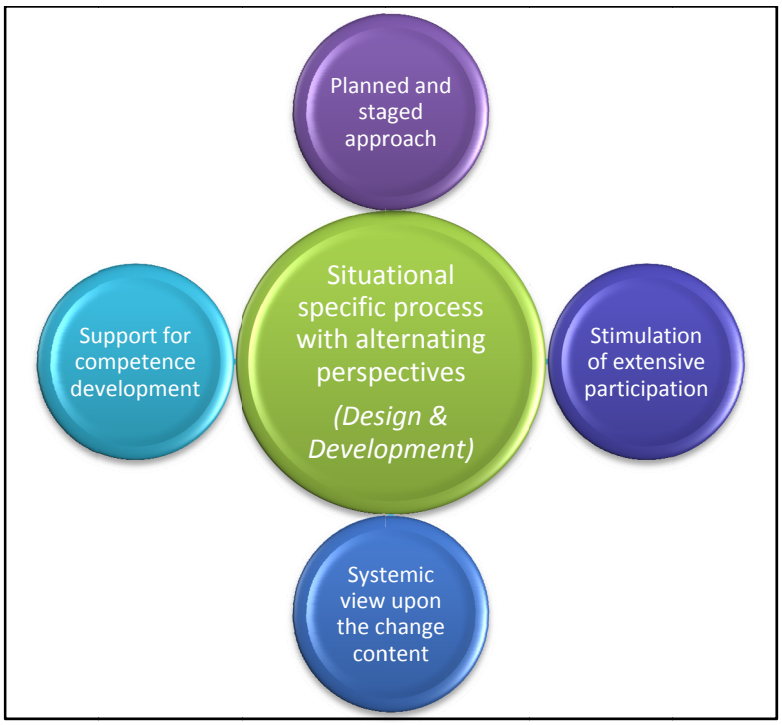


Figure 31 Fundamental principles behind IOD

2. Planned and staged process approach as concrete grip for the participants

This principle aims at structuring the change process. The foundations from organizational development excel in facilitating change and competence development, but experiences have shown a design approach can assist in this process by offering guiding principles and a good structure to content and process (Boonstra et al. 1998, pp. 282). Different IOD scholars state a staged process gives participants structure and clarity during the process (Beer and Noria, 2000; Boonstra et al., 1998). This is realized by a grand staging model that defines high level staging without detailing sub stages or activities (Figure 22, pp. 93). It is assumed that the change competences of the organizations are low and experiences with IOD are minor. The basic foundation of the IOD staging model includes:

- Functionalistic start phase emphasizing design and diagnosis activities.
- Transfer phase to design- and development-based activities and processes by consultation and interventions.
- Interpretative end phase emphasizing development activities to realize an organization that shows high change competences and increased capabilities

3. The high level of participation and the attention for the action learning process.

This principle describes the main elements to structure the participation process.
Participation fundamentally contributes to competence development, because it creates the opportunity to really asses the organizational problem themselves and act in the design process (Ketchum & Trist, 1992). This is often contrary to reality in which organizational members perform according to predefined role patterns or are even only able to approve of another person's solution without being heard. There is an essential difference between the personal satisfaction and development derived from individually finding a solution and merely receiving a reward by a praising person (Schein, 1961).
Organizational members who design their future structure, including the accompanying information system, resemble a catch 22 that can be compared to the drawing hands of Escher (1948). The organizational members are confronted with a design assignment in which they should design the triptych of information system, organizational structure and competences (Lievers & Lubberding, 1996), but simultaneously they should also experience the structural changes and competence development themselves. Schuiling (2001) proposes to break the catch 22 by introducing the concept *transition space*. Boonstra calls this *the collected problem experience* (Boonstra et al. 1998, pp. 282).
Extensive participation is required during the change process to use both resembling concepts. The mutual experiences and perspectives on *the problem* or change content are systemically discussed and shared by managers, employees and consultants. This way of working is confirmed by different scholars from both the IS as well as the change domain (Mumford, 1985; Passmore & Fagans, 1992; Arnstein 1969; Cavaye, 1995; Dunphy & Stace, 1993).
Participation enables the organizational members to experience the catch 22 themselves and be able to change the cognitive schemata. In the transition space the participants distance themselves from the existing system (i.e. the present organization in all its aspects), but also from their own existing role or behaviour in the system. By playing and experiencing with different concepts or schemata the participants try out 'design alternatives' that represent future organizational formats. Essential to breaking the catch 22 is the alternation between being subject and object in this action research setup. The participants thus not only come up with designs, but also investigate the mutual reactions to these "design alternatives". This way of working includes the multiparadigmatic philosophy behind IOD and describes the essentials of the interaction between design and development.

4. The adoption of a systemic view on the change content

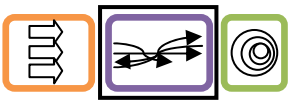
The collective diagnosis and design experience requires a strict design principle to create qualitatively good content, but also a development component to initiate sensemaking and change. Several scholars suggest applying a systemic diagnostic

model (Senge, 1990; Salminen, 2000; vd Vlist, 1987 in Boonstra et al. 1998) (Figure 5, pp.26) since this facilitates both the development as well as the design process.
First, it covers a diverse perspective on the change content that exceeds merely good information system design. It gives participants a concrete set of aspects they should take into account during the design process. The systemic model helps participants who by nature find it difficult to think laterally and it explains design topics that many participants either neglect or are unaware of. It requires participants to be explicit about affairs they normally would leave out of the design process and out of the design artefact itself.
Secondly, this intervention mechanism also stimulates mutual sharing between participants of different views on the organizational problems. This is based on systems thinking (Hutchins,1996) and sensemaking (Weick, 1995). Systems' thinking acknowledges that the paradigm spanning approach for 2nd order change can create a frame breaking design. It helps the organizational members to achieve a diverse view on the problems and the relationships between the problems (Kemp et al. 2006).

5. Support to develop competences of the organizational members.

IOD recognizes the development force within the organization, but also acknowledges the necessity to support organizational members in their competence development process. This support can be in the form of education and handbooks, but essential to the change process is the help of experienced people who are able to adopt different roles (Boonstra et al. 1998).
Most organizations have low change competences and therefore this support should be given by external consultants who are able to take both an expert view and a process consultation view (Schein, 1987). These external consultants help initiate the change process, facilitate the participation process and they pay attention to the typical characteristics of the paradigm spanning between design and development.
The change process goes hand in hand with tensions, turmoil and sometimes fierce emotions (Huy, 2002). Process consultation acknowledges these phenomena and guides individuals and groups during the change process. It aims at coaching or helping participants with their task to define current problems and to realize a collectively better situation (Garrick, J. 1999).
The combination of an expert view and a process consultation view on this facilitation process acknowledges the functionalistic and interpretative paradigm alternation. It both assumes that the diagnostic and problem analysis force lies within the organization as well as expert opinions from external consultants.

These five intervention mechanisms initiate and facilitate the design and development processes and their interaction. These terms for design and development are explained in section 3.2.1, but require a further analysis to understand their elemental underlying processes and also to explain the essentials of their interaction. The next section elaborates on these issues as the explication of the generic IOD process model (Figure 26) continues



Section 3.2.1 mainly explains the design and development processes generically in their respective functionalistic and interpretative perspective (based on Figure 27 and Figure 28). In IOD the alternation between these two paradigms is presented as a fundamental intervention mechanism. The essential meaning and activities in these design and development processes should therefore be explained in both perspectives.

The design process in change literature is described as the collective activities of diagnosis, problem analysis and initiation of creative ideas to realize a different organization of work. The functionalistic deployment of design, based on design science (Simon, 1973) and the original principles of STS (Eijnatten & Van der Zwaan, 1998), uses an expert approach. This functionalistic perspective assumes that the design content and the deployment of the design process are largely predictable in advance. It focuses on design content passed on by top and middle management and on a deterministic approach of the design process to specify this design content (Boonstra, 2000). Participation is argued to be essential, but it is realized on an expert basis. The course of the design process including the use of tools and methods is planned beforehand in a detailed step-by-step approach. Design instruments and interventions are used to craft a specialist design based on mostly detailed or specific knowledge.

Dutch and Swedish STS theorists (Berggren 1993; Van Der Zwaan 1999 and 2000) reacted to this deterministic deployment of organizational design and proposed a more interpretative deployment, which involves participants from different backgrounds, not necessarily all design experts. It assumes that both the design content and process are difficult to predict in advance. The design content will be defined and detailed step by step by sharing different perspectives and social interactions between these designers. This represents a bottom-up formulation of the design content. Gradually appropriate methods or tools are selected that suit the situation and design content up to a moment at which the participants decide the design is ready (Glock, 2003). This latter deployment of design connects with the understanding of the development process.

Development in the perspective of OD assumes that behavioural sciences can be used as intervention mechanisms to facilitate the development process of the involved people. Future competences and learning outcomes are perceived as predictable in the functionalistic perspective and the development and learning process is assumed to be planned with specific interventions, learning styles and educational formats (Örtenblad, 2002; Easterby-Smith, 1997).

There are scholars that equate this development process with learning (Kimble et al., 1961, Schein, 1999). Schein translates Lewins' notion of planned change into *managed*

learning. It assumes that the learning objectives are definable to a specific extent and use competence management as a concept to deploy skills, knowledge and attitudes of the organizational members. We value the rich body of knowledge and especially Schein's extensively described empirical experiences, but in our opinion an appropriate explanation of organizational development in the context of this thesis requires that it is subdivided in its essential sub processes.

Learning and development are certainly connected, but in the specific context of organizational change the equation of the terms does not explicate the entire context of the organizational change process.

There is extensive literature on learning both in the individual situation (Vermunt, 1992; Kolb; 1981;1984 ; Berings et al. 2005) as well as in the organizational context (Argyris & Schon,1978; Schimmel, 2007). To explicate the essential sub processes of the development process we prefer perceiving the learning process as being part of the organizational development process for clarification purposes. This can be argued as follows:

There are several examples of organizational change processes in which people learn substantially, but the organizational structure is not significantly changed. In such a situation the organizational members can gain knowledge and increase their competences, but the social and formal structure of the organization will remain unaffected. A PER ES implementation requires that both the organizational structure changes as well as that the organizational members develop their competences and change behaviour in the work situation. Learning thus contributes significantly to the organizational development process, but it is not *the* single elemental process.

Beer (1980) in his planned change theory elegantly combines the structural changes of the organization with the behavioural changes of the involved participants. According to Beer & Walton (1987) a significant structural change, like an ES implementation, will only succeed if it is accompanied by leadership, new social competences and interactions, and new shared schemata that go hand in hand with the new organizational structure. This coherent mix of different change aspects in Beers vision can be developed by a participative change process in which people, systems and structures are changed.

Changing social and formal structures (1) and learning and competence development (2) should be perceived as two entwined but distinguishable processes. Both process are closely connected and also interact during the organizational change process, and therefore they should not be separated, but for clarification purposes both can be distinguished.

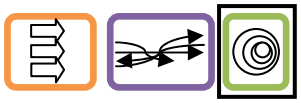
According to Boonstra (1996), Beer (1980), Schuiling (2001) and Beer & Noria (2000) these two elemental processes are accompanied by a third elemental process; the design process. The members of the organization themselves through extensive participation share and design different possibilities for the new organization. Schuiling (2001) calls this design process *working* and combines these three entwined processes; *learning, changing and working* into a generic process model (Table 13).

Working	This is what Boonstra and Beer call diagnosing and designing. During this process the participants contribute to the change process. Schuiling calls this working on the change (**δ**). The **δ** represents the insights into the organizational problems and the explication of the organizational change itself. In other words this first process is about the hard work of defining, designing, sharing and finally realizing the change
Changing	By enabling active participation during the different design activities, the organizational members not only work at defining the change, **δ,** but also start to interact, and existing social structures are enhanced with new ones, by new collaborations. This can be facilitated by creating teams that also deliberately alter in composition during the process (Beer & Walton, 1987). Participants will shift their social interactions and new structures will arise during the process of working.
Learning	The interaction between learning and working and changing in IOD is especially based on action learning and andragogy (Revans, 1980; Morgan et al., 1984). Based on these theories participants study and discuss their own actions as well as those of others. It extends the traditional teaching methods that focus on the presentation of knowledge and skills (Vermunt, 1992). The learning process can be realized individually when participants look for opportunities to develop and learn, but action learning especially focuses on groups. In the group setting the sociology of group based learning by exchanging experiences, exemplary behaviour and group dynamics plays its part (Boisot, 1995; Nonaka and Takeuchi, 1995).

Table 13. Three elemental processes during organizational development, based on Schuiling (2001), Beer (1980) and Boonstra (2000, 1998).

This process model defines three fundamental processes during the deployment of IOD. The model acknowledges the interaction between the three processes, but deliberately subdivides them to describe and analyse the three processes during a change initiative. The next section deals with the outcomes of IOD.

3.2.4 *Explication of outcomes of IOD*



The results of IOD are closely related to the content deployed in the processes, but the characteristics of these outcomes also are strongly influenced by the employed paradigm behind interventions and processes. In Figure 29 (pp. 107) the outcomes of IOD are divided into a design and a development outcome. As explained in the previous section there is a natural interplay between working, changing and learning during IOD. The outcomes will inherently receive alternating contributions from an interpretatively or a functionalistically emphasised deployment of processes & content. Despite the link between these processes, there are clear differences in format as the design as outcome is represented by a more tangible description in either models, narratives or other formats. Development as outcome is an increase in capabilities and competences of the organizational members and their different social interactions. These latter aspects can also be explained, but will especially take place between and within people. Based on Figure 29 (pp. 107) the following two themes can be discerned as outcomes:

1. Systemic design
2. Organizational development

Systemic design

Systemic design is a concept that connects with functionalistic and interpretative perspectives on design as outcome. It is based on the notion of systems thinking. One of the first references to system thinking can be found in Angyal in 1941 (Emery, 1969). Systems' thinking concerns forming an understanding of a system by examining the linkages and interactions between the elements that comprise the entire system (Checkland, 1981). Systems thinkers look at problems holistically and examine all possible interdependent and connected parts and how they work together (Hutchins, 1996).

Systemic design is the application of systemic thinking to the organization and the organizational change (Dunphy, 1996; Boonstra, 1996). It merges the systems thinking perspective with the later developments of socio-technical design (STS) (vd Zwaan, 1999; Eijnatten & vd Zwaan, 1998) and stimulates designers to both look at the problem as well as its parts and their mutual dependencies holistically. The objective is to form a complete picture of the change problem in all its facets. Participants are stimulated to take a situational-specific approach to the design content and apply either functionalistic or interpretative principles to define parts or aspects of the entire systemic view.

There are several versions of the systemic description of an organizational change either in general, e.g. de octahedron by vd Vlist (Figure 5, pp.26) or driven by technology introduction, e.g. the three layered model from Lievers & Lubberding (1992) (Table 3, pp.27)

Organizational Development

To aim at development as outcome is an important part of the philosophy behind OD literature. The collective OD literature divides development as outcome into two main categories:

1. Improving the functioning and productivity of individuals, teams, and the total organization by new social interactions and collaborations (Beer & Walton. 1987; Beer, 1980; Graetz & Smith, 2005)
2. Increasing competences of the organizational members (Boonstra, 2003 Nonas, 2002, Schuiling, 2001)

1. New social interactions and collaborations that improve the collective productivity

The first output can be explained by social network theory (Barnes, 1954; Burkhardt, M.E. 1994), social learning (Bosiot, 1995) and collective sense making processes (Weick, 1995). During the working, changing and learning processes organizational members are freed from their normal working environment. They share different perspectives on common problems with participants from different backgrounds and positions in the organization. This mutual dialogue will create deeper or a different understanding of these problems and will stimulate different interactions and collaborations between these members. This process results in new forms of collaboration and different social interactions that improve the productivity and quality of work life. Different concepts or models (Hackman & Oldham, 1976; Emery & Trist, 1961; Wall & Klegg, 1981) can be used to clarify goals, motivations and productivity of individuals and/or groups.

A systemic redesign also requires discussing the existing hierarchy and management structures. Participants from different backgrounds represent different interests and will sometimes form coalitions to force design decisions (Mastenbroek, 1999; Lammers, 1983). Schuiling shows that both in flat as well as hierarchic organizations the members will collectively reshape conditions that optimally fit their individual positions.

2. Competence increase of the organizational members

Beside the previous outcome that focuses on social interactions the second outcome emphasises the cognitive and behavioural perspective. In the change domain this is often placed under the competence concept. Competence is an ambiguous term with many meanings such as: knowledge, skills, attitudes, acting, behaviour, effective performance, expertise, capabilities, etc. (Weinert, 1999). In spite of this versatility competence is an appropriate concept to describe the different characteristics people have in a professional context (Stoof et al. 2002).

A functionalist perspective on competence increase assumes that personal development can be explained beforehand and can be defined in specific units or aspects. It also supposes that the process for this competence increase can be defined so that organizational members experience this competence increase.

This is often deployed by “competence management” to achieve the outcomes in the triptych: attitude, skills and knowledge, with an emphasis on the latter two. The deployment of just this single view on competence is criticised because it emphasises the cognitive knowledge increase and learning of skills (McClelland, 1973)

An interpretive perspective on competence development assumes that the notion of competence varies for several individuals or groups of participants and perceives competences as being situational specific. Competence should be investigated by these people themselves to find out the respective applicable meaning of competence for this situation.

Stoof et al. argue competence definitions should not be valued on their degree of veracity, but on the degree in which they are viable (Stoof et al. 2002 pp. 361). In their work they introduce an inside-outside approach (Figure 32) that offers both functionalistic and interpretative perspectives on competence increase. Participants are stimulated to set up a dialogue about the meaning of competence and about the application of specific terms of competence in specific situations. In this way of working the outside-in approach is the functionalistic perspective on competence. The inside-out approach resembles the interpretative perspective.

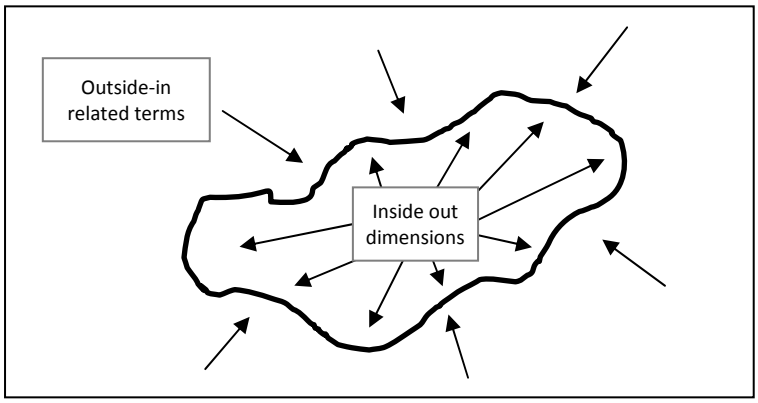


Figure 32 The boundary approach to competence (Stoof et al. 2002)

This constructivist approach to competence in the work of Stoof et al. 2002 is similar to that of the systemic model for the design artefacts. This approach supplies participants with a structure to deploy the concept of competence during the design and development process, without prescribing what competence exactly includes. It means competence as generic concept should be used by the participants in both an inside-out as well as an outside-in approach during the design and development process.

In the IOD context this model can be divided into two main categories of competence as outcome:
First, there is a specific focus on change capabilities or change competences of the organizational members during the development process (Nonas, 2002). See also Figure 18, pp. 75 that defines change competences as one of the main objectives of the development perspective in IOD. Change competence can be seen as the ability to continuously self-renew, but also facilitate changes in the organizational environment. Boonstra adds that the increase of the change capabilities of the people involved will help future change processes to be realized easier by the organizational members themselves without extensive external expertise and help.

Secondly, the notion of change competence as specific outcome is extended by other scholars to include raising personal competence in the professional context (Bandura, 1986; Locke, 1991; Schuiling, 2001). Here competence increase or personal development is used to describe the individual development of the organizational members. Schuiling (2001) based on andragogy (Schiefele and Pekrun, 1996) defines competence increase during the organizational change process as:

> *The capability to utilize and obtain "acting space" by an individual by a mutual adaptation of his skills, ambitions, interests and needs towards other organizational resources like colleagues, the organizational structure, systems and processes and the organizational norms and values.*

Figure 33 competence increase (Schuiling, 2001)

This uses **competence increase** as the bridge between the individuals personal and professional life. In today's society this understanding of personal development gains substance as our professional and personal lives flow together more and more due to flexible working hours and the different forms of teleworking (Limburg 2002).
Human acting is taken as a starting point in this definition of competence and at the same time the constructivist perspective from Stoof et al. (2002) is acknowledged. It exceeds the popularized notion that defines competence as the triptych between knowledge, skills and attitude. That definition narrows competence to a functional setting within the organization and neglects peoples' entire development process during life.
In Figure 33 competence is not only the ability to optimize the individual performance in the professional situation. Competence is about the individual being aware of his present situation in the organization, his ambitions and the understanding of the limitations to realize these ambitions. This perspective acknowledges the varied individual perspectives on personal development based on motives, experience and the stage in life (Rogers, 1961, Erikson, 1959), but also the limitations of personal development within the professional context of a changing organization.

IOD urges and helps participants to utilize their "acting space" to realize fruitful new social interactions and personal development during a collective organizational change process. It confirms the tight connection between individual and organizational development during the organizational change process (Pasmore and Fagans, 1992).

The synthesis of the results and elements from sections 3.2.1 till 3.2.4 can be used to derive a process model (Figure 34). The model displays the fundamental principles behind IOD, the elemental interacting processes that are initiated through the interventions and the outcomes of these processes.

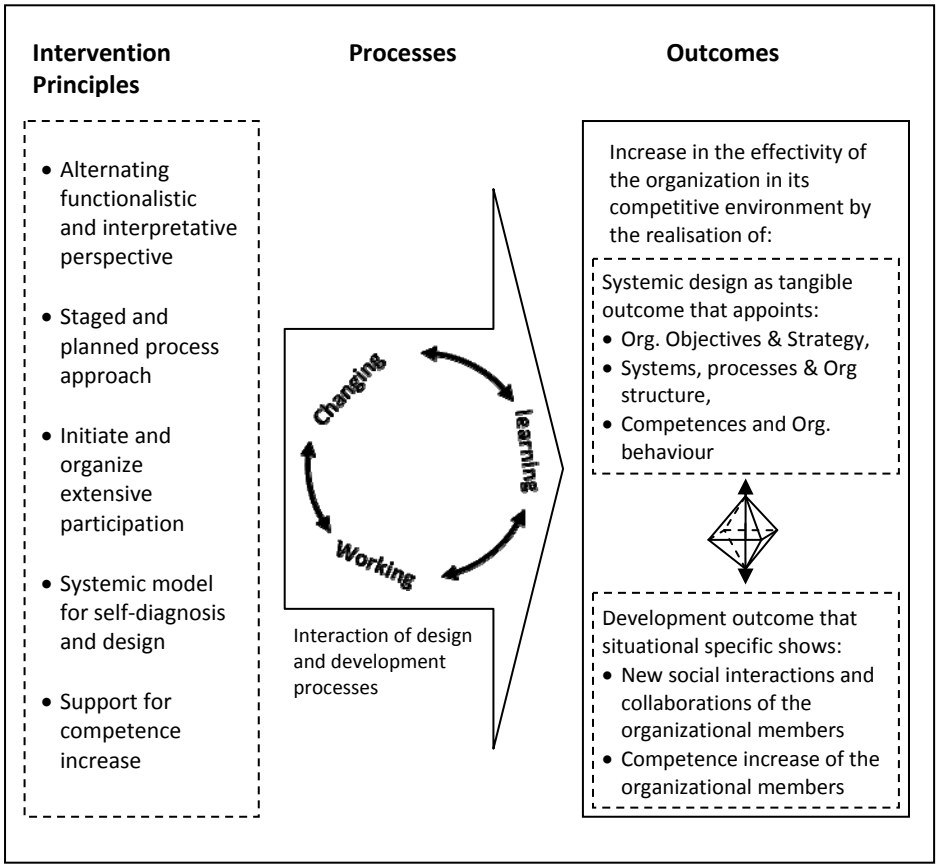


Figure 34 Generic process model based on Schuiling (2001), Boonstra (2000), Beer (1980) and Beer & Walton (1987)

3.2.5 ***Specification of the IOD principles to the PER ES context***

The last step in defining the way of thinking behind an applicable IOD approach is to specify the intervention principles to the PER project stage and its context. This is necessary to create a sound foundation for the ESIMM layers, *framework* and *tools* in which the processes and outcomes of Figure 34 will be explicated.

1 The situational-specific process approach with the alternation of design and development interventions.
This leading IOD principle can be applied to the PER project stage. It drives the design and development processes and facilitates the 2nd order change process, necessary to create frame-breaking process redesigns and embed new competences in the newly defined organizational structure.
It will nevertheless affect especially way of working, controlling and support by the consultants. In current practice the ES experts and consultants are used to a merely functionalistic perspective, the accompanying methodology and way of working. 'Paradigm hopping' can lead to difficulties and the adoption of this different approach cannot be expected to take place without help from experienced change consultants. It especially requires deliberate attention to this multiparadigmatic thinking and time to let the participants find their way to deploy this concept.

2. A planned and staged process approach
In section 3.2.1 (Figure 30, pp. 109) it is explained that the generic PER staging format and the IOD approach go well together by the clear distinction between two generic phases. Figure 35 is a detailed representation of Figure 30. It explains the actual integration of the IOD principles within the PER-specific context. The adoption of IOD in the PER context affects the project scope, the organization and structure of tasks and the allocation of time in the typical PER implementation stages. The current PER implementation approaches feature a functionalistic perspective on staging with detailed descriptions and discrete ordering of the respective (sub)stages (see §2.3.2, pp.61). The synthesis between IOD and the PER context is characterised by a more generic deployment in two stages that are less explicit in prescribing the order and details of tasks and objectives (Figure 35). This line of reasoning stems from the introduction of the interpretative perspective but also from situated method engineering (Aydin, 2006) and participative design (Limburg, 2002). The phases can be labelled as the design and development stage (I) and the system configuration and introduction stage (II) (Figure 35).

I. During stage I the participating organizational members will start with a merely design-based perspective. In the original IOD concept which perspective is chosen depends on the organizational capabilities and the characteristics of the change process. Because of the strong influence of the IT artefact together with the fact that most organizations possess low change capabilities it can be suggested that this stage should be initiated

with a design perspective (Beer & Noria, 2000). Gradually, by the deployment of the different intervention mechanisms the design and development processes will start to interact and the organization will gradually adopt a more interpretative approach and competences will increase. Stage I is finished when the systemic design (including the complete ES definition) is ready.

II. The use of ES technology affects the dynamics of the competence development process due to the necessary ES configuration stage. Current ES technology prevents real agile and repetitive system deployment (§1.4.5 pp. 37 and §2.6.1, pp. 90). During the second stage the ES package is configured and continuous competence development processes and interventions are continued with. The competence development process in this second phase will differ from the first design & development phase since the degree of freedom is less. This is caused by the appointment and definition of the final design. Nevertheless, competence development is deployed by experimental learning, sensemaking and especially by using the increased change capacity from the participating members in stage I. This differs substantially from the ES-specific key users training prior to go live as is currently done in the PER practice.

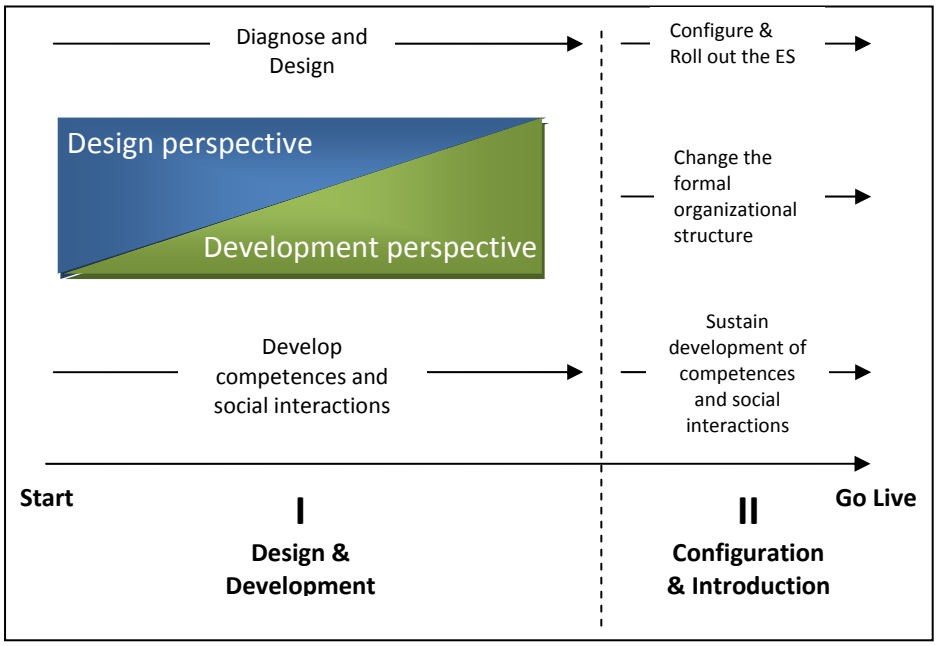


Figure 35 Generic stages of IOD during the project stage of the PER context

3. The high level of participation and attention to the dynamics of the participation process.

The generic principle of extensive participation is essential to IOD. This principle can be applied in the PER context, but there are two essential conditions that require a specific organization of the participation process that runs simultaneously with the with the competence development process.

First, in the current implementation practice an extensive amount of work is allocated to external ES consultants and experts. The IOD principle requires a transfer of part of their typical design tasks to participating organizational members, but also a shift in extra attention of external change expertise (see also the 5th IOD principle on support to the competence development process pp. 110)

Secondly, there are practical limitations due to size and project duration. Most ES implementations affect a significant number of the organizational members and therefore efficient mechanism must be applied to organize the participation process.

In different OD practices there are examples of how to facilitate extensive participation by for instance self-steering teams, large-scale sessions and network models. These examples have shown that extensive participation is possible, but requires organization and a deliberate attention.

Therefore in way of working and controlling an efficient solution needs to be found that addresses these issues. Conceptually this can be achieved by a growing participation model and a specific focus on the bridge between standing and project organization (Volkoff and Strong, 2002). This is further analysed in section 3.3 on the impact of the IOD principles on the ESIMM element *framework* .

4. The adoption of a systemic view on the change content as concrete grip for the participants.

Systemic models (e.g. Figure 5 pp.26. or Figure 37, pp. 141) can function as a diagnosis instrument in the specific situation of the PER ES implementation. These models fit the PER ES project stage and can facilitate the design and development assignment by structuring the design and change content. A deliberate and careful deployment is required since the introduction of the ES introduces a significant bias toward reengineering business processes. These reengineering drivers are derived in the envisioning stage of the ES implementation and specified in the business benefits case. This business process driver can be deployed to organize and structure the design content as well as the change process. It should not mean a specific hierarchy in the different aspects of the systemic models. Moreover, participants can take the respective business processes as a guiding diagnosis and design structure and embed other relating aspects such as future relationships and social interactions, possible organizational restructuration and future competences of the people involved.

5. Support to improve competences of the organizational members.

Competence development can be deployed during the entire project stage and is an essential contribution and support to the integration of design and development processes. Yet there are two specific conditions that should be taken into account:

1. The background of internal and external consultants
2. The staged process approach, described in the second IOD principle (Figure 35, pp.123)

First, the external help in the current implementation practice is dominated by ES Experts and business consultants. A different organization and staffing of the external workforce is required to facilitate the simultaneous design and development process. This implies a different or sometimes complimentary set of expertise for several external consultants and internal change agents. This influences the selection or recruitment process for external partners and consultants, but also affects their role, way of working and the project organization.

Secondly, the use of competence development is influenced by the dynamics of the project stage. In the second IOD principle (pp. 123) it is explained that the configurability of current ES technology influences the deployment of IOD in the ES context: The entire project stage can be seen as divided into two main phases (Figure 35). Competence development should be deployed and sustained in both phases, but each with a slightly different approach.

As explained in §3.2.4 (pp. 120) the first design and development phase will initially focus on creating change capabilities. This competence development process will contribute to an increase in the number of internal change agents with improved change capabilities. Gradually during this design and development phase the focus will move towards the personal development of the participants and the formulation of future competences of the entire organization. The latter is necessary since extensive participation is essential, but not all organizational members will be able to participate equally in this first design and development phase. This implies organizing participation efficiently during this first design and development phase, but also utilize this competence development process in the second system configuration and introduction phase.

Especially this latter deployment of competence development often fails in the current implementation practice as it is deployed in a quick uniform training setup.

In this second phase the degrees of freedom are limited compared to the first design and development phase, as the complete blueprint of the systemic model is defined.

The objective during this second phase should be to pursue competence development and not fall back on functional systems training.

The deliberate continuation of competence development can work beneficially since organizational members that participate extensively in the first phase will continue their competence development as internal change agents or coaches in the second phase. Different scholars have stated that the learning and development process

reaches its ultimate stage when participants are placed in the role of coach or lecturer (Okita & Schwarz, 2006) (e.g. Learning by teaching approach (Lernen durch Lehren (LdL)) of the "German School" A. Renkl, 2006). The group of organizational members who participate at a low level in the first phase will experience a similar competence development process during the second phase. Competence development in this phase continues while experimenting and getting acquainted with new behaviour, social interactions and above all experiencing the different aspects of the new organizational setting and its ES. This exceeds functional system training and results in:

a) Higher change capabilities of the entire organization.
b) A significant group of organizational members who discover their acting space and have adapted or start to adapt to new interactions and behaviour.

This concludes the specification of the five IOD principles in the PER ES context. It defines a situational-specific process approach in which a large part of the standing organization is able to participate during design and development activities. During these activities this collective group of participants exchanges knowledge and insights, formulates a future situation based on the implementation ambition, business processes and the organizational context while creating different social networks and increasing their competences. This section shows the IOD philosophy is essentially applicable to the PER ES context, but also shows the points that require further specification for the actual deployment. An in-depth analysis of its application in *framework* and *tools* is given in respectively sections 3.3 and 3.4.

3.3 Impact of the IOD philosophy on Framework

The ESIMM element *framework* defines the deployment of the methodologies' philosophy. Framework can be specified by the aspects way of working and controlling, which interact with each other.

- Way of working primarily defines the organization of work. It explains the possible tasks, their ordering, participation, collaboration, and staging in time. It also provides guidelines (heuristics) on how tasks and activities can be performed.
- Way of controlling focuses on planning, monitoring and control by aspects such as scope, outputs, staffing, quality & progress control, and the evaluation of plans.

In §2.3.2 (pp.61) it is explained that current ES implementation methodologies combine several of the above described attributes with elements from project management (PM) methodologies such as PRINCE2 or PMBOK that are founded in the IS development domain (Cadle & Yeates, 2008).
In the previous section the IOD philosophy, specified to the PER project stage is divided into five items that affect framework. In this section we will analyse how this specific philosophy will require adjustments of the current way of working and controlling.

This is carried out by a comparative analysis of the five principles from the last section and the following elements of way of working and controlling:
3.3.1 Scope & outputs
3.3.2 Planning and controlling
3.3.3 Activities & staging
3.3.4 Participation & staffing
3.3.5 Conclusions on framework

3.3.1 *Scope & outputs*

Scope in the sense of Avison (2006) intends to holistically define the comprehending aspects of the implementation. Based on the analysis results in §3.2.5, (pp. 122) this notion should be broadened from a mainly system introduction perspective into a holistic technology-driven organizational change process perspective. Although this may sound like a rather obvious conclusion this is an essential problem of the current implementation practice. The fact that chosen scope is too narrow forms a fundamental flaw that results in a false perspective on the implementation from the very beginning.
Scope should include the design and definition of the ES, the adoption of the ES by the organization and the organizational change process itself, including the accompanying structural and behavioural changes. This is a significant extension of the definition of scope in the current PER implementation methodologies and also affects the aspired project outputs.

In the analysis of section 3.2.4 and 3.2.5 a generic process model (Figure 34) is derived that explains the results of the IOD-driven change process. These results divides the final outputs of the project stage of the PER implementation into two main categories; a design outcome and a development outcome.
In the perspective of several project management methodologies outputs are mostly perceived as being functionalistic (Cadle & Yeates, 2006; Avison & Fitzgerald, 1995). This perspective makes them concrete for designers and often the SMART acronym is used to define them in specific, measurable, attainable, realistic, and timely aspects. This monoparadigmatic perspective on outcomes conflicts with:

- the multiparadigmatic way of thinking behind IOD;
- the principles defined in section 3.2.5 ;
- the notion of the coherence between the design and development outcomes (Figure 34).

Outputs
The application of the IOD principles does not imply departing from project management principles, but it does require an adaptation of the current merely functionalistic perspective on outputs. Participants of the PER project should become familiar with a focus on process *and* content instead of a mere bias towards the latter as aspired project outputs, as is the case with the IST towards SOLL approach in current ES implementations. . IST-SOLL is a German phrase that urges participants to think in CURRENT versus TO BE and is popular in especially SAP-oriented projects.

Thinking about what the future *should* look like especially prevents people from increasing their change capacities. This is exactly opposite to the philosophy behind IOD. Participants with low change capacities need support by interventions and a way of working that stimulates them to think in two paradigms. This requires enabling the participants to think about and reflect on both the content *and* the change process. Increasing change competences is realized by first making participants aware of this catch-22 and secondly by initiating a process in which the participants experience and gradually self-deploy this twofold perspective. The deployment of IOD in the PER context explicitly requires not to specify the outputs in advance. Systems thinking and the accompanying systemic models can guide the participants towards the outcomes. Examples of these systemic models are presented in the way of modelling in section 3.4.1 (pp.139)

3.3.2 *Planning and controlling*

The extension of scope (§3.3.1) and the adapted IOD principles require a different way of controlling than the current ES practice. In chapter two (§2.3.2, pp. 61) it is explained that project management and control in the current ES implementation practice receive an extensive amount of time and adopt a merely functionalistic perspective.

Planning

Such functionalistic approaches to project management and planning should be deployed in the appropriate context. There are several examples of such approaches resulting in successful projects, but the merely functionalistic deployment, as means to increasing the perception of control, often does not apply to the ES implementation project context (Keil, 1995; Alleman, 2002).

Exactly these merely functionalistic approaches that reduce uncertainties and increase the sense of control impede organizational learning and change. They hinder the intermediate adaptation of goals or the way of working during the change approach itself. In complex change processes such an approach will seldom result in changes of social interactions and organizational behaviour (Mohrman & Cummings, 1989; De Leeuw, 1994).

The adoption of IOD and the integration of development as main elements of the implementation process require departing from the single perspective on planning and controlling. Development processes are a different kettle of fish than operational processes, which, in a sense, can be managed and defined. Development processes are shaped by people who are given the responsibility to develop a specific part of the organization according to their mutual insights. To facilitate and manage such processes examples can be found in both agile and participative project management approaches that deal with the interaction of control and release (Hahn, Jarke, Rose, 1991; Kautz & Thaysen, 2001).

Large-scale change projects that have adopted these more participative project management approaches often show higher success rates than centrally and

functionalistically deployed project management (Ledwith, 2000). Agile and participative project management approaches keep the classical triad of scope, time and budget, but deploy it differently. Agile project management lets project managers and employees alike adapt to changing circumstances, rather than trying to impose rigid formal controls, as in traditional linear methods (Augustine et al., 2005). Although ES implementations are not similar to full agile software development projects the elemental principles can also be transferred to the ES context (Alleman, 2002). The deployment of these principles in the PER situation can be described as follows:

Letting go of the fully predictable subject matter
Inherent in development is the impossibility of predicting detailed subject matter at an early stage in the project. Important is to reserve time and space for both design and development processes.. IOD on the other hand is also about functionalism and defining a systemic design. Setting change objectives and monitoring the change process therefore also belong to the integral way of working and controlling. This should not be misunderstood as treating change aspects merely as risks (§2.3.4, pp.67). Development aspects are explicit areas of attention to which time and space is allocated during the development process. This means that structural aspects of the organization and capabilities of people are formulated and monitored prior to and during the project both by consultants and by internal participants. Based on the outcomes of participatory planning and monitoring the applied interventions or tools can be adapted or changed if necessary.

Project management is put into collective hands
The basis for this way of working can be found in the way of self-empowered teams described by Takeuchi and Nonaka (1986). Participants at first have a global view of the final project including the change objectives. In incremental stages these teams work on different design and development assignments, but also take time for collective reflection. They reflect on performance, planning and output and share these aspects with other teams, project managers and the projects steering committee. This way of working has also been applied recently in agile software development projects that include small package implementation via e.g. SCRUM (Sutherland et al. 2007).

PM documentation becomes a collective working document
The participants should be helped with this participative deployment of project management. Project documentation should be lightweight, accessible and comprehensible to a broad audience with different backgrounds (Alleman, 2002). The project plan becomes a working document in which more members can exert their influence than in the present functionalistic project plans. These current project plans tend to assist financial controllers and top management whereas a clear presentation of organizational objectives including its reasoning is essential for the change process (Wissema, 2000). The mutual sharing and adapting of the project documentation or parts of it should be normal business compared with the current hesitating attitude towards changing rigid and complex project documentation.

Role adaptation in the project team

This way of planning also requires a different approach from by project managers and their supporting staff. Participatory project management often uses role descriptions instead of functional project positions (Sommerville et al. 1998). Role adoption connects to competence development and the staffing of the project participations (Schuiling, 2001, Wierdsma, 1999). Participants should not be selected on their personal excellence but also on their personal development path. To combine the standardized role descriptions for effective teams with the change objectives extra roles are defined or existing role descriptions enhanced. These role descriptions exceed the mere deployment of Belbins' types in the team role model. The standardized Belbin or Margerison and McCann's (1995) role types mostly apply to effective project teams, but in large-scale change projects specific roles are defined that apply to the typical projects context. Exemplary are sponsor, change agent or project coach (Visconti & Cook, 2004; Bourne & Walker, 2004; Sukhoo, A. et al. 2005). The role of the project coach/manager and members from the project management team in this situation change to a multidisciplinary deployment of:

- A functionalistic perspective to investigate the triangle of time, cost and scope. This implies that the person plays the role of critical mirror to the change process itself and digs into progress, deviations from planning as well as its causes.
- The interpretative perspective to work closely with project participants and stimulate the dialogue between the different participants. It requires both guiding teams on progress and results as well as sharing ideas about planning, control and project adaptations.
- The critical perspective to tap into the power grid of top and middle management. It requires the collective discussion of political and power issues with participants, sponsor and steering group members.

Controlling

Way of controlling is traditionally managed by the constraints scope, time, and cost. (Gardiner & Stewart, 2000). In chapter two (§2.3.2, pp.61) it is explained that chosen scope in the ES domain is currently too narrow so that project managers focus on a technological system implementation. Because of this focus project and program management perceive change issues mostly as risks that need to be monitored and managed. This approach often gets out of hand due to unforeseen change issues resulting in longer implementation times and excessive cost (see also chapter 1, 1.4, pp. 29). The adoption of IOD does not mean that independent control mechanisms should be departed from. In agile and participative project management approaches controlling is still independent of planning and monitoring. This means a formal independent group of people controls the results and objectives and discusses possible measures or possible re-planning. The deployment of the IOD principles on the PER way of controlling is characterized by:

Acknowledgement of the systemic scope and attention to the change process
The steering team explicitly acknowledges the systemic and extended scope of the project as change process. Project adaptations in the current implementation practice mainly focus on deviations in timing, resources and outcomes. This focus should be extended to include the change process itself. Way of controlling regularly should put the design and development process itself in a critical perspective and enable participants to share their opinions about the development of both these processes.

Acknowledgement of the multiparadigmatic character of the change process
The steering team acknowledges the multiparadigmatic way of thinking and its consequences. Way of controlling thus requires both controlling but also the willingness to let go in specific situations. It is the acknowledgement of the limited predictability of change processes together with a deliberately open sharing of planning and monitoring information between participants, project team and the steering team.

Agreement on mutual rules and engagements
The adapted deployment of way of controlling requires organizational members to agree on a specific set of engagements. Organizations can be characterized by sometimes traditional vertical structures (Schuiling, 2001), coalitions (Mastenbroek, 1993) or hidden rules that frustrate honest participation or letting participants have an equal say. *"The trick is not to control the change directly, but to manage the rules of the game, according to which the changes take place."* (Scott Morgan, 1994). Rules as an independent mechanism can help overcome the hidden structures and facilitate the progress of the change process. This independent mechanism can be created by mutual agreements or 'rules of the game' that are established before and during the project stage. The rules have an official project status and all participants commit to these rules. The engagements or rules by themselves cannot resolve power or political conflicts, but they can function as an independent change mechanism to initiate the open dialogue on specific sensitive issues. Rules should be accompanied by other intervention mechanisms that facilitate the discussion on structures and coalitions. One important accompanying approach is to explicitly include coalitions and social networks as part of the systemic diagnosis and design content (Mastenbroek, 1993).
This will be elaborated on in the use of models, § 3.4.1 (pp.139)

Varied and diverse composition of the steering board
In agile approaches the composition of steering boards or committees is more diverse than in functionalistic project management methodologies. Top management support and participation is still indispensible, but this should be accompanied by a more diverse cast of the steering team. This implies appointing participants from different hierarchical levels in the organization. This facilitates the exchange and sharing process, but sometimes requires participants to adopt different roles in the project.

Role adoption for middle and top management

Management will regularly have to face up to unexpected events for a successful development process. Both middle as well as top management should adopt a more advisory approach when it comes to steering the organizational participants. Although this goes against their proven method of managing operations, their input will be very important in the development process. This does not mean letting go of the projected result of the organizational development, but refraining from interfering with the content or the sub processes that lead to that result. Those with ultimate responsibility face the challenge of letting go of a steering approach aimed at instructing and delegating in favour of the advisory role. Assigning and explaining the role of champion, initiating sponsor or sustaining sponsor can help managers in their personal development process to facilitate this process. Experienced external consultants will need to coach the principals in this respect.

3.3.3 ***Activities & staging***

Outputs are defined based on the systemic design model. Outputs are normally defined functionalistically, but IOD requires perceiving outputs systemically and from functionalistic as well as an interpretative perspective. Outputs in classic project planning are related to detailed predefined stages and activities. Planning in the IOD approach is realized incrementally and situation-specific, but in the perspective of the generic two stage structure (Figure 36).

The first stage is characterized by problem analysis versus the explication of the reengineering ambition. This is a back and forth between sensemaking of current organizational habits and explicating existing issues and problems and reframing existing schemata, explicating the business benefits case and concretising business process visions. The increasing number of participants collaboratively create a systemic redesign and develop their competences by deploying the multiparadigmatic perspectives together with appropriate 2nd order change interventions (Bartunek & Moch ,1987; LaBianca et al., 2000; Balogun and Johnson 2004).

The systemic design is a representation of the new organizational including the configuration specifications of the ES. The establishment of this design as artefact marks the end of the first stage and the beginning of the second stage. The first stage is characterized by a repeating format of the generic activities diagnosis, design and reflection. The situated approach takes both the design content as well as the deployed process into account as subjects in these activities. This implies that both design decisions as well as experiences on way of working or used interventions may lead to a different deployment or staging of activities.

During the second stage the ES is configured and the physical system introduction is prepared. During this stage the competence development process is continued by using the experiences of the design and development process from the 1st stage. Participants who have low-level involvement in the 1st stage, but who will be affected in the new situation will be helped with a competence development program that is based on the 1st stage. Especially by experimental learning (with e.g. prototypes and game play), but also by meetings that facilitate the creation of new social interactions

the formal introduction of ES and organizational structure is accompanied by a simultaneous development process. In large implementation projects, this can be divided into small subsequent introduction waves one after another.

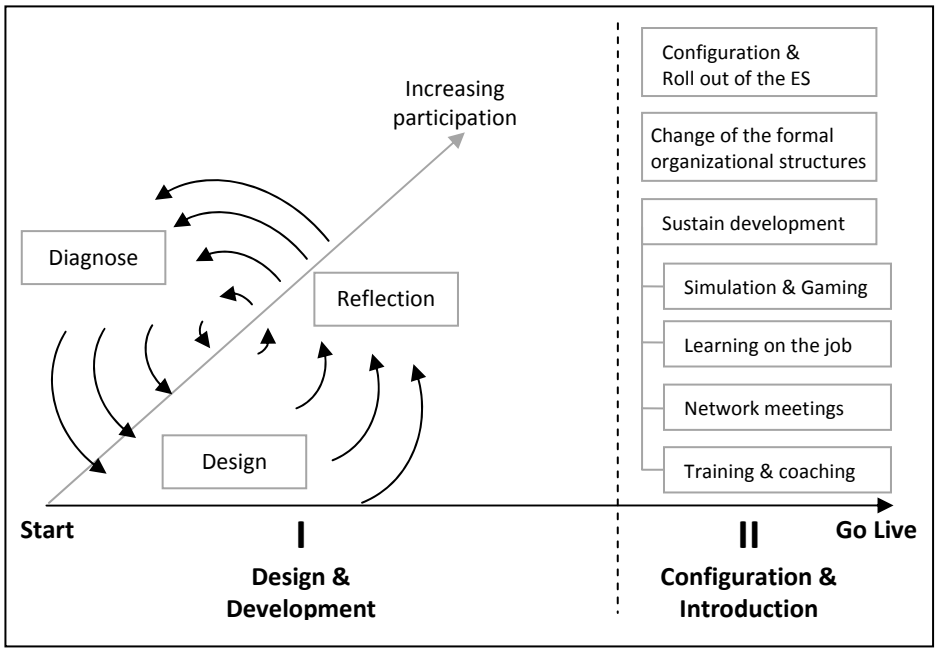


Figure 36 Realization of activities in the two generic stages

3.3.4 *Participation & staffing*

Way of working defines guidelines to organize activities and participation based on scope and the aspired outputs. The organization of participation is one of the most cited critical success factors in ES implementations (Bancroft et al. 1998; Bingi et al. 1999; Estevez & Pastor, 2000; Kawalek & Wood-Harper, 2002).

The organization of activities and participation is investigated in different research domains so as to analyse and describe participation both as artefact in itself as well as a process. Participation degree or participation level is a concept that is often used to describe participation. Effective development of both the organization and individuals requires high levels of participation from challenging up to creation (Passmore & Fagans, 1992). Participation can be explained by more characteristics than just separating high versus low involvement of organizational members.

Table 14 shows the typical issues of participation in the special situation of current ES implementations. It is based on the framework of Katsma et al. (2007) and Cavaye (1995) and specifies the different determinants of participation, in which participation is perceived as a process over time. The table makes clear that the participation problem cannot be simplified to just one problem, but involvement of participants depends on different entangling aspects.

	Theoretical background	Problems in the current ES implementation practice
Level of participation	Recognises that each participant type may have different levels of responsibility and influence during the stages of the participation process. This can be compared to the ladder model of Arnstein, 1969 or the level model of Passmore: & Fagans (1992)	• Low level of participation (Passmore & Fagans, 1992) caused by a small number of actively participating members in the project organization and very limited involvement of organizational members outside this project organization • Limited decision influence of the active part of the line organization that is not part of the project organization (Estevez. 2003).
Participant type	Refers to the proportion of users that participate in the development process and their role (Kappelman & Mclean , 1991).	• Most invited participants are experts in the content matter (either external ES experts or internal experts in information systems and existing business routines). • Participants are unable to facilitate the participative design and development process. There is a lack of deliberate coaching and awareness training for the organizational project team members to support and assist during this process. • The appointed, so-called, change agents do excel in becoming design and system experts (Davenport, 1998), but fail in supporting the necessary other aspects.
Format	Refers to the several different formats of participation (based on Looise et al. 2001)	A twofold participation strategy can be discerned in general: 1. Design workshops and team interventions in the project team inner circle. 2. Large-scale information markets or fairs for organizational members outside the project organization The relatively small amount of bridging between both formats results in a strange dogleg of participation influence
Content	Users may be involved in different aspects of systemic view on the organization (Leids Octaeder). The model of Pasmore & Fagans (1992) by definition takes the STS perspective on system being the social *and* technical system	• Misbalance in subjects that are dealt with during the participation process. In most ES implementations the main focus is on the system design. • Development of change competences is mostly not addressed. When attention is given to organizational aspects (in socio technical approaches like ASAP or Rapid Re) paternalistic- and functionalistic-based approaches rule. • Interpretative development processes with large-scale participation or real influence are neglected.
Timing	Acknowledges that participation can vary in scope during different phases of the innovation process. Based on the packaged implementation process (Markus & Tanis, 2000	Misbalance in timing and degree of participation: 1. Selective participation towards the beginning of the design activities in the project stage. 2. During the end of the project stage the majority of the organizational members get involved, but with a conforming level during training. The possibilities for extensive participation in between these two phases are neglected.

Table 14 Aspects of Participation in current ES implementations (based on Katsma et al. 2007).

Organizing participation in the project stage

One significant barrier to immediately organizing extensive participation during the ES implementation process is that many individual users in organizations cannot participate in the design process, due to time constraints and in most cases the scale of the organization itself. In ES implementations that exceed 1000 or more users it is difficult to let all potential end user have an equal say in the design and change process. In current ES implementation practices this is solved by installing a project team of mostly key users. The substantial remaining part of the organization is involved by newsletters, road shows and at the end of the change process by functional system training. The scale problem cannot be solved by an instantaneous, organization-wide, high-level participation initiative since current operational processes need to continue.

Therefore, a feasible organization of the participation process still requires the distinction between participants with a high-level and low-level involvement during the start. For practical reasons a project organization will still prevail, but a different approach is necessary to bridge the gap between the high-level participating members and low-level participating members. This bridge is not an artefact by itself; it is often misconceived that forming a project organization suffices as one significant part of the participation process.

This 'bridge' should not be realized by setting up more information fairs or sent out more newsletters. It is about initiating personal contact between individuals or small groups on a specific topic or subject. To facilitate bridging during a design assignment there are formats available like participatory or participative design (Boonstra & Vink, 1996; Greenbaum & Kyng, 1991; Limburg, 2002). Swedish experiments have shown that the number of participating members will grow similar to an oil stain by acting on network models (Toulmin & Gustavsen 1996; Gustavsen, 1998). These network models treat the triptych of participation level, format and timing (Table 14) in a gradual perspective.

The network model addresses two significant aspects necessary to succeed in combining IOD in the PER context. It first addresses the scale problem by a growing or network-based organization of the participation process. It secondly incorporates one of the aspects of the aspired outcomes; social networking (pp. 142). This networking approach stimulates the bonding and bridging concept (Putnam, 2000) and can be combined with the deliberate use of "designers" as change agents to bridge and bond between several types of participants. Such change agents sometimes face a difficult challenge (Volkoff, 2001), but their problems are typical of trying to change the organizational structure (Schuiling, 2002). Perseverance and social networking of such agents has shown beneficial results (Newell et al. 2002).

To accomplish this way of working a heterogeneous group of participants should be installed and social networking as *bridging assignment* should be one of the topics in the participation content. Secondly, the support from external change agents and sponsorship from top or higher management are an essential contributor and facilitator.

Staffing

The deployment of the adapted way of working and controlling also requires different staffing and selection of the projects participants. In current methodologies the participants are mainly selected on their current (often IT-emphasized) knowledge and future interaction with the information system. Positions within the project team are staffed by functional project team positions such as end-users, key-users, IT-consultants, Business Process owner, project manager, etc. (Value SAP, 2005). Placing participants in such positions often does not fully release them from their current schemata or working practice. The staffing of the project team can be realized by roles instead of such functional descriptions. Role-based staffing enables participants to be released from their prior position and function in the line organization (Bresnen et al. 2003; Wierdsma 1999).

As explained, the problem of scale is still efficiently organized with the instalment of a selected set of high level participants in one or multiple teams. This initial core project team should consist of both internal and external participants who are able to fully participate with a high participation level (creation).

To create a different way of working the existing selection criteria and role descriptions of the participant types in the team must be improved. Some existing team roles from the current implementation practice are applicable, but need to be extended to incorporate the integral change approach and its organization of the participation process. The group of participants with relevant business process- and IT-related knowledge should remain. An extra heterogeneous group of participants who can facilitate the integral design and development process is required in addition to this first group.

The competences that accompany these roles are related to the systemic design and development assignment. Typical role characteristics are the ability to create extensive social networks in the organization and taking an independent and sometimes even critical perspective on current ways of working. These role characteristics should not necessarily be combined in one and the same participant. It also is not necessary for all internal team members to show the necessary competences from the start since one of the fundaments behind IOD is the mutual competence development during the change process. To support this competence development process a number of experienced external participants is needed (see specification 5 in §3.2.5). Table 15 displays a generic overview of team roles (staffed internally and externally).

Source	*Role*	*Description*
Internal	Change agent	Change agents with affinity for competence development or a critical view on the organization. Able to create extensive social networks
Internal	Sponsor	The sponsor can take an independent position and supplies the project team with all its necessary resources. This not only implies financial or human resources, but also the deployment of necessary interventions if the change process is obstructed. The sponsor role requires an executive position in the line organization
Internal	Expert/ Specialist	Experts in content matter. Typical key users with system support function in today's practice. People with in-depth know-how on present business process and current information systems.
External	ES system expert	Consultants with in-depth module-specific know-how on the appropriate ES.
Internal	Expert	Legacy and existing IS. Current systems management practice
External	Business process analysts	Consultants with expertise in business process reengineering, ES implementations and 2nd order change
External	Change agent / coach	Experienced change consultant with experience in integral organizational development and preferably affinity with IT implementations

Table 15 Generic staffing roles for the PER project stage

3.3.5 *Conclusions on framework*

The previous analysis shows that the adoption of the newly derived philosophy requires adaptations to the way of working and controlling of the current PER practice. The current project management principles in ES projects are adapted by the synthesis of the PER-specific IOD principles and participative and agile project management principles. The adapted way of working and controlling can be defined by the following specifications:

1. **Extension of scope.** The project stage of the PER implementation aims at the integral realization of a systemic design and competence development of the participants. The systemic perspective that is necessary for the deployment of IOD also applies to project planning. Change aspects are not treated by risk mechanisms, but fully included in the planning cycle. The design and development process and its outcomes are included as two equivalent aspects of the projects' scope. Integral planning means the acknowledgement of the limited possibilities to plan ahead in detail, but also to monitor the change process from an integral perspective. Criteria such as initiatives for changing social interactions and competence development are included in the planning and control scope.

2. **Participative planning**. Way of controlling is still realized by the classic triad, but adopts an incremental way of controlling based on participative and agile project management. Project work is organized in self-steering teams or clusters. Project planning is an explicit part of the participation process and the participative content. This implies a change in the way of working and role of project management. The project management staff takes on more of a coaching role compared to what is defined in functionalistic project management methodologies. Participants responsible for project management adopt both a monitoring and coaching role and also act as a critical mirror to the change process and its outcomes. It also requires a different format for project documentation than in functionalistic approaches. The project documentation should be lightweight, accessible and serve its purpose as working document to the participating members.
3. **Independent Control mechanism**. Monitoring and control in the adapted way of working and controlling remain unchanged. An independent steering committee is responsible for controlling and jointly agrees on actions or corrections in scope, time or budget. To align to the participative project management approach a diverse selection of the steering team is recommended. Top management commitment and ownership in the steering committee is required, but the steering committee does not necessarily need to be staffed with high-level executives only. The steering committee is committed to the philosophy behind IOD; It is aware of its meaning and both acknowledges and champions the design and development process with its partly uncertain outcomes.
4. **Activities and Staging**
   The first stage is characterized by repetitive problem diagnosis, design and reflection. In short this is the back and forth between problem analysis and the explication of the reengineering ambition. During this repetitive cycle-wise deployment of these three activities the participants experience a 2nd order change process and create a frame-breaking systemic design. The establishment of this design as artefact marks the end of the first stage and the beginning of the second stage. During the second stage the ES is configured and the physical system introduction is prepared. During this stage the competence increase process is continued by using the experiences of the design and development process from the 1st stage.
5. **Participation and staffing**
   Participation is organized in an initial project team that creates increasing participation. The successful realization of competence development requires that this team consists of internal organizational members who also meet specific profiles. Participants should not be selected on expertise of processes and system content matter, but on their change capabilities. The increasing number of internal participation requires the explicit assignment for the initial change agents to set up a growing network of participating members. The growing network model facilitates a gradual course of participation level and format during the project stage.

3.4 Impact of the IOD philosophy on Tools

The ESIMM element methods and instruments define the different method fragments that can be used to realize the way of working of framework. Not only does it specify the methods, but it also explains how these methods fit way of working and controlling. Because of the PER-specific design context special attention is given to how models are used. This section is structured by a comparative analysis of the five principles from section 3.2.5 and the specifications of way of working and controlling in §3.3.5. It consecutively explicates:

3.4.1 Way of modelling
3.4.2 Way of support/products
3.4.3 Conclusions on tools

3.4.1 *Way of modelling / model*

The main perspective of the models used in the current ES implementation methodologies, using the classification of Avison and Fitzgerald (2004), is of the iconic or schematic type. In the ES practice the main focus of the modelling instruments is on process modelling, data analysis and, if applicable, analysis and design of workflow and supply chains (Biazzo, 2002). The majority of the tools are supplied by third parties. Mostly semi-formal representation techniques are included such as e.g.: EPC's, Flowcharts, data flow diagrams (DFDs), unified modelling language (UML) diagrams and entity relationship diagrams. The formal logic and language are closely connected to the ES vendors criteria (e.g. EPC's for SAP).
Based on the specifications from section 3.2.5 and the extensions described in framework (3.3) way of modelling should be extended from a process and data-based iconic perspective, to a richer modelling view on the change content.
The participation specifications require models as well as their methods to also be accessible to a broad and inexperienced population and to be suitable for collaborative approaches in small or larger group settings.
Several examples from both the change as well as the IS domain can facilitate these requirements. According to Avison & Fitzgerald (2004) the informal representation techniques such as text, rich pictures and animations can be combined with the iconic types. Exemplary mature applicable techniques are the rich picture concept (Checkland, 1995) or the narrative concept in ETHICS (Mumford, 1985).
In the formal modelling domain progress is made with newer initiatives in BPML and extensions of UML. The UML language is becoming a quasi-standard in the software engineering domain and the BPEL4WS in the ES and SOA domain. Extensions are developed to support process modelling and human interaction, such as the enhancement of BPEL with BPEL4People.
Despite these initiatives, the organizational attributes are still not, or only scarcely, incorporated into the same models used for process design. Concepts such as Ethics and the rich picture incorporate different representations, either a narrative or combinations of iconic and narrative representations. Such representations cannot be

automatically linked to BPEL or other formal process languages or modelling techniques. Especially the explicit combination of both domains is required to accommodate the systems thinking and sensemaking process during the design activities (Mulder, 2004).

We can conclude that, despite several initiatives, there is currently not just *one* modelling method or tool in the ES domain that includes all these aspects and supports the systemic design process. There are nevertheless different ways to support the different more integrated way of modelling (Wijers, 1991, de Vreede, 1996). It requires a pragmatic and consequent approach into which different models and methods are combined. The main objective of this modelling approach is not to select and deploy the single excellent formal description of the organizational system in all its entities, but also to depict and share the total systemic picture with several participants. The adoption of this extended way of modelling requires a different way of working and thinking by current ES experts who sometimes favour iconic and formal process languages due to the fast transfer to the ES configuration process.
The diverse and pragmatic approach to modelling and the use of models has shown good results. A pragmatic approach in which different models or tools are combined goes hand in hand with design speed, fun during the process, design quality and increased understanding (Jensen & Scacchi, 2005; Hedman & Borell, 2004; Bødker 2000). Specific deployments of these principles can also be found in the ES domain (Gibson Holland & Ligt, 1999). The use of narratives for example is described by Alvarez and Urla (2002) to construct an ERP system as an integrated system including the elaborate description of the organizational values.

Structures as guiding models
In section 3.2.1. it is explained that the interaction between design and development and the multiparadigmatic perspective aims at realising outputs with two distinctive characteristics. First, the more functionalistic, tangible outcomes and secondly the more interpretative, intangible outcomes. In § 3.2.1, pp.104 the coherence between these two outcomes is explained as the ourobouros between content and process. Designers and participants with low change capabilities often find this concept very difficult. A concrete deployment of this “continuing” concept is to organize the change content by guiding structures. These structures give participants grip and lead them towards outcomes, but simultaneously they also support participants in their development process. They contribute to both tangible as well as intangible outcomes.
Structures can be characterised by their guiding properties without being directive. To facilitate participants in the PER project stage the following three exemplary models can be used:

Deployment of Systemic Design models
The systemic perspective does not define the main elements and also doesn’t show how the several elements are connected. This is because this is situation-dependent . The objective behind the systemic model is to create a generic structure that

participants can gradually fill, adjust and finish to form a description of the change content. The systemic design can thus be seen as a structuring aid as well as an outcome. These models should be seen as functionalistic descriptions of outputs, but also as interpretive frameworks to these outputs. There are several systemic models, e.g. Figure 5 pp.26. Figure 37 presents a systemic view by Salminen (2000). This model shows exemplary elements from an enterprise in a systemic perspective.

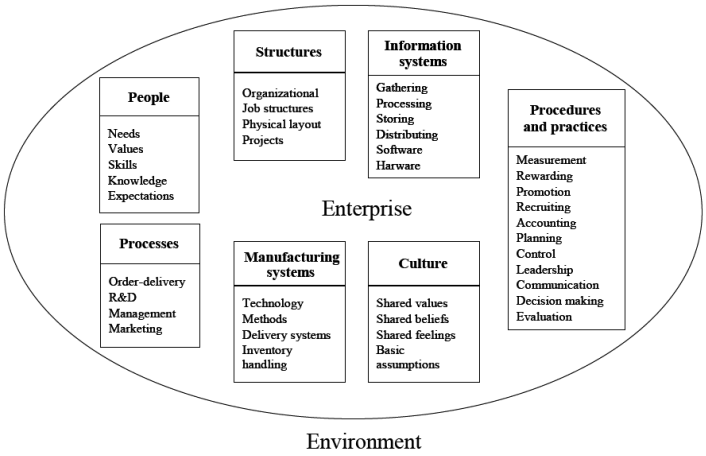


Figure 37 Systemic view on the subsystems of an Enterprise (Salminen, 2000. P.42 based on Beer, 1980 and Cleland and King, 1983

Systemic design as result of IOD includes a tangible systemic description that is composed of in-depth and detailed drawings, functional and tasks descriptions, but also competence profiles. The systemic design is especially about being exhaustive and the explication of relationships between the several subsystems or parts of the entire holistic perspective of the organizational change content.

Social networking

The creation of new social networks and interactions is introduced in § 3.2.3 (pp. 114) as an essential part of the organizational development process. The exchange of insights and interests, but also getting acquainted with new people is an important aspect of the social learning process. The creation of new social networks is not only an intervention mechanism that supports this process, but also a deliberately aspired outcome The introduction and deployment of the ES will force organizational members to start working in different settings with new collaborations, dependencies and interactions. A multiparadigmatic deployment results in experiencing these social interactions as well as in the explication of these new social structures including the dependencies and formal structures such functions, positions, authorizations and responsibilities. Social network diagrams (Figure 38), as a part or supplement of the previously phrased systemic models, can assist in charting existing social networks, but also in describing new networks and explicating interactions as outcomes.

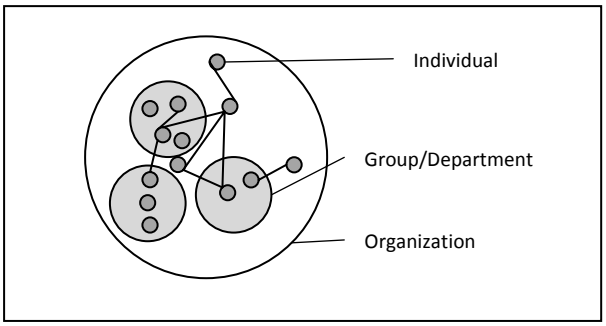


Figure 38. Social networking diagram based on Dijk van J.A.G. (2001)

Explicating competence increase

Competence increase is an important contributor to the design and development process. A constructivist approach to competence is introduced in §3.2.4, pp.117. To facilitate the deployment of this approach a supportive model is developed by Schuiling (2001) that enables structuring and facilitating the systemic thinking and design process. The three-layered model (Table 16) is based on andragogy Nijk (1978) and McClelland, (1973) and divides competence increase in the professional working context into three dimensions; the technical, narrative and affective dimensions.

The technical dimension	The technical dimension describes *the person's abilities to realize intentions*. The knowledge, skills and arts to achieve something.
The narrative dimension	This level concerns the stories and motives behind peoples' actions and behaviour (McClelland, 1973; Rogers, 1986; Boonstra & de Caluwe, 2006). The narrative dimension concerns *the abilities to be wanting something*. Each individual acts according to his or her specific story, experience and intentions. The narrative dimension explicates formulating, ordering, considering and choosing the intentions.
The affective dimension	The affective dimension concerns *the abilities to shelter one's actions* and is about loving its acting and behaviour. This dimension is not about the daily alternating moods or emotions, but about the fundamental state of mind a person has during the change process.

Table 16 Three dimensions of personal competence

Competence increase during a change process not only means the improvement in one of the three dimensions, but also an increase in a person's consistency among these three dimensions. Organizational members experience personal development if they act based on skills, ambitions and experiences, while their actions are in accordance with their emotional findings and intentions (Schuiling, 2001; Huy, 2002; Huitt, 2006).

The model can be deployed as constructivist model to explicate competences during the design and development process. It gives a generic structure of how competence increase can be perceived, but the deployment and completion of the model are situation-specific and are left to the participants themselves. When competence is defined functionally, explaining future knowledge and skills, the focus is merely on the technical dimension. The model on the other hand can also be used to focus and structure the dialogue of people's intentions and actions in a specific setting. This deployment emphasises the narrative dimension. Competence encompasses many different meanings and perspectives from the several participants. The process in which mutual expectations and meanings are exchanged and explicated can first lead to a common and increased understanding of the competence concept and secondly to a situational-specific explication of competence that fits the different characteristics of the ES implementation.

3.4.2 *Way of support, tools and products*

Way of support defines all sorts of support from the methodology itself and its supplier. This can be realized in several formats, called the products within the methodology (Avison, 2004). It can be handbooks, 90 days online help, courses, ICT tools or methods, consultancy, etc. According to Wijers (1991) way of support is not only about the presence of methods and tools, but also about the explanation of why and how these tools can be applied.

The explanation of IS scholars of the way of support is highly focused on the system definition and specified as either automated or non-automated support (Tolvanen, 1998). Compared to the analysis in the modelling section methods and tools in current implementation methodologies are specified to process design and project management. The new philosophy (3.2.1) and the extensions described in framework (3.3) require a broadening of this perspective.

Way of support in the broader perspective of an organizational change process also includes how participants help each other or how people are organized to support each other. This latter aspect directly relates to the participation principles from §3.3.4. Way of support is thus also about how people help each other, facilitated by or without methods or tools. This human interaction as way of support matches the 5th principle in §3.2.1, (pp. 114). This principle requires the presence and help of change expertise either in the form of external professional change consultants or internal change agents. This should be accompanied by a deliberate process to turn members of the line organization into change agents (Pascal & Sternin, 2005; Bies, Bartunek et al., 2007). This latter method produces extensive support and helps the organization in

its process of becoming more and more independent of external knowledge and expertise. It is one of the objectives that Boonstra calls “increasing the organizations’ change competences”.
Schooling and training material is also needed to introduce the concept design and development to the participants. This schooling material should not focus on teaching organizational change (§2.4.4, pp.74). The material should focus more on relationships between explicit interventions or tools that can support the design process, the development process and the interaction between both.
Way of support requires an extension of the typical process modelling-based tools and techniques described in the previous section. The way of controlling and working in *framework* demand specific tools or techniques. In the organizational change domain scientists and practitioners have developed extensive toolsets, intervention methods and techniques to facilitate different change processes. Interventions are a generic term to describe a set of sequenced planned actions or events intended to help an organization increase its effectiveness. (Cummings & Worley, 2001, p. 142). Interventions, workshops or events in general are: *“… the vehicles for causing change”* (French & Bell, 1995, p. 156). Interventions can be selected depending on target audience (individual, group), objectives of the intervention or the internal mechanism (e.g. confrontation, playing, creation of awareness) (Boonstra et al. 1998). An overview of a selected set of intervention techniques from the OD domain that fit the five specific IOD principles is presented in Table 102 (Appendix, pp.484). This selection is based on the five intervention mechanisms from §3.2.1, pp.104

Besides the various described interventions the design assignment plays a major role in the ES project stage. Therefore design workshops in the current ES practice are dominant. Such workshops are mostly realized within the project team context and results are shared by newsletters or functional training with the low-level participants.
Participatory Design (PD) in both the field of organizational science as well the IS domain is proposed as a method or approach to connect participation with complex design activities. Participatory design set-ups in the ERP domain are confronted with shortcomings due to the simple limitations in numbers (Dittrich & Pris-Heje, 2006). (Oostveen & Besselaar, 2004). Initiating democratic models in which extensive PD methods are used such as surveying, interviewing and design workshops lead to unmanageable design projects and canalization of design decisions. This problem is addressed by several practitioners by the development of so-called Large Scale Interventions (LSI) (Jacobs, 1992) or Large Group Interaction Methods (LGIM) (Bryson & Anderson, 2000).
Several practitioners have derived large-scale interventions, often based on the previously described classic small-scale OD interventions. During a LSI up to 1000 participants can simultaneously work on organizational problems (Dannemiller & Jacobs, 1994). Despite the lack of scientific evidence on their effects (Bood et al. 2000; Bryson & Anderson, 2000) the foundations behind these methods are sound (Holman and Devane, 1999). There is an extensive amount of different LSI’s based on organizational development and some more specifically on the social constructionist line of thinking (Bunker & Alban, 1997).

LSI's can contribute to and initiate specific aspects necessary and relevant for this specific problem domain. They can create energy for enactment, initiate the start of new relationships and stimulate dialogues or collective thinking processes. On the other hand LSI's should definitely not be perceived as the 'holy grail' offering *the* solution to all problems of the large-scale process.
An in-depth analysis of specialist business processes is sometimes too complex in a large-scale setup and takes more time. The in-depth scrutinization of specialist business scenarios then is sometimes better off in smaller PD settings. The presentation of results and collective sensemaking process then again can take place in large-scale settings.
Based on these characteristics and the ES implementation dynamics an alternating participation format is necessary. An integral structural change and competence development process requires a well-considered balance between large-scale interventions in addition to classical smaller-sized interventions such as coaching or participatory design.
There is a trade off between large- and small-scale participation settings. Both approaches have their proprietary advantages and shortcomings and there is not simply one perfect generic approach that covers these aspects. The essential improvement over the current use of participation format is the deliberate alternation of both formats and the mutual adjustments to LSI's and smaller PD sessions.
The generic LSI concept can be further specified or improved by the following methods:

Large-scale investigation and feedback
Large-scale sessions and participation can be supported by survey-based interventions such as Survey feedback analysis (Bennebroek, 2003 Schuiling, 2001). These interventions aim at investigating specific opinions, a situation or status on different items during the change process, and especially collectively discussing survey results.

Socialising events
In the current implementation practice the main focus is on a formal organization of participation. A conscious mix between informal and formal sessions is required to support initiating new networks and creating personal relationships. In today's implementation practice this demands the addition of informal sessions. There is good experience with the deliberate combination of informal and formal elements into design workshops.

Gaming and simulation
Several scholars (Smeds, 1997; Duijn et al., 2003; deCaluwe, 1996) state that the introduction of joyful elements substantially improves the change experience. The integration of learning and playing with for example gaming and simulation shows an enhanced experience for participants, improved social interactions during the process and it also boosts the quality of the design outcomes from these sessions (Barreteau, 2003; Feinstein, et al.. 2002).

New developments that connect gaming and organizational development also include process- and workflow-based gaming during system implementation and design (Ruohomäki, 2003). Recent developments in simulation-based gaming can increase the sense of reality (Lindley, 2005) and even after the implementation process is over these simulations accompany the organizational members since they give additional information or functionality than the plain ES. (Wenzler & Chartier, 1999)

3.4.3 *Conclusions on tools*

The integrative notion behind IOD reverberates in the integration of the methods and tools. A vast amount of methods and instruments is available to assist participants in several objectives. The IOD philosophy that is adapted to the PER context requires the methods and its deployment to pay attention to the following objectives:

- The methodology should mostly suggest methods and only prescribe methods in generic formats. Participants are urged to try out and experiment as much as possible to develop their competences
- The current modelling practice is focused on iconic process design and definition of information requirements. The IOD philosophy demands a pragmatic approach to modelling a systemic representation of the change content. This can be realised by the extension of the merely iconic models to include e.g. narratives and systemic structures such as social interaction diagrams.
- Specific attention should be given to the deployment of the methods to support the integral design and development notion. This can be achieved by the use of methods and instruments that are able to combine these notions into one method. An example is the collaborative design workshop. Specific attention should be paid to the deployment of methods with a merely interpretative or functionalistic focus. The latter holds for classic process and IS modelling techniques. These tools especially require the pragmatic integration or combination of other non-iconic methods to create a systemic design.
- The integration of competence development with the large-scale setting of the PER ES process requires a combination of participatory design and repetitive LSI's in a growing participation model. Multiple LSI's along the project timeline can help organize the increasing amount of participating members, but also forums, blogs and collaborative workspace can help this process. The alternation with smaller-scale participatory design found collaborative workshops facilitate profundity and specific design items.

3.5 Design requirements for an integral change approach

In the previous four sections, the analysis of IOD in the perspective of the ESIMM is elaborated upon. The design requirements for a generic implementation methodology can be derived based on these analysis results. The combination of these findings defines the design requirements for a deployable methodology. Figure 39 shows the design rationale subdivided in the ESIMM elements based on the findings from chapter three of the current ES implementation methodologies and implementation practice.

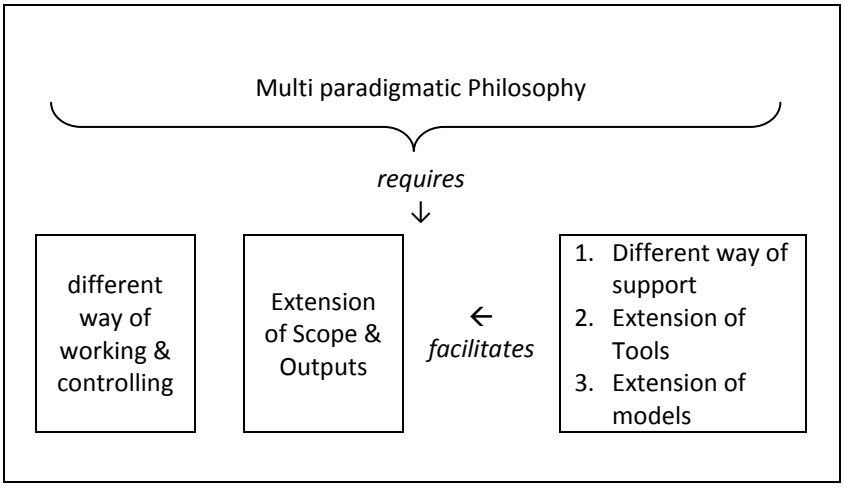


Figure 39. Design rationale to apply IOD in current ES implementations

3.5.1 ***Philosophy***

A PER ES implementation requires a situational-specific planned change approach that initiates integrated design and development processes. During this process, three substantial processes take place: working, changing and learning. Five essential principles found this philosophy and define framework and tools:

1. Alternating functionalistic and interpretative perspective
2. Planned and staged process approach
3. A high level of participation.
4. Application of systemic view on the change content
5. Support for competence increase of the organizational members by building relationships and deploying process consultation.

3.5.2 *Framework*

The analysis of the IOD philosophy in the perspective of the PER ES framework results in an adjusted way of working and controlling. The following design specifications explicate the adapted framework:

A	The project-based approach remains, but an adaptation of current ES project management principles is required: a. Continuous emphasis on design and development. Create awareness and make explicit time for the development perspective in a highly dominated functionalistic and design-based domain. b. Extension of the project's scope and objectives. Extension of the projects objectives from a merely information system introduction to a technologically driven organizational change process. This is summarized in three main objectives that have subjectivist/objectivist properties: • A systemic design that includes classic information system design, but incorporates a systemic perspective on the entire change content. • Creation of new and different social structures and interactions. • Competence increase. Participants are stimulated to take a constructivist approach to the competence concept
B	Organize activities and participation on the following objectives: a. A growing network model to organize extensive participation in an efficient setup b. A deliberate focus to exchange organizational members in new social settings during the project stage c. Role adoption as measure/intervention to facilitate competence development d. Network format to create new social interactions and initiate discussions on coalitions

Table 17 design specifications for framework

C	Planned and generic two-staged approach to organize extensive participation and sustain competence development during the reengineering and later the ES configuration activities I. Stage I marks the design and development for an extensive number of organizational members • Use of internal expertise and people. • Create an accepted systemic design and initiate competence development II. Deliberate focus on continuation of competence development during configuration and introduction stage after the systemic ES design is approved. • Passing on of experiences by internal people that act as internal consultants, support or change agents. • Use of extra methods, like experimental learning and coaching rather than the merely classical ES training.
D	Deployment of the systemic design approach to capture the design content and use systems thinking. Business processes can be taken as guiding structure to give participants a certain grip, but the holistic quality of the systemic model should be preserved since this facilitates systems thinking for the design and development process.
E	Deliberate and extensive support for the organizational members a. Use of internal change capabilities and introduce external change capabilities if necessary b. Deployment of process consultation (explicit focus on creating helping relationships and room for an open dialogue). c. Clear and enduring top management support and sponsorship, which includes exemplary behaviour from top management d. Coaching and role development as measures for competence increase
F	A situated process approach in which the participants deploy methods and instruments according to their context assessment. a. Requires deliberate reflection moments to discuss deployment and outcomes. b. Incremental and participative deployment of project monitoring and planning. c. Planning is based on two generic stages d. Project documentation is a working document
G	Control mechanism remains unchanged, but the steering council is staffed variously. a. Cast and staffing of the steering council is changed simultaneously with change objectives b. Requires role adoption, mutual agreement on rules and exemplary behaviour of sponsors and/or top management

Table 17 (continued) design specifications for framework

3.5.3 ***Tools & Instruments***

The adopted IOD philosophy in the PER context requires both an extension of the used tools as well as a pragmatic approach to the way of modelling. The design specifications for tools include:

Way of modelling.

- Extension of modelling methods to richer descriptions of the change content in an accessible way and representation,
- Pragmatic deployment that combines existing iconic business process-driven models with non-iconic representations or systemic structures
    - Focus on distinctness of information requirements and system functionality and process logic.
    - Extension and integration with different modelling methods that are able to facilitate the discussion and design process and define organizational aspects such as skills, knowledge, mood, social interactions etc.

Way of support

- A balanced combination of technical tooling, of physical handbooks, versatile digital media, but especially human support
- Extension of merely information system-based products to include organizational social and system-based products:
- External assistance not only based on the configuration of the ES and the business process analysis. The team of external help should be assessed on: :
    - Affinity with integral organizational development and planned change
    - Affinity with large-scale packaged software such as ES and its accompanying project dynamics.
    - Aim should be to transfer competences and knowledge to the adopting organization

4. Design of ES*i*OD

--Design is not just what it looks like and feels like. Design is how it works.
Steve Jobs (1955 -) --

4.1 Introduction

Chapter 4 finalizes the route from chapter 2 and 3 towards the concrete applicable elements of the change approach based on IOD. It focuses on the ESIMM elements *framework* and *tools*. This chapter will not go into the details of the several steps of the design process and versions of the design. Instead it will describe the design considerations in hindsight, but moreover it will explain the main fundamental elements of the design and the logic behind their composition. The design of the change approach is called ES***i***OD, which stands for Enterprise System implementation and integral organizational development. The italic *i* symbolizes the integrated thinking between technology ***i***mplementation and ***i***ntegral organizational development. This approach will be described in different sections:

Introduction and generic structure of ES***i***OD

- In section 4.2 the main foundations of ES***i***OD are explained. Firstly, it presents the generic structure of ES***i***OD. Secondly, it bridges the main outcomes of chapters 2 and 3 towards the reasoning behind the design itself and the design considerations;

In-depth explanation of the elements of ES***i***OD

- ES*i*OD uses the ESIMM element *Framework* in three different assignments. These assignments are explained in 4.3 to 4.5, each with its accompanying *tools and instruments;*

Generic deployment of ESiOD

- ES*i*OD is a pragmatic approach that offers the participants elaborate room to define its deployment themselves. Section 4.6 accordingly gives some generic guidelines for the deployment of ES*i*OD.

4.2 An introduction to ES*i*OD

This section will describe how the elements of the ES***i***OD fit the design specifications formulated in chapter 3. We will first introduce the main elements of ES*i*OD, its connections, and generic deployment. Secondly, we explain the general design considerations. The detailed design considerations behind the choice of instruments and way of working are explicated in sections 4.3 to 4.5, which explicate the individual elements in-depth.

4.2.1 *Introduction of the basic elements of ESiOD*

ES*i*OD is formulated as a pragmatic approach that can be used stand alone or next to existing implementation methodologies. It includes a small number of products as way of support and especially stimulates participants to use each other's experiences and knowledge. ES*i*OD is based on three connecting equivalent assignments. The idea behind the assignment concept is:

1. Assignments are a comprehensible way towards a concrete presentation of objectives without an exact prescription of the different ways of working and possible activities;
2. Assignments deliberately focus on extensive participation by making the participants[4] responsible for its accomplishments;

Figure 40 shows the generic structure of ES*i*OD. The three assignments encompass the different elements of the ESIMM aspect *framework*. The content matter in the three assignments guides the participants in the necessary design and development activities and includes the adoption of a multiparadigmatic perspective. *Methods and instruments* are suggested in each of the three assignments. In most cases they are described in a generic format, so there is room for the application of method fragments and self-development when the different tasks are fulfilled. The three assignments can be mapped to the three entangled crucial building blocks of integral change; content, organization and behaviour (Cozijnsen & Vrakking, 2003 pp. 15). The equivalence between the three assignments deviates significantly from the existing implementation methodologies which merely concentrate on the design task and project management. ES*i*OD focuses equally on:

1. Creating a systemic design
2. Creating new social interactions by organizing gradual, but extensive participation
3. Supporting and experiencing competence development

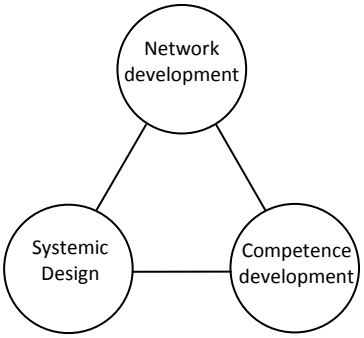


Figure 40 Three assignments in ESiOD

[4] Participants are the internal organizational members as well as external experts

In short, the three assignments, in random order, consist of:

Network development:
This assignment aims at organizing large-scale participation in a growing network model. It acknowledges the need to repeatedly exchange participants during the design and development process. It supports the creation of new social interactions and initiates setting up open dialogues on existing networks of coalitions. It exceeds the installation of a project organization and pays attention to gradually creating awareness, knowledge and acceptance for the future organizational situation in a significant part of the line organization.

Systemic design:
This assignment instructs and helps the participants to create a systemic design that covers their organizational needs. The systemic design starts from the high-level ambitions derived in the first stage of the ES implementation. It acknowledges the specific characteristics of the Enterprise System, the PER design rational, but also includes the necessary structural, social and behavioural parts of the future state.

Competence development
This assignment focuses on the facilitation of competence development simultaneously with the systemic design assignment. It acknowledges the different situations of individual participants and helps experience personal development. This assignment is concentrates on the increase of skills, experiences and also pays attention to the affective components of the change process. This assignment initiates personal development for a significant part of the organizational members prior to the actual system introduction stage and explicates competence development for the rest of the organizational members prior to and during the system introduction.

The three assignments are equivalent to and intertwined with one another. ES*i*OD includes the following connections between the three assignments:

Systemic design ←→ network development:
This connection aims at creating a relevant and accepted design and stimulating participation with concrete tasks. To create a systemic design various perspectives on the design problem are necessary. A diverse network of participants from the line organization increases the different aspects and organizational relevance of the design. On the other hand, the design assignment is a guiding and stimulating principle for growing participation.

Systemic design ←→ competence development
This connection personifies the catch-22 described in chapter 3 (§3.2.2). Explicating personal development and the meaning of competence in the systemic design assignment facilitates the competence development process of the participants. Realizing a systemic design requires knowledge increase, reframing of cognitive schemata and consciousness development of the participants.

On the other hand, the competence development process of participants improves the design quality and its completeness. This combines the basic rationales behind IOD: the mutual design and development process and its interactions.

Competence development ←→ network development
This connection combines social interaction and group processes and their important contribution to individual competence development of the participants. The release of participants from their "normal" working situation and environment results in different social interactions. In these new social interactions, exemplary behaviour, sense making processes and mutual knowledge exchange improve change capabilities, knowledge increase and the organizational learning abilities. On the other hand, the explicit assignment for competence development urges participants to look for different and new ways of support and initiate new social networks. This connection is an important contribution to the hidden introduction/implementation process as described in chapter 3 (3.2.1)

Interplay between assignments and the development organization
The assignments in ES*i*OD include several generic project management principles, but it takes a different perspective on the project team. ES*i*OD is based on forming extensive participation from the line organization. The adoption of a paradigm spanning approach requires these participants to be part a coherent group that deliberately focuses on both the design process as well as the change process. This group is called the development organization.

The development organization
The development organization is not just a different name for the project team that is used in current ES implementations. The development organization is responsible for accomplishing the three assignments within ES*i*OD (Figure 40). The development organization receives the multidisciplinary assignment to create a systemic design, shape the organizational change process, facilitate participation from the line organization, and initiate competence development. The substantial number of participants in the development organization is formally released from their prior position in the line organization and its daily operational tasks. The concept of the development organization can be compared to the method for collective competence increase as described by Wierdsma, 2006 (in Boonstra & de Caluwe, 2006). The development organization will gradually increase in size during the change process by the deployment of network development. This is further explicated in Assignment A, Network development (§4.3).

Staffing
The development organization consists of internal and external members. It represents a mixed, but well-balanced part of the entire organization. The internal organization should provide participants from top and middle management, typical experts in the subject matter and internal change agents. The external consultants from the partners

should preferably have experience in the combination of the ES implementation process and organizational change. A substantial number of specific change consultants with experience in integral organizational development is necessary. The staffing of the development organization is based on roles and not on prior positions. This will also be further explained in §4.3.

Dynamic composition and structure
Project teams, in the current implementation practice, are often structured according to the typical functional modules of the ES or based on end-to-end business processes. This organizing structure may still be necessary for the development organization at the beginning of the project stage, but a dynamic organizational structure is necessary to facilitate spreading of knowledge (Pan et al. 2001), and to create new social interactions (Beer & Walton, 1998) and competence development (Kræmmergaard & Rose, 2002). The structure in the development organization is thus deliberately changed throughout the project stage. This may mean an internal reshuffling of sub groups, but also the exchange of different participants with the line organization.

4.2.2 ***Explanation of general design considerations***

One of the main foundations of ES*i*OD is the integrated notion behind design and development. The combination of interventions (tools) into three enacting assignments is especially based on this integrating philosophy. This means the instruments cover and integrate multiple objectives such as large-scale participation and collaborative design or competence development and participative project planning. Figure 41 shows ES*i*OD unravelled in the ESIMM elements.

Philosophy
The way of thinking behind ES*i*OD is “Design and Development”. The employment of this philosophy in ES*i*OD is first realized by a deliberate explanation of this way of thinking and working in the approach itself. In the documentation and training material the differences between the classic functionalistic perspective and the multiparadigmatic perspective are explained. Secondly, the elements within *framework* and *tools* comply with this multiparadigmatic perspective and also facilitate this ‘boundary spanning approach’ in the design activities.

Framework
Framework organizes the process and guides the way of working during the project stage. ES*i*OD is based on the rationale of the change process model in Figure 34 (pp. 121).ES*i*OD considers the three processes of designing, changing and learning as its joined fundamental contributors. Each assignment emphasizes one of these three processes, but it is the united deployment of the three assignments that collectively realize a systemic design and organizational development.

Tools

Different methods or instruments support ESiOD. In Figure 41 the methods are related to their main assignment. Yet the methods also facilitate other assignments than its major contributor does.

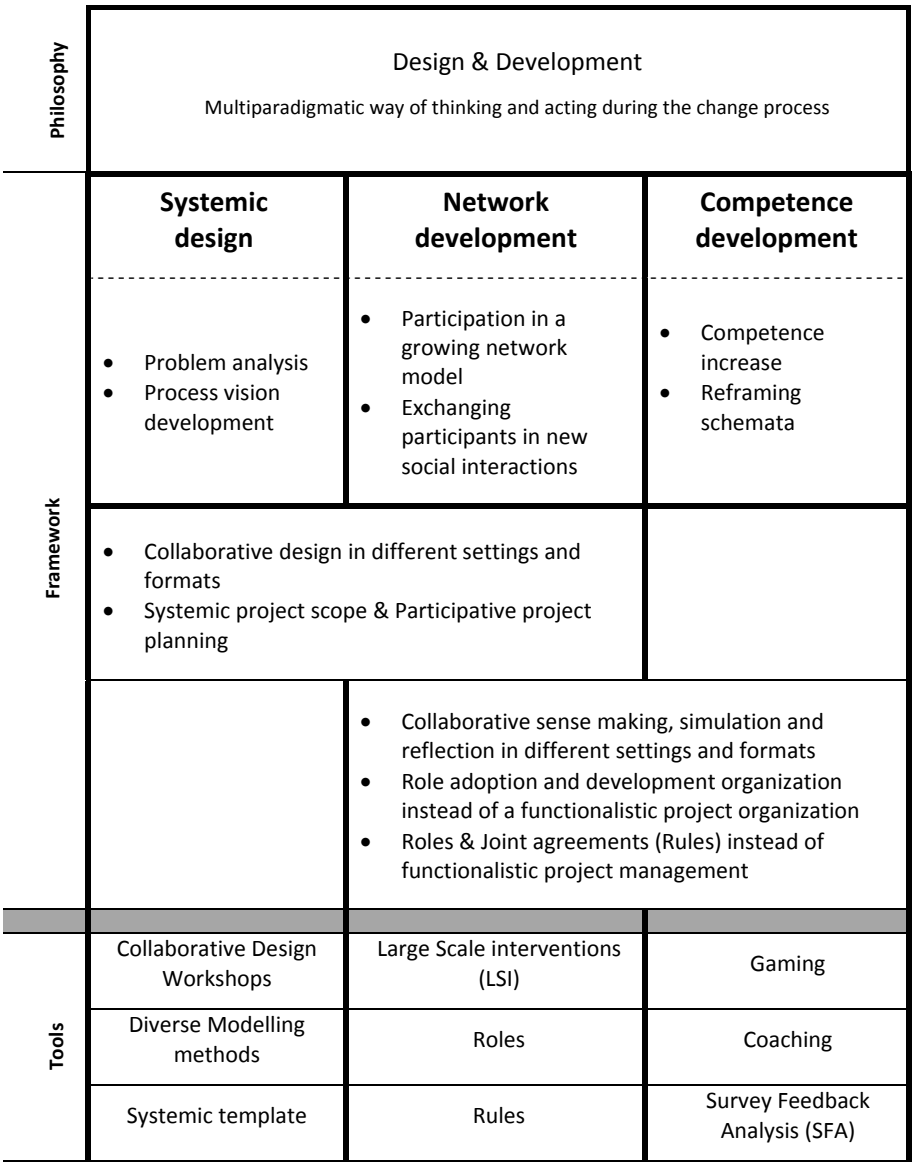


Figure 41 The three assignments of ESiOD and the respective tools in the ESIMM structure

Deliberate focus and limitations of ES*i*OD

ESiOD emphasises a specific way of working with the accompanying methods and instruments. The approach also deliberately leaves out several specific methods. This is in line with the philosophy of ESiOD: Stimulate extensive participation and initiation of a simultaneous design -and development process with a selective set of methods and instruments. Organizational members gradually will increase their competence level and by self-deployment and innovation, new ways of working or methods will be suggested and deployed.

Current implementation methodologies already offer vast amounts of tools and methods. ESiOD limits itself to the essential methods to initiate this participative design and development process. Several topics that are addressed in the organizational change domain are not explicitly addressed under their labels. Themes like communication, stakeholder management, resistance, education and training do not receive a detailed explanation about its deployment or the respective method compared to current ES implementation methodologies. In some situations these themes are touched upon, but themes also deliberately are left out. ESiOD for example gives extensive suggestions how to initiate a learning process, but leaves out the detailed deployment of an education and training plan.

This is in line with the ambition to stimulate competence increase. In other situations the themes are embedded in ESiOD, but in a more implicit way. Communication for example is not explicated in one specific method or instrument. The analysis in section 3.2 shows communication, resistance -and risk assessment are not the weak points in current implementation methodologies. The standardised communication channels like new letters, intranet sites and road-shows are already available in the current ES implementation methodologies. The link between ESiOD and communication is implicitly connected via the assignment network development. The creation of social networks and large scale interventions can be used as extra ports of communication.

The foundations behind the design of ES*i*OD are based on the design criteria from §3.5:

- The foundations of IOD by Boonstra (1992), Boonstra et al. (1998), Beer and Noria (2000) and Nonås (2005)
- The existing design practice in current ES implementations (Bancroft et al. 1998; Brown & Vessey (2003, Fleisch et al. (2004)
- Participative design (Greenbaum & Kyng, 1991; Mumford, 1985) and Limburg (2002),
- Collaborative reengineering, Schuiling (2001) and Vansina & Taillieu, 1995)
- The organization of participation (Passmore & Fagans, 1992; Katsma et al., 2007).
- Competence development Nijk (1978), Schiefele & Pekrun (1996) Schuiling (2001)
- The social-learning cycle and team exchange principles from Beer (1980), Weick (1995), Boudreau et al. (2000), Boisot (1995) and Wassenaar & Katsma, (2004)

Table 18 shows the design specifications and considerations (3.5) and the respective ES*i*OD elements

Analysis outcomes / design requirements	Accompanying ES*i*OD design elements		Explanation and line of reasoning
	Framework	*Tools*	
Extensive participation	Network development	LSI	The LSI concept in the growing model of network development facilitates gradual expansion of participants
• Creation of new social networks and interactions • Changing existing structures	Interaction of Network development and competence development	Roles development organization	Repetitive restructuring of participants in the development organization
		LSI, gaming	• Participation in a growing network model • Playful elements facilitate the creation and shaping of participation in new networks
Participative planning by self-steering teams in a generic two staged process	Interaction between network development and systemic design	Development organization, Roles and Rules	Development organization is responsible for integrated deployment of assignments facilitated by a generic two staged plan. Rules shape independent conditions for open dialogue and progress of the change process Specific roles in the development organization relate to the deployment of participative planning and control
Explicating issues versus concretizing implementation ambition and process vision	Interaction between Network development and systemic design	LSI, Collaborative design WS, varied modelling	By a repetitive deployment of design and reflection workshops the participants share collective problem experiences and create a mutual understanding and acceptance for the newly defined organizational setting (collective design, collective sensemaking)
• 2nd order change • Systems thinking	Interaction between systemic design and competence development	Role play and Janusian thinking during design workshops	The deployment of specific intervention methods facilitates participants in integrated design combined with creativity sessions or experimental learning by experiencing conceptual designs

Table 18 explanation of design considerations behind ES*i*OD

Analysis outcomes / design requirements	Accompanying ES*i*OD design elements		Explanation and line of reasoning
	Framework	*Tools*	
Knowledge exchange	Interaction between Network model and systemic design	Combination of design workshops and LSI accompanied by roles	Growing network model combined with experiential leaning and participative design facilitates the knowledge exchange process. Roles facilitate information exchange deeper into the line organization
Explicating issues	Competence development and Systemic design	SFA and simulation	SFA facilitates large-scale elicitation of existing issues and organizational behaviour Simulation & gaming makes participants aware and lets them experience different situations related to the design or existing situation
• Extension of scope • Systemic perspective on the content	Systemic design	Systemic structure, various modelling methods, collaborative design workshop	Pragmatic approach to modelling using various modelling methods/principles, e.g.: Narratives, Storytelling and the Rich picture concept Focus on change competences, future skills, knowledge and organizational behaviour
• Multi paradigmatic philosophy • Support for the competence development process	Competence development assignment Diverse work formats bridging design and development	Coaching, Role adoption and play collaborative design workshops Systems & Janusian thinking,	Participants are stimulated in specific roles accompanied by interventions that facilitate a paradigm shift. ESiOD in itself encourages action & reflection Deployment of different perspectives in workshops and interventions facilitates transition space for participants. Extensive coaching and role definition facilitates release of participants from old habits and structures Dialogue on meaning and explication of competence
Situated process approach	Formulation of ES*i*OD in three concrete assignments with accompanying generic methods or method fragments		Participants of the development organization select methods and their deployment themselves dependent on their needs and the context

Table 18 (continued) explanation of design considerations behind ES*i*OD

Presentation of ESiOD

In the next three sections 4.3 to 4.5 the three assignments (A, B and C) will be explicated in the following structure:

1. First the design considerations behind the assignment are defined. These sections explain motivations and considerations behind the definition of the assignment itself and its accompanying methods and instruments. These considerations are founded on the design criteria specified in section 3.5.
2. Secondly each assignment is explicated in the following order:
    a. Objectives: It explains the main objectives of each assignment;
    b. Methods: This explains the specific selection of the methods in the assignment and how they contribute to the assignments' objectives; The methods are labelled A1, A2, A3, B1, etc..
    c. Deployment: This explicates the generic process and way of working in the assignment. It explains how the collective deployment of the three methods contributes to this process and the assignments' objectives.

4.3 Assignment A Network development

4.3.1 *Design considerations behind assignment A*

A different organization of participation is necessary to meet the participation issues explained in the analysis section (Table 14, pp.134). Section 3.3.4, pp.133explainsthat the current combination of participation level, timing and format results in the problem of a discontinuous participation process during the project stage. This can be met by using a gradual and growing participation model. Different scholars have explained the advantages of participation and collaboration by using a growing network-based format (Hanssen-Bauer and Snow, 1996; Ford & Ford, 1995). Secondly the network perspective on the organization, contrary to the systemic model, pays attention to coalitions that exist in the organization with contrary interests (Lammers, 1983). In the generic format a network of participants is initiated from the beginning of the process and this network grows incrementally. This initial group of participants is responsible for the design and the change process, but also for orchestrating the growing network of participants. Network development is not only an efficient approach to organize the participation process, but also explicitly pays attention to competence development. First this is closely connected to collective action (Beer & Eisenstat, 1996; Nijk, 1978). The growing number of involved organizational members participate in the processes of analyzing, problem solving and interpreting so that

collective learning becomes effective and new behaviour is adopted (Argyris & Schön, 1996; Beer & Noria, 2000; Pasmore & Fagans, 1992). Secondly the ability to share and manage conflicts results in the development of change competences on the organizational level (Aronsson et al. 1995; Nonas, 2005).
To support this growing participative model traditional project management methods can be strengthened by elements from participative project management (Ledwith, 2000) and experiences from incremental methodologies like SCRUM (Augustine et al., 2005). The adoption of roles can help the initial team with their network assignment (French & Bell, 1995).The essential design considerations for this assignment are:

- Gradual but extensive participation (Passmore & Fagans, 1992; Ford & Ford, 1995)
- To and fro between initial development organization and network (Volkoff et al., 2002)
- Repeated exchange of participants in different (especially new) social settings and interactions (Weick, 1995; Beer & Walton, 1987;1990)
- Create acceptance for design proposals (Davis and Olson, 1985 Venkatesh et al., 2003)
- Coalition forming, discussion on mutual or contrary interests and creating new power structures (Mastenbroek, 1993,1999)
- Bridging integral organizational development with project management principles (Stellman & Greene, 2005)

4.3.2 *The Objectives*

This assignment addresses four objectives:

1. To gradually facilitate the structural change process by knitting new social networks. This helps people adapt to new social structures in both a formal and an informal setting. This includes the creation of new power and political structures. During the network development process new coalitions will be formed and older coalitions will change or even disappear. (Mastenbroek, 1993)
2. To realize different forms of competence development prior to go live of the ES. Not all affected organizational members will be able to experience a uniform competence development process prior to the ES introduction. Nevertheless network development contributes to a shared development of change competences for a significant number of participants and explicates the competence development for the rest of the organizational members (Mintzberg & Westley, 1992; Norrgren et al., 1996). This approach facilitates the hidden implementation effect (§3.2.1, pp. 110), which is more effective than the brief training practice in current ES implementations.
3. To facilitate the collecting of essential necessary information from the experts in the field. The network is an efficient way to organize large-scale participation. The network adds to information transfer and the spreading of multilateral communication.

4. To create acceptance by involving participants who are further from the daily design tasks, whereby the population will grow overtime.. A substantial group of people within the line organization exceeds the participation level of conforming, but really contribute and in some cases even create.

4.3.3 *Methods and instruments*

Three methods are suggested to facilitate the activities in assignment A and especially assist the aspect *way of support.*

A1 Roles for the participants
A2 Rules for participants
A3 Large Scale interventions

A1 Roles for the participants.

Participants in the current implementation practice receive a new function in the project organization that resembles their function in the line organization. This organization of the implementation process can impede the change process significantly.

Description

Participants do not instantaneously change their behaviour when they are assigned to a development organization. The existing power and hierarchical patterns will still be present and hence a substantially different situation and setting is necessary to release the participants from their original position. Different scholars have reported that assigning roles to participants is a means to both break free from the existing functional schemata and also initiate competence development (Kræmmergaard & Rose, 2002; French & Bell, 1995; Sonnenwald, 1996).

Deployment

Based on Sonnenwald (1996) it is possible to define very explicit roles that are necessary for the accomplishment of network-based participation and the systemic design activities. Assigning roles to participants thus is tightly connected to the systemic design assignment (assignment B, §4.4, pp. 171) and the intended competence development (assignment C, §4.5, pp.181).

The roles method is also used to help alter the composition within the development organization. Roles can be fulfilled by one or multiple participants, but changing roles may also take place during the change process (Boonstra et al. 1998). Specific roles are added that change the specific project management functions from classic project teams to the participative project management with the development organization. The following roles can be discerned for the development organization:

Expert

Description

The expert fully uses his or her expertise freed from his current hierarchical and functional situation. The expert makes suggestions and substantially assists in redesigning the future situation, based on his or her insights into bottlenecks and quality of working life.

Initial competence profile:

the expert is not necessarily a person with a high change capacity. The expert is an authority on a specific business process issue or functional aspect.

Scanner

Description

The scanner transmits information from outside of the design context, but which is relevant to the design content. This maybe information about specific issues that seem negligible from the perspective of the line organization or about sensitive affairs that organizational members hesitate to express. The person who adopts this role assists the process owner.

Initial competence profile:

this role can be adopted simultaneously with other roles and requires a good social network, open ears and a trustworthy reputation in the line organization.

Mirror

Description

The mirror takes a critical reflective perspective on the course of the change process. The participant adopting this role will reflect upon the design process and deliberately look for dialogue or confrontation if in his opinion the development organization focuses too much on creating designs and pays less attention to development. This role is not about defining the right and wrong or truth finding in the design and development concept; it is much more the catalyst to the participants to regularly reflect upon their own actions and the entire process.

Initial competence profile:

The participants adopting this role should be able to alternately take a critical or neutral position. External change consultants favour this role because of their inherent independence and position.

Project Manager

Description

ESiOD incorporates participative project management (K Kautz, K Thaysen, 2001; Hahn, Jarke, Rose, 1991). Members of the development organization are collectively responsible for reporting and exchanging the progress of the change process with each other as well as with the project manager. Based on the principles of participative project management (§3.3.2, pp. 127) the project manager plays a multidisciplinary role with the following three objectives:

- Coaching the development organization during its change process towards its objectives
- Monitoring the progress of the change process in all its different aspects. Objectively inspect the different constraints and investigate differences between planning and realizations in cost, objectives and time.
- Negotiating significant deviations between the planning and actual course of the change process with the transition counsel, members of the development organization and sponsors.

Initial competence profile:

This role should be adopted by an experienced project manager who has affinity with the principles of organizational development and experiences with agile project management methods.

Process owner

Description

The process owner plays a key role in network development. Process owner is a specialization of the role of *Change Agent* that is often used in literature and practice. The term '*process'* in process owner has a double meaning. First the process owner is responsible for the design of a specific business process or a part of it. Secondly he is responsible for the change process necessary to accomplish the realization and implementation of this design. The process owner role personifies the notion of integrating both design *and* development. He is also responsible for facilitating network development and stimulating the participants to use varied work forms to integrate systemic design and competence development.

Initial competence profile:

This role especially requires participants to have high change competences and experiences in organizational change processes. The role also requires participants with good social skills, perseverance and the capabilities to knit new social networks. The applicant does not necessarily need to be an expert in the business-related content matter. Though beneficial, this is only a secondary selection criterion.

Transition council member

Description

The transition counsel, beside the project manager, is the second role that connects classical project management with the integral change approach. The transition counsel is an improvement on the classical steering committee. The transition counsel still has to monitor and control the overall project, but the objectives are extended and the composition of this team may differ from the traditional steering committee. The cast of the transition counsel should be formed by sponsors and opinion leaders and doesn't have to be top management alone.

The main objective for the participants in this role is to:

- Monitor progress and quality of the change process. By meetings and informal gatherings with the development organization the transition counsel tries to get a good picture of the course and development of the change process itself and its outcomes. This helps the project manager and a mutual opinion is created on the development process by exchanging observations and qualitative and quantitative data.
- Stimulate and sometimes protect process owners by making sure that current hierarchical structures or existing power blocks do not impede their change initiatives. The transition counsel preserves the agreed rules during the project stage, if necessary participants if they violate rules, and facilitates mediation if necessary.
- Facilitate a dialogue on eventual adaptations in the projects objectives, scope, time or budget. In this objective they support the project manager and members from the development organization to facilitate the development process and its interaction with the design objectives.

Initial competence profile: This role should be adopted by experienced members from the line organization, who are preferably able to act from an independent position in the line organization with substantial social networks in different units of the line organization. Affinity with the principles of organizational development is preferred.

Sponsor

Description

The sponsor helps ensure acceptance and funding of the project in the larger organizational unit. In relation to the rules (explicated in the next section) the sponsor can help or mediate if change issues related to power and politics disturb the progress of the development process.

Initial competence profile:

This role requires that the sponsor comes from senior management. He acknowledges the design and development process and commits to the change process with its particularly uncertain outcomes.

Figure 42 Job aids explicating specific roles in the development organization

A2 Rules for the participants

Organizing the participation process during the project stage is one of the main objectives of Assignment A. The rules instrument supports this objective in two ways:

1. It helps overcome the impediments of existing of power and political structures.
2. It serves as bridge between change process and program and project management

Deployment

1. Help overcome existing impediments in the current political and power structure.

The network development assignment also includes the objective to discuss current hierarchies and formal structures (both horizontally and vertically). In chapter 4 this is described as one of the main topics of participation content. Agreements are necessary to support the participants from different hierarchies or organizational units and enable them to have an open and equal dialogue. These agreements should be collectively defined as rules.

These rules should not be imposed top down in advance, but should be agreed on during a joint negotiation process . Rules are an extra support to keep participants in their role or assist people to expose or establish their role. This is something that is more difficult in the functional position. It would nevertheless be naïve to consider rules and roles as a complete solution to the impeding existing power structures. But means of roles and commitment to the rules by organizational participants facilitates the negotiating process (Caluwe & Reitsma, 2007). This negotiation, during the design and development process, is a major determinant to restructure power and political affairs (Mastenbroek, 1999).

2. Bridge towards program and project management

Rules can also facilitate the participative approach to project management. Project management requires both controlling and monitoring but also letting go. This again is a direct influence of the development paradigm in the philosophy. To facilitate this monitoring process the rules are an instrument to create mutual agreements on the behaviour of participants during the design and development process. The rules as bridge to project management look after:

1. **The necessary progress of the implementation process.**
   There is an area of tension between the design-based project management of activities and the development approach during the change process. This may sometimes result in compromises. In complex change processes a classical linear approach will seldom result in changes of new social interaction, working manners and relationships (Mohrman & Cummings, 1989; De Leeuw, 1994). The linear planned approach is often used to reduce uncertainties, but it impedes learning adaptations and the intermediate adaptation of goals and change approach due to possible gained insights during the process.

Therefore project management is still necessary, but the acknowledgement of the development perspective in the project stage is necessary to facilitate the change process. Rules can help achieve a mutual agreement on either continuing the development process if stakeholders cannot create a fixed and broadly accepted design or accepting compromises due to the necessity of a higher cause.

2. **Stimulating design quality.**
   Extensive participation is a serious challenge. Participants too easily try to criticize each other's initiatives based on existing structures or insights.
   Participants should be obliged not to only comment but also introduce alternatives to the mutual dialogue. The joint agreement on design quality rules can facilitate the design and development process.

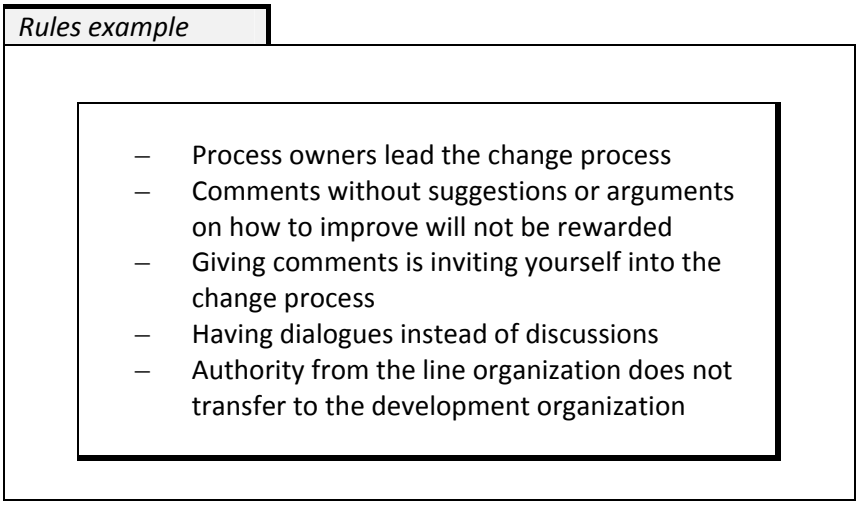


Figure 43 Job aid exemplifying rules

A3 Large-scale interventions

The network development assignment is based on the vehicle of existing social networks, but especially the creation of new networks. LSI is a generic term for interventions or workshops in which an extensive number of participants can participate. The participation size and duration especially fit the PER stage and can facilitate the process of network development. Nevertheless the deployment of the specific LSI should be adjusted to the objective and participation size as well as the design content.

Deployment

There are several LSIs, but not all formats fit the specific dynamics of network development and the project stage of the PER implementation.
In §3.4.2 (pp. 143) it is explained that a situational-specific deployment of the LSI concept is necessary. The LSI concept is no holy grail and the development organization should apply a limited amount of different LSI formats depending on the objectives and participation size.
The objectives of network development that can specifically be addressed with the LSI concept are:

- Creating shared vision and opinions amongst a large number of participants
- Creating broad acceptance
- Facilitating large-scale information exchange and mutual discussion
- Facilitating the creation of new social networks

Besides these network development-specific objectives the generic LSI concept can also be used and adjusted depending on the methods and instruments in the otherassignments such as collaborative design (§4.4.3) and gaming (§4.5.3). This will be explicated in the respective sections. Table 19 shows an excerpt of different available LSI formats that can be deployed in the PER stage.

LSI Selection Job aid

Name	Purpose(s)	Group Size	Who Participates	Duration	Facilitation Skills Needed
SimuReal	Decision-Making and Organizational Learning	30-80+	Whole group	1-2 Days	Process Facilitation Comfort with Ambiguity Systems Observation & Feedback
Open Space Technology	Divergent Thinking and Sharing	25-500	Everyone	1 to 3 days	Large Group Dynamics Comfort with Ambiguity
Real Time Strategic Change	Envisioning	100-2400	Everyone, including reps. from outside of the organization	2-3 days+ follow-up	Large Group Dynamics Logistics
The Conference Model	Redesign	80+	Groups of Representatives	10+ days in five conferences over at least 12 weeks	Multiple Processes of Work Redesign
Real Time Work Design	Redesign	50-2400	Everyone, including reps. from outside the organization	Several 1 day events	Large Group Dynamics Logistics

Table 19 Job aid of applicable LSI formats to facilitate network development

4.3.4 *Deployment of Network development*

Figure 44 displays the basics of network development. At t_0 a specific number of people from the external implementation partner(s) and the line organization is formally appointed as the *Development organization*. This team is instructed to deploy ESiOD. The assignment, network development, is to initiate a growing participation process. At t_n the network has grown significantly and the number of people involved in the design and change process has as well.

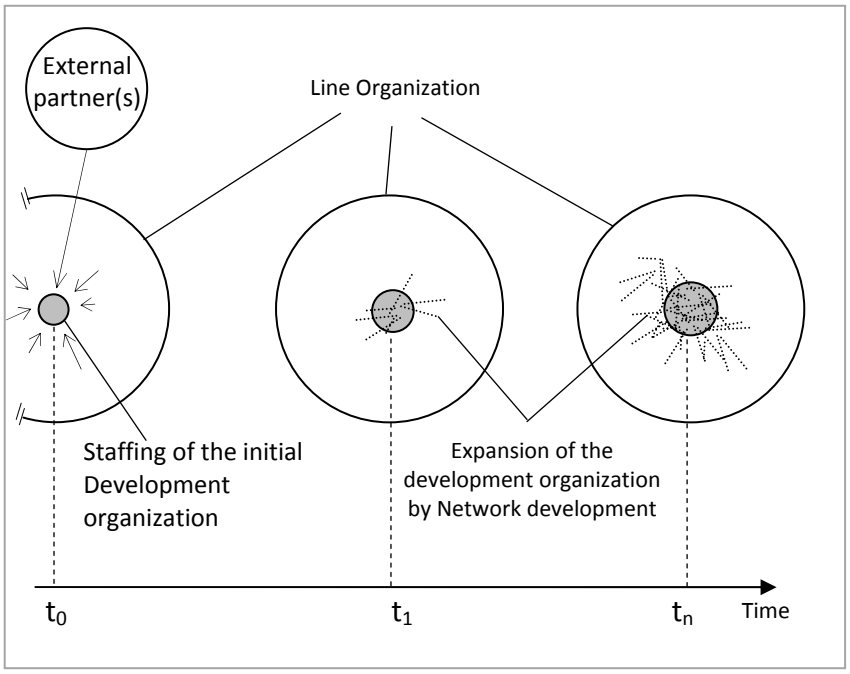


Figure 44 Development organization and network development

Network development is initiated by the development organization and means inviting participants from the line organization to work together during the design and development activities. This may mean simple support in answering expert questions, but also to function as mouthpiece or change agent to the line organization or parts of it. It may even mean that participants of the line organization need to be asked to offer a limited amount of time to cooperate in the development organization. By this approach the development organization increases in size during the project.

This dynamic restructuring is realized in two ways:

- First, the development organization is not a static institution. By inviting participants from the line organization the development organization will grow and evolve.
- Secondly, experiences have shown that planned reshuffling of sub teams can accelerate the development process and overcome impediments in the change process (Beer & Walton, 1990). It is therefore stimulated to alter the composition of teams in the development organization during the project stage.

In classic IS participation literature there is a clear distinction between user groups with a high participation level (creating) and a large group of participants that act on a low participation level (conforming). Network development facilitates by using a more gradual approach that offers different levels of participation to a large community of participants that sometimes varies over time.

At first sight network development can be compared to the an expanding oil macula, but network development is subtler. A Mycelium [5] provides a better image to represent the dynamics of network development. The mycelium, compared to the oil macula, is characterized by the combination of funguses aboveground and an invisible network underneath. This represents both a visible as well as an invisible development of social structures matching exactly the intention of network development in the context of ES implementation process.
Participation by network development is concerted (formal), but only in limited proportions. A lot is left to the organizational members themselves to not only "spread the word" but also actively collect responses from their organizational comrades.
The assignment of network development urges practitioners to put a specific amount of time and energy in network development. Current project management templates merely focus on rewarding the quality of documentation of design artefacts and on decisions within time and budget of the project plan.
To stimulate and initiate "Assignment A" a well-balanced explication of network generation is necessary as well as of an equal rewarding structure. This requires making the network-based way of working explicit to the participants including their role in the network. It also requires letting go of the informal networking initiatives.
Network development takes an equal position between just good expert system design contributions and creating a wide participation network. Network development should reward explicating social networks and sharing them with other participants.

[5] Mycelium is the vegetative part of a fungus consisting of a mass of branching threadlike hyphae that exists below the ground or within another substrate

4.4 Assignment B Systemic design

4.4.1 *Design considerations behind assignment B*

The design requirements from chapter 3 state that the current functionalistic design process, emphasizing the information system, needs to be modified and enhanced. This design process should integrate and facilitate the design and development process, include a broader perspective on the design content, and also relate to the first assignment of network development. Systemic design integrates the design process with systems thinking and the systemic perspective on organizations. The experiences from participatory design and systems thinking forma good basis for these requirements. Systems thinking perceives wholes to be conceptualized and studied as systems because they are not merely the sum of their parts. Systemic design implies a systemic version of the design artefact and the deployment of systems thinking during the diagnosis and design activities (v Eijnatten & Zwaan, 1998; Zwaan, 1990). The systemic perspective acts contrary to the network or coalition perspective (Lammers, 1983). ESiOD pays attention to both perspectives on the organization (Mastenbroek, 1993, see assignment A §4.3.1, pp.160). Deployment of assignments A and B facilitates the paradigm spanning between these two perspectives.

The method engineering and the ISDM domain (Tovanen, 1998, Aydin, 2006) suggest pragmatic and situational-specific methods and models to support practitioners in their complex design assignment. Participatory design and diverse accessible modelling methods are favoured over prescriptive and vast modelling frameworks (Monk & Howard, 1998). The recent insights from agile principles like JAD, Scrum or XP can be partially incorporated. The ES technology still dictates a onetime codification process, but prototypes can still be used to a limited extent. Such prototypes will reflect “quasi” user interfaces and system functionality. Assignment C (§4.5 pp. 181) incorporates the methods gaming and simulation that compensate for the limited adoption of the agile practice and also connects to the diverse modelling methods. Gaming and simulation, as method, facilitates the imagination of the different participants. Role play or process simulation for example can stimulate the imaginative powers of the different participants to experience the new situation more lively if process models or screenshots do not suffice.

The essential design considerations for this assignment are:

- Select a small number of modelling tools that make it possible to describe and define the different systemic aspects of the change, δ, both in understandable but also sufficient detail for system configuration.
- Support for systemic design output with a structure that guides the participants on the topics that need to be addressed, but does not prescribe ordering of the topics or the typical modelling tools.

- Situational participatory design as main way of working. An open generic format of collaborative design workshops is suggested. The basic foundations for the collaborative design workshop are prescribed. The specific application of timing, content and number of participants is explicitly left to the participants themselves.

4.4.2 *The Objectives*

The objectives of Systemic design are:

1. To initiate a design and development process by balancing between explicating current problems, exchanging possible solutions and process vision development.
2. To create a broadly accepted systemic design that explicates the several aspects of the change (including system definition, competences, structure, etc.).
3. To succeed in making a significant part of the organizational participants understand or even incorporate new competences and making them familiar with the different way of working in the new structure.

4.4.3 *Tools*

The following three methods support the activities in assignment B.

B1 Collaborative design workshops
B2 Diverse modelling approach
B3 Systemic design structure

B1 Collaborative design Workshops

There is extensive knowledge on collaborative design sessions or workshops in the specific field of IS (Greenbaum & Kyng, 1991). In the field of organizational science this concept is positioned as a specific type of large group intervention (LGI) (Bunker & Alban, 1997; Vansina & Taillieu, 1995). In the work of Mulder (2004) and Holman & Devane (1999) the application of constructs from both disciplines can be found including the extension of subjects with social and cognitive functions to explicate behaviour in the working situation.

Based on this collective work a collaborative design workshop is characterized by gathering a heterogeneous group of people, not necessarily with an engineering or a design background, and giving them a multidisciplinary systemic design assignment.

To this workshop several ‘designers’ with diverging expertise and backgrounds are invited. The design process starts with representatives of the future user domain. In addition, people with specific expertise or a certain background can be invited to participate. Ideally the collaborative design team is multidisciplinary. This facilitates thinking across borders of disciplines and current practices. The interaction among the team members is central. Brainstorming, thinking aloud and creating a dialogue between the team members is stimulated to take place in terms of the functions of human interaction instead of the functionalities of technology.

There are different ways to realize the collaborative design workshop. The classical operation in IS development explicates relatively small teams consisting of heterogeneous specialists who define systems in a repetitive setup. A blend between participation and IS design can be found in participatory design (PD) (Greenbaum & Kyng, 1991; Schuler, D. and Namioka, A.E. (1993).).

Collaborative approach	*Expert design*
Human-to-human interaction	Interface
Supporting the team	Designing a system
Social and cognitive functions	System functionality
Innovation	Current support
Dynamics	Stable use
Designing *with* users	Designing *for* users

Table 20. Differences between collaborative design workshops and expert design (based on Mulder, 2004)

Since the rise of Large Scale Interventions (LSIs) there have been different applications which combine the participatory design concept with the LSI concept (Purser, 2007). Dannemiller & Jacobs, 1992; Jacobs, 1994).
Still there are differences between the gradual collaborative design approaches based on PD and the LSI-based approaches. The LSI format focuses on large-scale knowledge sharing and democratic models and has evolved into a collaborative design workshop applicable to group sizes over 100 people. Participatory design classically supports teamwork and focuses on 'smaller' group sizes.

In LSI settings there is customized tooling such as automated collaborative design and solution environments that helps the participants to easily and quickly share ideas. The basic template of such workshops is to start off with entire groups and break down work packages that can quickly be shared and debated on during intermediate sessions. This approach makes it possible to simplify complicate problems in 1 to 10 days. The advantages of these workshop formats are in speed and distribution of knowledge, opinions and ideas.
Small-scale PD workshops emphasize either detailed design content or in-depth organizational problems. The smaller setting enables adding specific interventions such as sharing narratives or Storytelling. (Breuer, 2006 and Abma, 2006 in Boonstra & Caluwe, 2006). Sharing stories in a trusted environment can unravel hidden problems, but also the sense making process can result in a collective sense of urgency to change (Kotter& Cohen, 2002) or inspire the different participants to come up with new ideas

as foundation for new cognitive schemata (Bartunek, 1992). This deployment acts as bridge to another method in assignment C (Janusian thinking,§ 4.5.3)

ESiOD suggests using a situational-specific approach and matching the different settings of the collaborative design workshop dependent on the required situation. The benefits of the LSI setting are obvious from the specific problems of scale in ES implementations. Therefore its application is stimulated in assignment A, network development. Nevertheless the LSI setting should not be perceived as optimal., because several studies critically state that organizational development may sometimes require more time than the mere deployment of LSIs can give. Smaller-scale PD-based collaborative workshops in some situations offer the time, space and atmosphere necessary to enable participants to reframe schemata, create a mutual understanding or go into detailed issues. Therefore a well-balanced application of this LSI setting in combination with the smaller PD-based setting of the collaborative design workshop is necessary. Some case-specific LSI methods already incorporate a situational specific alternation between large-scale and small-scale workshops (compare the GE Workout in Table 21).

	Large (UP TO 2000)		Up to 10
Number of participants	Larger ←→ smaller		
Main Objectives	Create shared vision and opinions among a large number of participants Creating broad acceptance	Collaborative design in medium to large-scale settings	In-depth discussion and exchange Attention for sensitive or small-scale problems
Repetition	Possible	Necessary	Possible
Profundity and detail	The red line		Very detailed
Example	**Real Time Strategic Change**	**GE Work-Out**	**Participative Design**
Type	**Strategy and envision LGI**	**Alternation of large-scale meetings with small-scale workshops**	**PD workshops to detail and finalize designs**

Table 21 Distinction between generic characteristics of different LSIs and PD

B2 Diverse modelling approach

ESiOD does not prescribe one specific modelling method. It suggests the use of different, diverse and accessible methods. The basic line of reasoning should be not to strive for a 100% formally correct representation of reality, but for a diverse, understandable and exchangeable palette of models that covers the systemic design output. External consultants quickly use their favourite and accustomed methods and tools. This may mean that the extended defined outputs are neglected. An explicit agreement on this way of modelling between external experts and internal organizational members is necessary.

To help the participants from different backgrounds modelling methods should be deployed that:

- Are accessible (not difficult or only accessible to experts that have completed extensive courses and training)
- Facilitate collaboration (the method should invite broad participation and facilitate the sense making process)
- Are versatile and act as bridge to the systemic design concept (I.e. cover different aspects of the organizational problem/ the design content)

The diverse modelling approach should be versatile in the deployment of modelling techniques and cover the different aspects of the systemic structure, but it is suggested to apply this approach in a pragmatic manner. ESiOD suggests the following three modelling methods that can enhance today's process model-driven design practice in the ES domain.

Social network diagrams

Social network diagrams, sometimes called sociograms, are structures made of nodes (which are generally individuals, groups, teams or other organizational dimensions) that are tied to one another by one or more specific types of relations, such as values, visions, idea, financial exchange, and conflicts. In its basic form, a social network diagram is a map of all of the relevant ties between the nodes being analysed. This diagram can be used to communicate the structural conditions and process dynamics between the nodes or help visually represent socio-technical interaction (STIN) (Kling, Kim, and King 2003).(Figure 38, pp.142)

The Rich Picture concept

The Rich Picture (Checkland et al. 1990; Monk and Howard, 1998) is a flexible graphical technique which may be used as part of the Soft Systems Methodology (SSM) (Checkland 1981, Dunning-Lewis 1992) or as a stand-alone method to represent a situation, problem or concept. RP is also used in other information systems methodologies and in the specific IS package situation (Jensen & Scacchi, 2005). It is characterized by a free format cartoonish modelling approach and invites participants from different background to give different perspectives on the design.

Rich Picture example

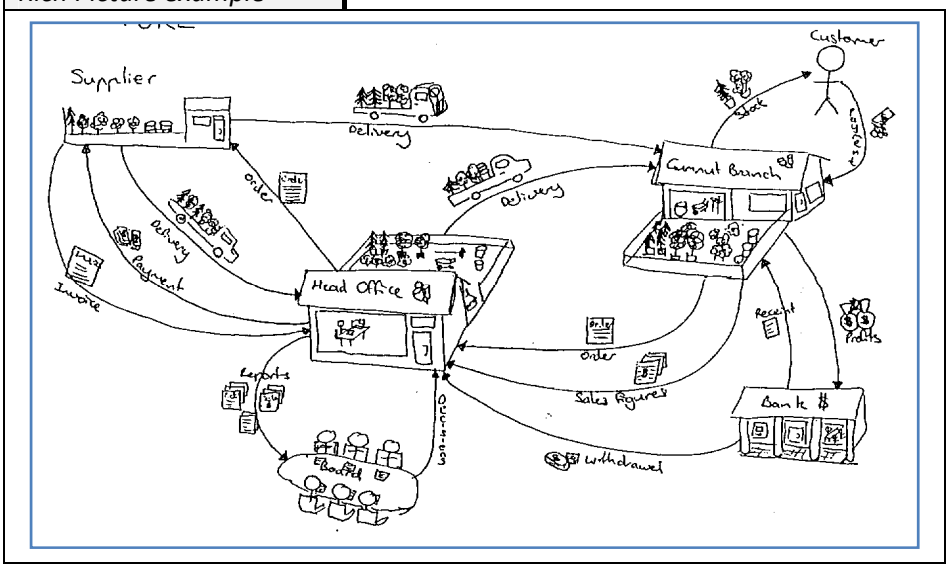


Figure 45 example of a rich picture (source: Lubna A., University of Canberra)

Causal diagrams or causal loop diagrams

Cause maps and causal loop diagrams are generic techniques that are particularly useful to explicate cause and effect relationships of ambiguous or complex organizational problems (Vermaak, 2003). They support the interactive sensemaking process of the participants (Weber & Manning, 2001). Causal loop diagrams are always situational-specific. Similar to the RP method they lack one specific formal standard that defines the correct approach to deploy these models. One can speak of a generic format in which arrows link factors and circles marking feedback or learning loops. (Vermaak in Boonstra& de Caluwe, 2006).

But the strength of the generic format is that there is no modelling convention that prescribes participants to adopt a specific way of modelling. The participants collectively strive to create a visual and an as elegant as possible model that captures the sense making process. At the end of the session this may result in a streamlined drawing that captures the essentials according to the participants.

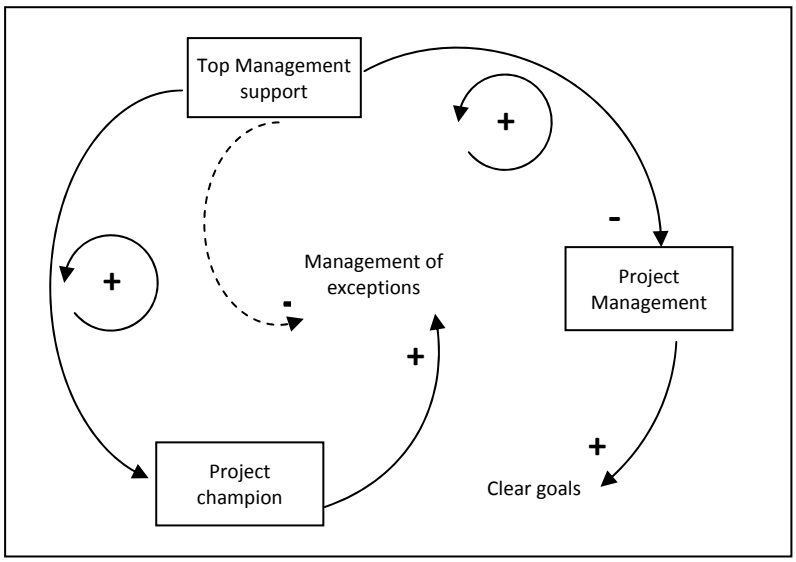


Figure 46 Causal loop diagram (based on Akkermans & v Helden, 2002)

B3 Systemic design structure

The previous two methods help participants in their design assignment. The third method 'systemic design structure' supports the participants as a guiding template in deploying the different modelling methods during the collaborative workshops. ES*i*OD does not prescribe a formal definition of model completeness, but the rationale behind the different design sessions should be to focus on a systemic design that incorporates all the elements that the participants think are necessary for a successful change and system introduction.

Classical systems and analysis methods propose following the order from system requirements to organizational affairs. The current ES implementation practice also follows this route and is driven by the design logic of process standardization and information integration. The classical socio-technical approaches suggest that it should be the other way around. This line of thinking is transferred to the ES domain by Benders et al. (2006) in their Modern Socio Technical design approach.

Integral organizational development suggests that content is used in a multiparadigmatic setup (content/process relationship). A specific ordering of topics beforehand can disrupt the multiparadigmatic perspective. ES*i*OD follows this approach and prescribes a situational-specific and recurrent approach as generic solution (Aydin, 2006; Boonstra & de Caluwe, 2006). This means participants are free to choose the order of topics.

To employ assignment B a holistic view on the organizational change is necessary. ES*i*OD distinguishes between two perspectives; content and process. These two perspectives are inserted to help participants in their multiparadigmatic design assignment. In daily use participants should alternately work equally with each characteristic.

First, ES*i*OD explicates the change content. This is the systemic description of the δ, meaning the systemic description of the change in all its aspects. Secondly, explicit time should be reserved for the participants to reflect on the process followed. This process perspective on the design content helps participants in their systemic accomplishment of assignment A, but it also supports participants in double loop learning (Robey, 1995).

This process perspective also facilitates the assignments A and C. Changes in the approach should be possible if the situation at hand requires so. During the project stage circumstances may change or the mutual sense making process between the participants may cause the process perspective to be changed significantly. These are typical examples where a changing organization should be enabled and have the courage to discuss its original initiated way of working and possibly choose an alternative path. This deviates from the functionalistic way of controlling and acknowledges the collaborative monitoring of design *content* and *process.*

Systemic design structure

Content perspective			**Process perspective**
Information system and business process characteristics	**Organization of work and Organizational structure**	**Competences Capabilities & social interaction**	**The change process itself**
Business process logic	Functions and tasks	Skills	Network development
System functionality	Responsibilities	Attitudes and schemata changes	2nd order change
Data models	Authorizations	Trust	Problem analysis
Authorizations	Hierarchies and relationships	Power and Political structures	Process vision development
Interfaces to other Systems	Quality of Work	Behaviour on the job	Competence development
Architecture		Collaboration	Mood

Table 22 Systemic design structure based upon (Bender et al., 2006; Boonstra &Vink, 1996; Colthoff, 1965)

4.4.4 ***Deployment of systemic design***

Systemic design can be perceived as the blend of diagnosis and design processes in which different subjects are explored. It is about dealing with single subjects, but the final goal should be to explicate the change in all its aspects using a systemic perspective. This is called explicating the δ (i.e. the change).

ESiOD uses business processes as guiding structure, (3.2.5, pp.122). The business process is perceived as the backbone during the systemic design assignment to attach and relate all other systemic aspects. This assignment ties in with the design and development processes (Boonstra, 2000) and facilitates the 2nd order change process (Bartunek & Moch, 1987). This is realized by balancing between two sub processes: *problem analysis* and *process vision development*.

Problem analysis

In the current ES practice the implementation ambition and future vision are explicated during the 1st stage of the implementation process. In the 2nd project stage too often conceptual process designs, based on best practices, are quickly created to meet the project ambitions. This ignores the fact that several organizational members possess different perspectives on and understandings of existing problems and often creative solutions or ideas can be derived from the organizational members themselves. The implementation ambition on the other hand also embraces future needs and ideas of different members in the organization.

Problem analysis urges the participants to define the problems and bottlenecks of the implementation ambition. The explication is often the starting point for a collective understanding of different visions on future business processes. From problem analysis several different solutions can be formulated using the expertise within the entire organization. Especially these problems should be the driving force behind the improvements that fit into the implementation ambition as well as match the ES functionalities.

The formulation of these improvements requires broad participation and an investigative attitude. This is realized in the collaborative design workshops, facilitated by the systemic structure and the diverse modelling approach and organized via *network development in* Assignment A.

Problem analysis in short is the in-depth explication of existing problems, their sharing, the creation of a mutual understanding and the validation of the ES implementation ambition.

Process vision development

Process vision development is the paradoxical counterpart of problem analysis. During the 1st stage of the ES implementation the implementation vision is often created in a limited organizational setting and also lacks in-depth concreteness. Process vision development pays attention to both characteristics. It is about gradually making the organizational change concrete, but also about the diffusion of this change within the entire organization. The first objective is realized by explicating several aspects in the business process themselves.

Business processes make up the guiding structure in the systemic design and therefore a growing number of organizational members should be invited and enabled to reflect on and work with several visions and versions of business process that meet the implementation ambition. The driving force behind this design and reflection process should be to make the business process more and more concrete. During this process the participants should be aware of the limitations of the ES, as process definitions are mostly based on standard business processes or best practices.

Process vision development is the search for creative design suggestions that meet the implementation ambitions and can be realized within the limitations of the ES.
Process vision development should invite participants to reframe existing experiences and come up with concrete innovative alternatives. By using network development and taking time for this process the number of participants in this process grows. Figure 47 shows how process vision development has a converging character considering its specification, but a diverging character considering its creators and supporters.

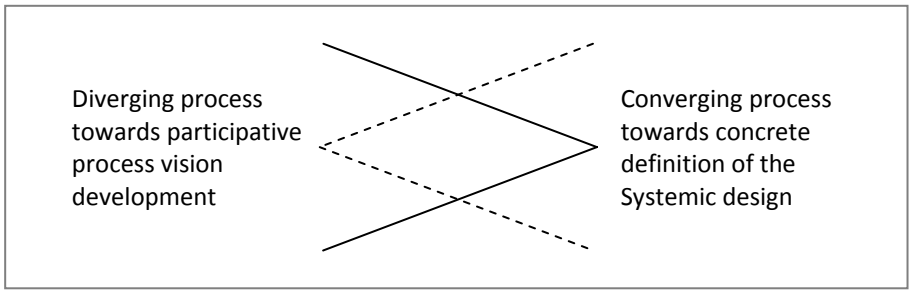


Figure 47. Two processes, that are contradictory in shape, but reinforce one another

Interaction between problem analysis and process vision development
These two processes are not in consecutive order. The participants are stimulated to repeatedly alternate both processes and collectively work towards shared and concrete business process designs. These should be aligned with the implementation ambition designs should and acknowledge the problems perceived by the organizational members. . Participants should reflect on current collective problems and bottlenecks during problem analysis. This alternating process will require departing from existing practices or structures.
During the collaborative design workshops participants are first stimulated to separate the wheat from the chaff in explicating collectively perceived bottlenecks. Secondly they are helped in creating trailblazing design alternatives by getting expertise and creativity from the organizational members (Bartunek, 1996). This explicates exactly the 2nd order change paradox between problem analysis and vision development. Assignment C, Competence development, includes specific methods that supports this 2nd order change process by the interplay between these methods and the collaborative design workshops.

4.5 Assignment C Competence development

4.5.1 *Design considerations*

The last assignment exceeds the learning and training rationale of today's implementation practice. To support the integral change approach education and learning should exceed mere skill-based training and requires other educational and didactical concepts. The current implementation practice focuses its attention on knowledge increase in an efficient manner by classroom training and digital self-study documentation. In Chapter 4 competence development is described from the combined perspective of the individual's course of personal and professional working life.

The design challenge for ESiOD is to realize a deployment of this individual perspective on development in the large context of the ES implementation. This is achieved by focus on group processes, survey and feedback in large groups, social learning and the collective sensemaking process. In ESiOD specific attention is given to personal learning styles (Kolb, 1981) and different educational formats that fit these learning objectives and styles (Vermunt, 1992). This does not imply a fully customized individual educational program, since this is not feasible when considering the amount of participants. Nevertheless ESiOD incorporates a deliberate deployment of different educational formats specifically aimed at how adults learn (andragogy) in their professional life.

The essential design considerations for this assignment are :

- Aiming at competence development as link between personal growth and professional development (Nijk, 1978)
- The dialogue on meaning of competence (Stoof et al., 2002)and instruction to explicate future competences (Boonstra et al, 2006)
- Using different educational formats that fit large- and small-scale audience and acknowledge the individual styles (Vemunt,1992)
- Interaction and integration between these formats and methods and the design and change context (D' Abate & Tannenbaum, 2003) and methods in the previous two assignments (Marsick & O'Neil, 1999)
- Setting up a learning process with equivalent attention being given to knowledge increase, sense making and social learning, skill-based teaching and experimental learning. (Weick, 1995, Boisot, 1995)
- Paying attention to large-scale feedback and reflection. (Schuiling, 2001; Bennebroek-Gravenhorst, 2002)

4.5.2 *Objectives*

The goal of this assignment is to create competence development for a significant group of the organizational members. Competence development exceeds participation and training and takes the ambitious position to develop the competences of the organizational member in a balanced mix. It means that during the change process the participants will:

- Increase their skills, experiences and change capabilities.
- Explicate and exchange the different notions and meanings of competence in the different situations of the organizational change
- Define the necessary competences in the future working environment and business processes.
- Develop their capacity to reflect on their experiences and also the ability to put individual stories into the perspective of their working life including their position in the organization,
- Experience a disruptive emotional process that finally ends in a satisfied feeling about the realized accomplishments.

4.5.3 *Tools*

Three different methods and instruments accompany this assignment:

C1 Survey feedback analysis
C2 Coaching
C3 Gaming and simulation

C1 Survey Feedback analysis

Survey feedback analysis is a method to deploy a two-stage process of investigation and response with different numbers of participants.

In step one, one or more surveys are deployed within a part of the organization. In step 2 during one or more sessions the respondents are able to collectively analyse, share and discuss their answers with each other. This feedback process distinguishes this instrument from the mere survey instrument to assess acceptance or resistance before or during a change process. This latter deployment is often used in the current ES implementation practice.

The feedback loop initiates or assists a collective learning process in which the participants reflect on the exiting situation or specific problems (Bennebroek-Gravenhorst, 2002; Cozijnsen et al. 2000). Setting up the survey requires careful planning and it is mostly a time consuming preparation. Also a deliberate attention should be given to the feedback and sharing process with the organizational members. An appropriate application of survey feedback is extensive and requires time and resources. The advantage of this relatively time consuming instrument is the repeatability of the survey and the combination of investigation and enabling the collective response. This makes it an efficient and powerful instrument in the typical dimension of ES implementations as SFA can be applied in a repeated setting with large numbers of participants.

Figure 48 shows the generic steps to deploy Survey feedback analysis. The template shows the generic structure of preparing, performing and collectively reviewing of the survey. The contents during the design stage can vary from democratic design decisions, attitude and schemata elicitation or just large-scale evaluation of proposed design alternatives. Attention should be paid to the review process, because elicitation of survey results without feedback is one of the important motivation killers during a change project. For the specific application of this instrument in ESiOD two types can be discerned: SFA for the network participants and SFA for the development organization. Figure 49 and Figure 50 display the network and development organization-specific survey feedback

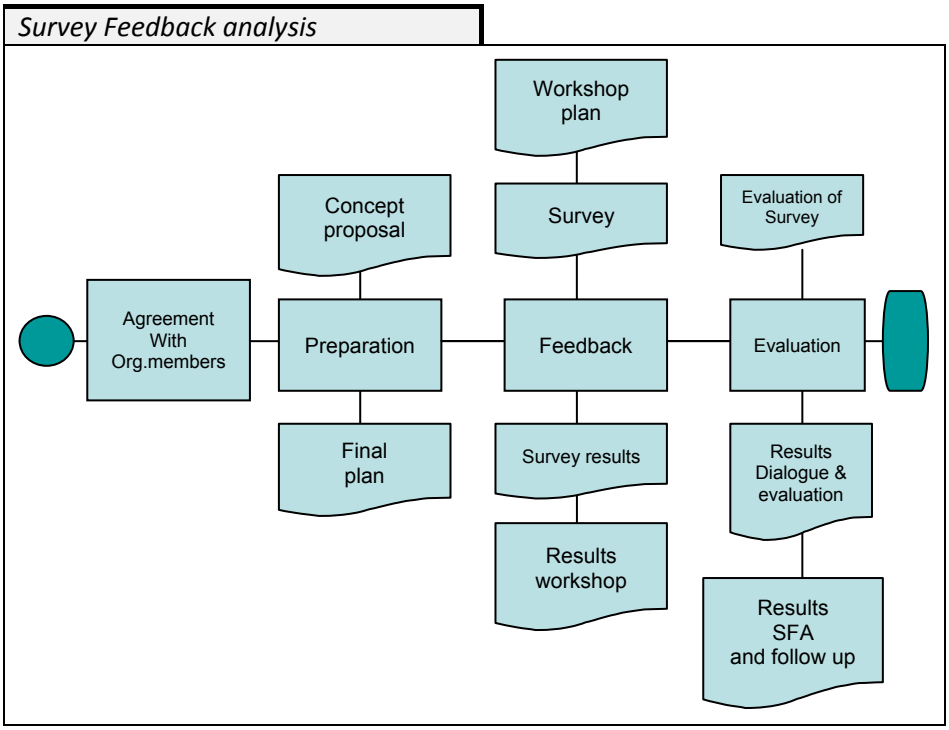


Figure 48 Survey Feedback analysis template

SFA for the network

This is the category of SFA that can be applied with large groups of participants in a repeated setting. These surveys can accompany the collaborative design workshops and enable participants in the network to share and reflect on design proposals. Another application is to deploy SFA during democratic decision processes. Such surveys are more situational-specific and need to be custom developed in close cooperation with the line organization. (Bostrom and Heinen, 1977). (De Sanctis and Courtney, 1983).

Figure 49 SFA for network participants

SFA for the development organization

This SFA is for a smaller audience and two distinct objectives can be discerned:

a. Facilitation of Team composition
b. Facilitation of focused competence development

These two objectives are in a logical order with the first more focusing on the instalment and team composition. The second facilitates the development process of the teams or individuals in the teams.

a. Facilitation of Team composition and instalment	*b. Facilitation of focused competence development*
The composition of the development organization requires a blend of different participants with different characteristics and backgrounds. To prepare and evaluate the composition of different teams several surveys are available (Triogram, Belbin, MBTI). Such surveys facilitate the team compositions or focus on specific parts of the competence development process with for example team and personality assessments (Jessup, 2002).	SFAs can be used, after the instalment of the teams, to facilitate the development process and focus on behaviour in the teams or the entire development organization. This is done by the further analysis of the data from the first team composition SFA, the creation of individual personal development plans (PDPs) and for example 360 degree SFAs (McCarthy & Garavan, 2001). In this latter SFA type the team members are requested to assess themselves and each other. This latter method is often combined with the second method of this assignment coaching. The feedback process on this minute and sometimes individual level requires careful coaching and support.

Figure 50 SFA for the development organization

C2 Coaching

Professional change consultants can help the participants during a coaching process. The coach can be seen as catalyst to initiate specific processes of awareness creation, behavioural change or competence increase (Luthans & Peterson 2003; Kilburg, 1996; 2001). The coach is able to take a somewhat neutral position and stands back from the daily activities that the members of the development organization are confronted with.

The coach builds relationships with several members of the development organization and sometimes uses the gained trust or a safe situation to help members in difficult situations. It may not always be possible to help on an individual basis, but the presence of coaches in the development organization can stimulate the competence development process of its members. Coaching in ES*i*OD includes various tasks, but the coaches in ESiOD especially have the following objectives:

a) Stimulate and facilitate competence development process

b) Facilitate Role adoption
c) Facilitate survey feedback analysis

Stimulate and facilitate competence development
The coach plays an integrated role in the perspective of several instruments and methods (Thach, 2002). In dialogue with the members of the development organization he can suggest a different emphasis on the use of instruments and methods. But the coach can also assist in selecting, preparing and further deploying the several methods and interventions within ESiOD. For example the coach can e help in the situational specific deployment of the survey feedback method or advise on the contributions of role play.

Facilitate Role adoption
Participants in the development organization are requested to adopt one or multiple roles. Their experiences in the line organization to deploy this role adoption mostly are low. Often participants are requested in a role that differs fundamentally from their prior position. Role adoption by these development organization members is an important foundation behind ESiOD and therefore support is necessary. Role based coaching is a special objective in which the participants are assessed upon their actions and developments in their different roles. This can be deployed in a 1:1 or in group wise (intervision) setting.

Facilitate survey feedback analysis
During the design stage a coach should continue to take a neutral position between the several participants from the network and development organization. This enables him to reflect with the different members or sub teams of the development organization on their experiences and the outcomes during the design stage. The coach for example takes time to reflect on the process and outcomes from design workshops and helps collective interpreting reactions from the network. The coach is also of specific help in processing and interpreting the data from the surveys (SFA).

Figure 51 Job aids for coaching

C3 Gaming and simulation

In the systemic design assignment the limitations of the ES project stage are compared to agile development methodologies. Gaming and simulation covers a range of methods or tools that first compensates for these limitations and secondly facilitates competence development. Gaming and simulation include a large range of different types and distinctive methods from simple 'ice breakers' as introductory game in a social gathering to complex simulations that approach reality. For ESiOD the following specific types are selected that can substantially contribute to the objectives of this assignment and harmonize with the other methods in ESiOD:

1) Role play
2) Janusian Thinking

1) Role play

Role playing exercises are part of the oldest educational methods. Small children do it spontaneously when imitating behaviour they see around them (play customer and shop). During a role play participants take on individual roles in a hypothesized social group and experience the complexity of establishing and implementing particular goals within a fabricated structure. In a role play, participants adopt a characters who may have motivations and backgrounds different from their own (D'Abate & Tannenbaum, 2003). The participants assume their roles of characters and collaboratively create or follow stories. Role play as instrument in Assignment C covers two goals:

- Facilitate role development for the participants of the development organization
- Facilitate the collaborative design workshops by inserting the possibilities for simulation and action learning

Facilitate role development

Roles are identified in assignment A as important method or instrument to facilitate the participation process. The participants in the development organization in many cases are not suitable for role that they were assigned to. . Sometimes the people do not yet fit the actual profile or the profile is not available within the line organization. Role play, besides coaching, can help in developing a person's competences that suit this role.

Type indicating surveys help define participants' strengths, weaknesses and opportunities. Coaching helps the participants to set goals, act in the change process and further develop different competences. Role play is an instrument that by action learning and reflection (role for the coach) can give participants understanding of how to adopt a specific role and the effects of acting accordingly.

Role play forms the natural triptych with Survey feedback and coaching to initiate and continue competence development for the participants in the development organization.

Enable simulation and action learning

Role play covers another objective besides supporting the competence development of the development organization. Role play is also aimed at assisting the participants from the line organization who are part of the network. It can be used during the collaborative design workshops to significantly improve the perception the people involved have of reality (Gredler, 1992). During role play they will already perceive what a future situation looks like and how their actions match this situation or whether different behaviour or competences are required. The deliberate attention being given to future skills, competences and behaviour during the design workshop (assignment B) is the first step towards co-creating the characteristics for people's roles in that future process and therefore also towards creating the role play.

By performing role play the participants temporarily adopt a role necessary to understand the processes and interactions in the new organizational setting. In this second alternative it is the instrument to link the contents of the design assignment and competence development of the participants from the network. By action learning role play helps to exercise and experience the new situation (Marsick & O'Neil, 1999). Figure 52 shows two different job aids. One card that assists development organization members in preparing the role play, another which assists during the role play itself and defines what is expected from the participants during the role play itself.

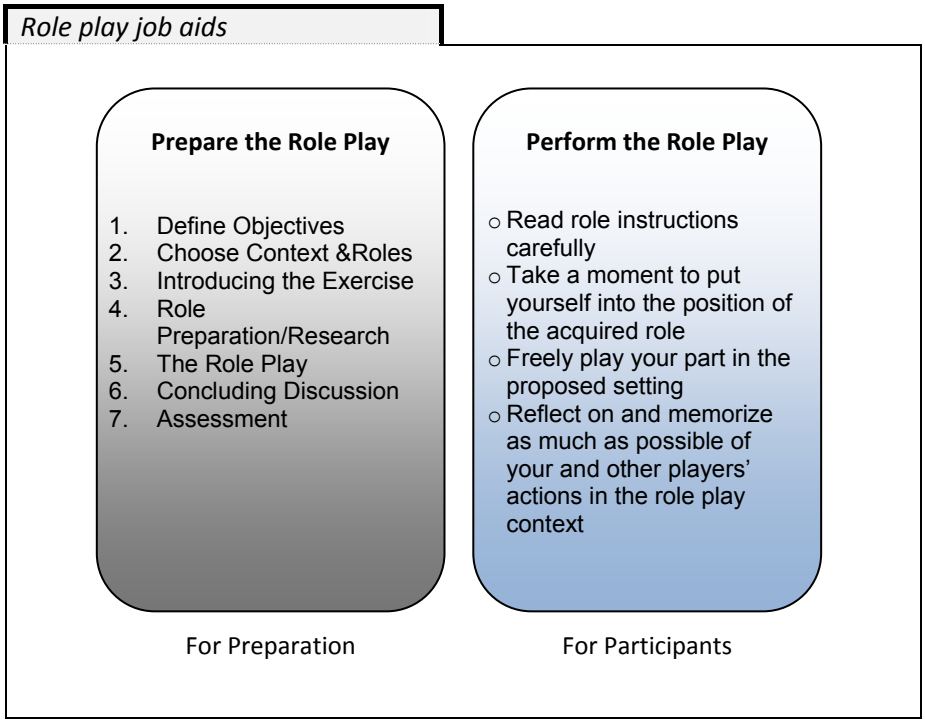


Figure 52 Role Play job aids

2) Janusian thinking

This method is an intervention based on the contrary thinking concept (Table 102 pp.484) that supports the multiparadigmatic perspective of IOD. The name of this method is derived from the Roman God Janus. Strictly there is no Greek counterpart, but some sources compare him to the Greek god Hermes. Characteristic of Janus is the combination of two faces into one "being", displaying both entrance and exit, past and future. This stands for the combination of two contradictory concepts into one. In the context of 2nd order organizational change Janusian thinking involves the capacity to conceive of and utilize two or more contradictory concepts simultaneously. Janusian thinking plays with the mere creation of subjective realities (Gergen, 1999). In ambiguous situations participants have difficulties understanding and embracing the change process or parts of it. Gergen, 2001; Boonstra & de Caluwe, 2006; Weick, 1995) argue for an interacting dialogue in which participants share and construct new subjective realities and so start changing their own situation. Janusian thinking asks to accept contradictions as naturally occurring phenomena. In the perspective of Organizational Transformation it is also described extensively in the work on Competing Values by Quinn et al. (1983).

Janusian thinking can be part of a role play or a design workshop. It also can be used as a stand-alone intervention. The principle behind Janusian thinking is to help its members in their second order change process and practice thinking via different paradigms. Process models that describe this intervention do not explicate timing (Bartunek, 1996, Bartunek & Moch, 1987; LaBianca et al, 2005; Foldy, 2006). A reframing process can take place in one workshop, but a cascade of workshops possibly accompanied by another method (role play, design workshop) maybe necessary for it to be successful.

The deployment of Janusian thinking as intervention is described by Mason & Mittroff (1981) and it combines the dynamics of the 2nd order change process, the participative design workshop and a sense making process:

- First the participants are helped to form different perspectives on the design content or the problem analysis. This can be realized by creativity sessions (deBono, 1970) or brainstorming.
- Secondly, the participants are split up in two groups that should perceive the design content or the problem analysis from contradictory perspectives. If applicable the groups are obliged to use each other's natural perspective. An example may clarify this. There is a natural tension between organizational members who are employed in purchasing and controlling. During Janusian thinking the purchasers perceive the business process or design content as controllers and vice versa. In this way participants' cognitive schemata are challenged and this will help them come up with an increased understanding for each other's viewpoints.

- Thirdly, a sense making process is deployed in which via group dialogue consultation and negotiation the different perspectives are used to re-label the current schemata. During this Janusian thinking process the schemata are easier to be reframed. The teams should be urged to reflect on each other's viewpoint but the dialogue should not escalate into a conflict situation. This requires experienced consultants during the session and eventually the recollection of rules (assignment A). Figure 53 shows an exemplary job aid to support the workshop.

Janusian Workshop

Description

This workshop is applicable if a collaborative design workshop does not meet the expected outputs or the participants do not succeed in coming up with innovative ideas during the discussions. The Janusian workshop can also be deployed deliberately in the beginning of a collaborative design workshop when different participants are expected to take on opposite perspectives and a mutual agreement seems a difficult task.

Participants:

- At least one consultant experienced in this workshop type
- Maximum of approximately 15 people from at least two different departments in the line organization that in their current or future situation will collaborate

Stepwise deployment (in short)

- Mutual agreement on the problem issue
- Two distinctive groups separately discuss and define a groups' perspectives on the problem and a possible process towards a solution/vision.
- If appropriate, opposite perspectives should be adopted by the group's natural own position (e.g controllers adopt procurement perspective and vice versa)
- Collective dialogue by both groups
- A dialectical debating process is expected to start, but should gradually change towards mutual understanding, sense making and a dialogue.
- Give room for mutual points of view and sharing of understanding. Let the group develop towards new shared understanding

Figure 53 Janusian Workshop job aid

4.5.4 *Deployment of competence development*

This process is less explicit and concrete than the previous network development and systemic design assignment. People by habit feel comfortable with a concrete design assignment to craft an object or future situation. Reflecting on existing experiences, challenging current ways of working or even changing behaviour is perceived as being more difficult by the participants. The essential process during this last assignment is actually best described as “doing and letting go”. This doesn’t mean it will happen all by itself. Competence development indeed requires hard work, but competence development can be earned directly by this hard work only to a limited extent.

Interaction between network and competence development

In §3.2.5, pp. 122, the principles of IOD in the PER context are explicated. Figure 35 (pp. 123) shows the differences of integral competence development and the employment in the PER project stage. Due to the dynamics of the ES implementation process there are limitations to simultaneous participation and competence development for the entire line organization during the whole of the project stage. The adapted approach is a staged deployment of competence development in which the participants of the development organization are ahead of the rest of the line organization.

This does not mean that the methods of this assignment C, competence development, only apply to the development organization and part of the line organization that participates via the network in the stage I (Figure 35). The methods also apply to stage II, prior to system introduction.

People from the development organization and those who have participated with high participation degrees in stage I can help during this second wave of competence development. During this second wave the same methods such gaming & simulation, coaching and SFA are applied. The only difference is that there is no feedback to change the ES configuration.

Although the generic process of competence development is deliberately left open, there are some guiding principles that may give participants some grip. This is based on the three layered competence model from chapter 3 (Table 16, pp.142)

The employment of this assignment requires that the organizational members are aware of the meaning of competence development and work with different methods to initiate the process. It can be stimulated by paying balanced attention to each of the three layers in its triptych concept.

Layer 1. (technical dimension)

This layer includes knowledge, skills and capabilities. This layer is included in the systemic design template (Table 22, pp.178).During the design and development process the participants define current and future capabilities. Based on these explications the methods from assignment C (gaming, SFA and coaching) can be initiated and further specified during the project stage. This exceeds the classical

training and education of the current implementation practice. To stimulate competence development balanced attention during the change process should be given to skill-based training, experimental learning, experiencing and role-based learning. The emphasis of learning in ESiOD is a situational-specific application based on different educational work forms and learning styles.

Layer 2 (Narrative dimension)
To stimulate the increase in layer 2 a comfortable environment and familiar relationships with different organizational members is required. The participants are stimulated to relate their experiences, their motives and personal background during the collaborative design workshops (assignment A). These workshops can be in either small or larger group settings and are possibly accompanied by coaching.
In this setting sometimes even a safe environment is necessary. The mutual explication of conation (willing), cognitive schemata (thinking) and attitudes (valuing) helps create awareness for both the one's own position as well as those of others. Layer 2 is essentially about experiencing, sharing and reflecting during the change process.

Layer 3 (Affective dimension)
A change process is accompanied by vehement feelings or such expressions. Layer 3 is not about covering up or diminishing these phenomena. These feelings should receive special attention and be expressed or shared between the several organizational members. Peoples' fierce feelings of despair or their difficult feelings of releasing old habits and structures should be acknowledged.
A deliberate attention should nevertheless also be given to create a positive mood. A positive but also sincere message and way of working towards opportunities and chances for several organizational members should be stimulated. Large groups can be covered with questionnaires and large-scale interventions such as information markets, but large groups can also be positively stimulated with informal gatherings. On a smaller scale coaching can help to help the different organizational members with their affective affairs.

Assignment three is thus about being aware, the collective thinking and the collective acting on competence development. Each organizational member should be aware of his or her position in the organization and the possibilities and limitations during the design and development process.

- Layer 1 is realized by a mutual knowledge increase and especially by an experimental learning approach.
- Layer 2by making people aware of their ambitions and motives and enabling them to tell and share their stories
- Layer 3 by offering room for emotional disturbances, reflection and making individuals and groups aware of unconscious processes and/or behaviour.

4.6 Deployment of ESiOD

In the beginning of this chapter the development organization is presented as the initial group of people who initiates ES*i*OD. In the previous 4 sections the foundations behind ES*i*OD and the in-depth deployment are explicated. This section explains the deployment of ESiOD from a higher perspective and explains the line of reasoning behind the context-specific deployment of ES*i*OD.

4.6.1 *Situational-specific deployment of ESiOD*

ESiOD typically lacks a detailed preparatory way of working and specific timeline. The line of reasoning behind this aspect is extensively explained in the previous sections and also in the analysis of chapter 3. Nevertheless practitioners have a natural desire to put a methodology in a perspective, or in other words to understand how the methodology generally works. The answer to this question can be given by contributions from context-dependent change, situated method engineering and adoption of methods and tools.

Situated method engineering or method adaptation stems from the ISDM domain, but its principles can be translated to the integrated design and development notion behind ES*i*OD. Aydin (2006) at the end of his thesis elegantly describes the interplay between the participants who deploy the elements of a methodology and the interacting organizational context. In his work these three objects are called actors, method fragments and the projects' context. Relevant to the deployment of ES*i*OD are the findings with regards to the interaction between these three objects during an implementation or change process. These findings tell us about the limited predictability of the interaction between 'proposed methods' (by the methodology itself), 'owned methods' (from the experiences and knowledge of the actors) and finally the 'induced methods' that are entered by the organizational context. Aydin (2006) and Baskerville & Stage (2001) state that it is more important to initiate a socializing process on the mutual understanding of the methods than to meticulously define principles and deployment in advance. The scholars in this domain in other words say that it is more effective to let the intellectual function of the methods play their part instead of emphasizing the structuring and prescribing function of the methods. This line of reasoning reverberates in the joint findings from the scholars in the situated method engineering domain and context-dependent change:

1. There is a limited predictability of the precise deployment of methods and interventions by the several participants;
2. The importance to match understanding and accessibility of the offered approach or methods to the several participants;
3. The investigation of the context-specific aspects can assist in a more effective deployment of methods and interventions;

ES*i*OD continues this line of thinking, by addressing these three findings. :

ES*i*OD leaves the deployment of methods in the respective assignments to the participants (agents) without precise prescriptions or a predefined structure of time, stages and activities. It gives a structured overview of three concrete and accessible

assignments in a generic stage model. And finally makes participants aware of the context-specific situation and stimulates the deliberate analysis and selection process in which practitioners adjust methods and their deployment. ESiOD is about paradigm spanning. The first two assignments, network development and systemic design, contain several methods and ways of working that sometimes prescribe a detailed way of working and emphasize a functionalistic perspective on the design and change process. Competence development can be seen as the opposite and a kind of balancing compensation. Therefore to realize competence development the deliberate use and deployment of these methods is required, but also especially the awareness and conviction by most participants to sometimes let go and see where the process will go. Competence development can only to a limited extent be enforced and therefore the hard work during designing should be combined with playful release and deliberate sense making. There is not just one process description to carry out this assignment. It is the collective application of the three assignments and its nine methods that helps the collective of internal organizational members and the external partners during their situation-specific design and development process.
Figure 54 gives an overview of the elements within ESiOD.

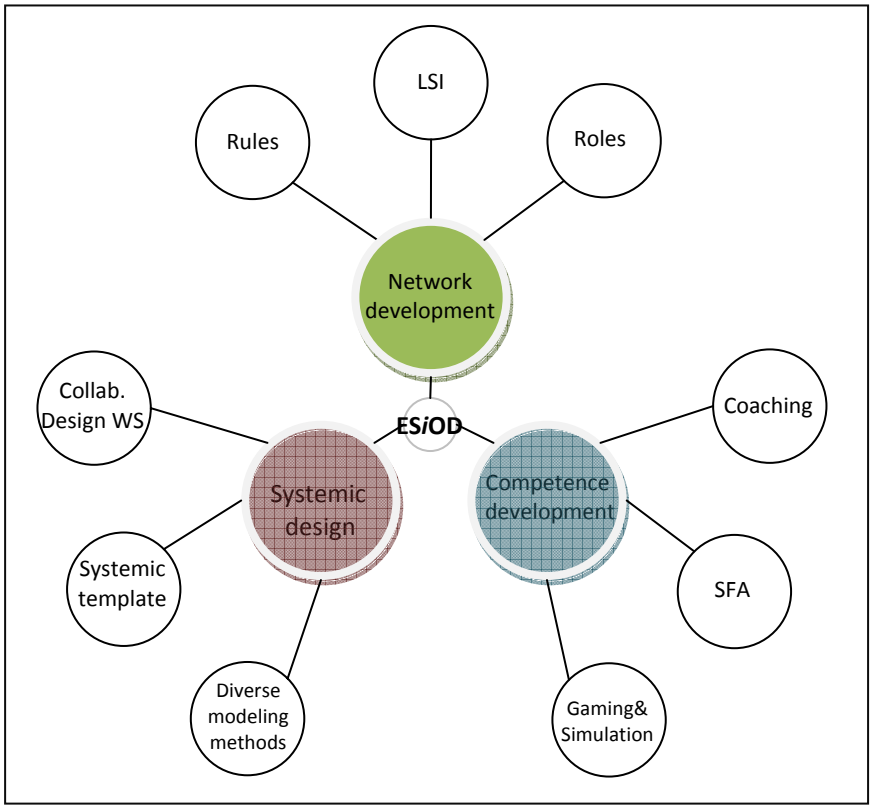


Figure 54 The different elements of ESiOD

The answer the question of 'How to start' in that perspective may well be 'Yes' (Block, 2002), meaning that it is more important to initiate a deliberate process in which the actors discuss their understanding of the methods' context rather than the to predict what the process will look like in outcomes and timing. This does not imply that one should brashly start the change process and 'just' adopt the offered change approach. Integral organizational development requires a contextual analysis with an accompanying contingency-specific start (Koopman & Pool, 1994; Cacioppe & Edwards, 2005). The start of deploying ESiOD first requires a contextual analysis of the project and organizational settings. After this assessment a collective dialogue is to be initiated on the meaning of ESiOD and how it can be deployed in the specific situation. This context-specific approach to methods and methodologies is also recognized in the line of reasoning of some scholars in the ISDM domain. The next section explains how the contextual analysis can be deployed in ES*i*OD.

4.6.2 *Deployment of ESiOD after situation and context*

In line with the reasoning in the previous section ESiOD does not present a cookbook recipe of how to start and deploy the three assignments. Nevertheless a set of initiating guidelines can be presented as way of support for the participants in the development organization. ESiOD is specifically constructed for the project stage of the ES implementation process. This implies that there are specific boundary conditions.
These are:

- A finished envisioning stage in which the implementation ambitions and a business case are defined
- Top management commitment to the continuation of the implementation process.
- Budget and resources available to continue the ES implementation process
- Selection of suitable implementation partner with appropriate experience in ES implementation and organizational development

In the beginning of the project stage the development organization will be especially engaged in staffing and start-up. This means role adoption, creation of social networks and gradually each process owner will create his or her network or cluster of people that will help create the respective business process visions from the higher implementation ambition.
During this start-up period the different clusters in the development organization are expected to also gradually reflect on the project's context and investigate how the three assignments of ESiOD can best be deployed. This is the incorporation of the situated way of thinking as displayed in Figure 55.
It shows the dynamic deployment of ES*i*OD, the contextual analysis and the reflection to adapt way of working and deployment of used methods or interventions. The contextual factors should be perceived as systemic structures.

They should not be seen as a functionalistic preparatory perspective on the deployment of ES*i*OD, but as way of support for the development organization to initiate ES*i*OD and start a deployment that matches the situational context.

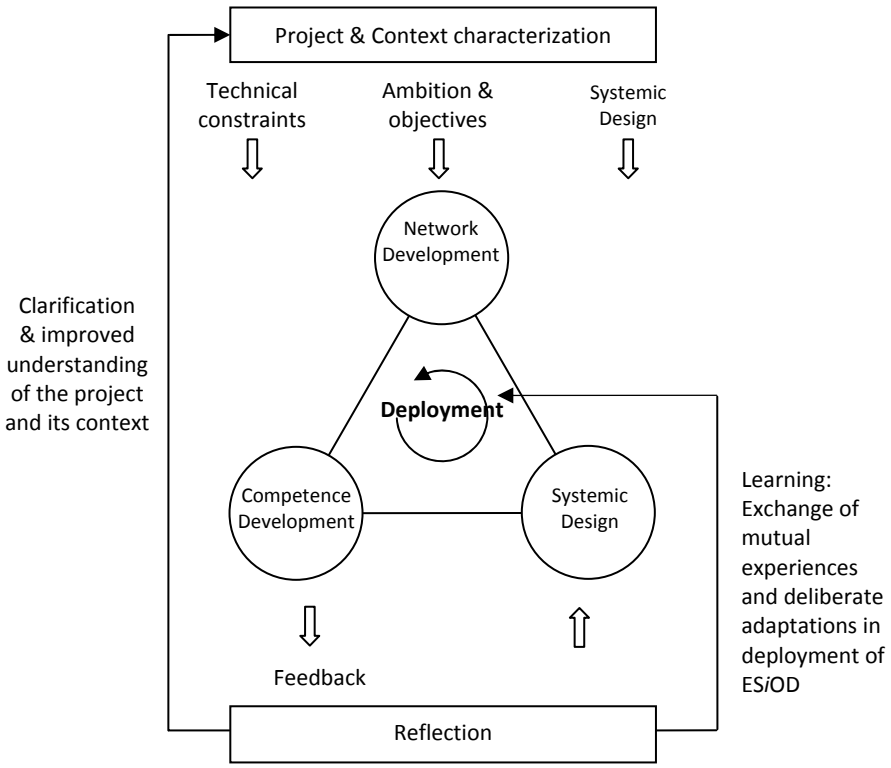


Figure 55 Context-dependent deployment of ES*i*OD (based on Aydin, 2006)

After the first assessment of the organizational and project's context, the deployment of ESiOD is in the hands of the development organization, as described in the preceding sections 4.2 to 4.5. The following aspects are exemplary to further define the systemic structures for the contextual analysis:

Implementation ambition:

- This defines the objectives of the implementation process
- The explication of implementation scope (number of modules, affected business processes and impact on the organization)
- The first explications of business process visions if defined in the envisioning stage

Organizational characteristics

- Organizational characteristics: E.g. Organizational structure, change capabilities, culture, hierarchies, power structures, coalitions
- An overview of historically relevant projects or implementations in the organization, reorganizations or comparable innovations)
- Projects characteristics: E.g.: deployed approach in stage I, participation degree, change capabilities and perspective on organizational change of involved participants, etc.

Technical constraints

- Available time,
- Imposed and available technology,
- Available resources (people and money)
- Contracts with external suppliers (agreed involvement)
- Number of suppliers
- Characteristics of suppliers (capabilities, used approaches & methods.)

The previously described situational-specific way of working will be deployed in chapter 5 by an analysis of the MINDEF case. It will feature an analysis of the deployed stage 1 and implementation ambition, an assessment of the organizational characteristics, and finally the technical constraints of the implementation project. This will not be explicated as *the* contextual definition in which ES*i*OD is to be applied, but it will be used as independent plan evaluation (Swanborn, 1993) to define the case-specific characteristics and a suggested deployment of ESiOD. The actual deployment is still left to the participants of the development organization in MINDEF. Figure 56 finally gives a generic staged overview on ESiOD and includes the essential elements as they are discussed in chapter 4.

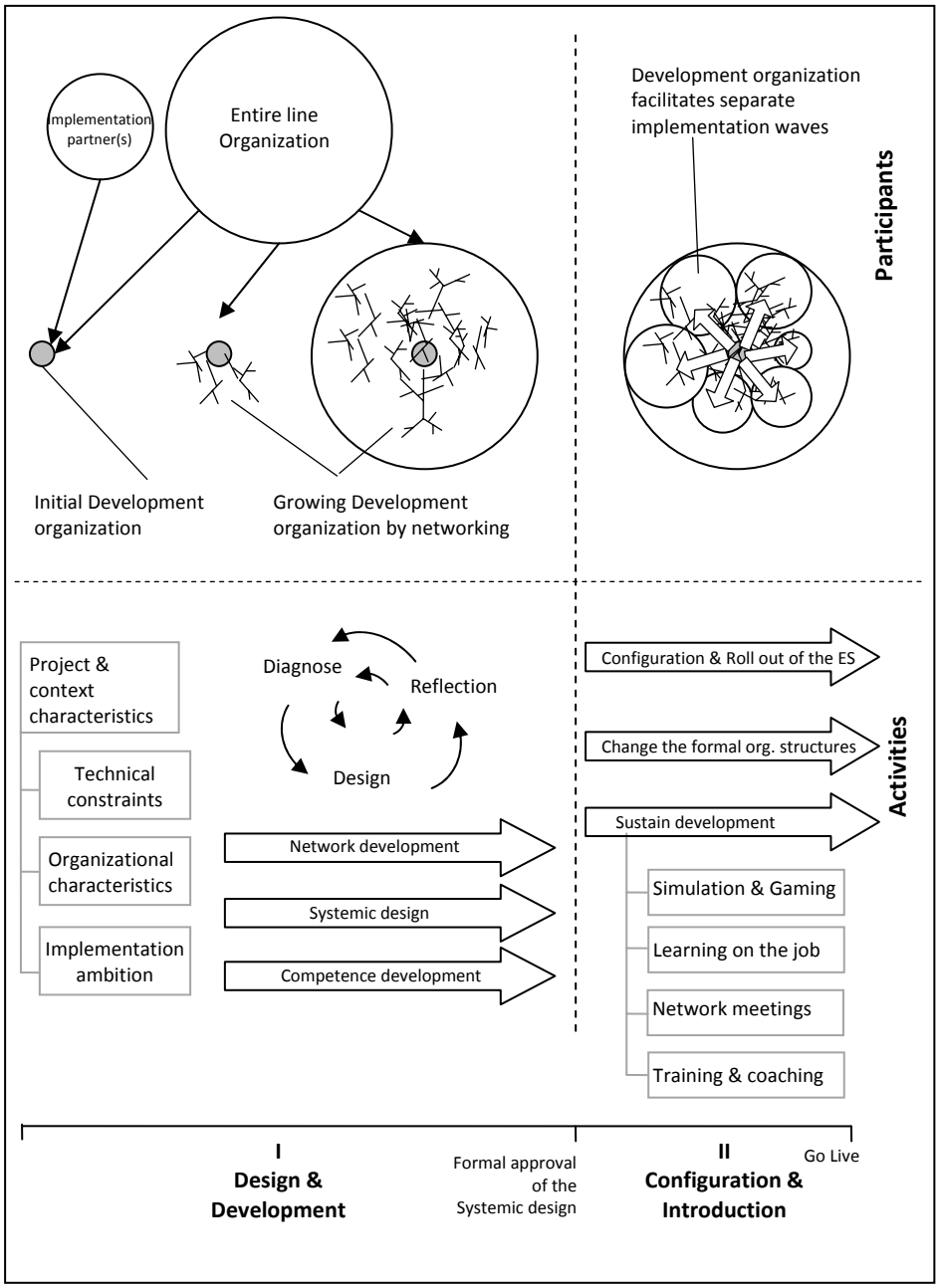


Figure 56. Deployment of ESiOD in the project stage

Part C.
Application and Assessment of ES*i*OD during a longitudinal case study

5. Plan evaluation: Case specific analysis and design

-- An army of asses led by a lion is better than an army of lions led by an ass --
George Washington (1732-1799)

5.1 Introduction

The main objective of this chapter is to specify the deployment of ESiOD for the specific situation of the ES implementation in the Dutch ministry of defence (MINDEF). This section specifies the organization and project specific aspects based on §4.6 (pp.192) and presents the ideal context enhanced version of ES*i*OD for this specific case.
This chapter also is the first step in the evaluation cycle of the deployment of ESiOD in this longitudinal case study. In chapter 1, §1.6.4, pp. 51, it is explained that the evaluation of the designed approach is deployed in a plan, process and product evaluation (Swanborn, 1999). This chapter explicates the ex-ante plan evaluation of ESiOD by the researcher himself. To deploy this objective the ERP process research propositions from Boudreau and Robey (1999) are used. These propositions are based on Van de Ven & Poole (1990) and Van de Ven and Huber (1995) and composed around three perspectives on the ES enabled organizational change process: *context, content and process*.

- First the *context* is elaborated by an analysis of the case organization and the characteristics of its ES implementation in section 5.3.
- Section 5.4 explains the *process* perspective that emphasises the preceding 1st stage of the ES implementation process up to the beginning of stage 2 (the project stage).
- The design -and change *content* is analysed via the project documentation. Project scope is analysed and described in section 5.5.
- The combined results and analysis of these three aspects defines the context specific requirements in section 5.6. Based upon these requirements the MINDEF specific situation and relevant contextual information for the deployment of ES*i*OD is described in section 5.7.

5.2 Operationalization of the ex ante evaluation

This chapter describes both analysis and design. First the three perspectives context, process and content are analysed for the MINDEF case. These three perspectives help to specify the project and context characteristics of MINDEF and its ES implementation as illustrated in Figure 55 (pp.195). Based on this analysis a specific version of ESiOD is defined. The used methods in this analysis are explained in Table 23.

Research topic	Research population	Research methods	Explanation of deployment	Items	Time
Context	1. Participants from stage 1 2. Change consultants	Interviews	Interviews with change consultants	Organizational analysis (culture, structure and change capabilities	t0 (nov 2004)
	Random sample from the Dutch navy	Survey	Perspective upon the organizational change process	Colour model (de Caluwe & Vermaak(	
			Assessment of organizational culture	OCAI (Cameron & Quinn)	
Process		Document inspection	Analysis of Project and change management during stage 1	• Reflection on stage 1, • way of working, • participation, • type of interventions	t0 (nov 2004)
	Participants from stage 1	Interviews	Semi structured		
Content		Document inspection	Project documentation	• Project ambitions and scope, • Reorganization objectives of MINDEF • ES design objectives	t0 (nov 2004)

Table 23 Used research methods, population and items for the plan evaluation

First the organizational *context* is elaborated by an analysis of the MINDEF case organization and its ES implementation in section 5.3. The Ministry of defence and its organizational characteristics are analysed as well as the background of the ES implementation process. The relating programmes & projects are explained and an analysis of the organizations' culture is described based on interviews and surveys in a sample population of the Navy. The surveys include the organizational culture assessment instrument (OCAI) of Cameron & Quinn (1999) and the colour thinking model of de Caluwe & Vermaak (2004). Both surveys are deployed in the same period with the same population.

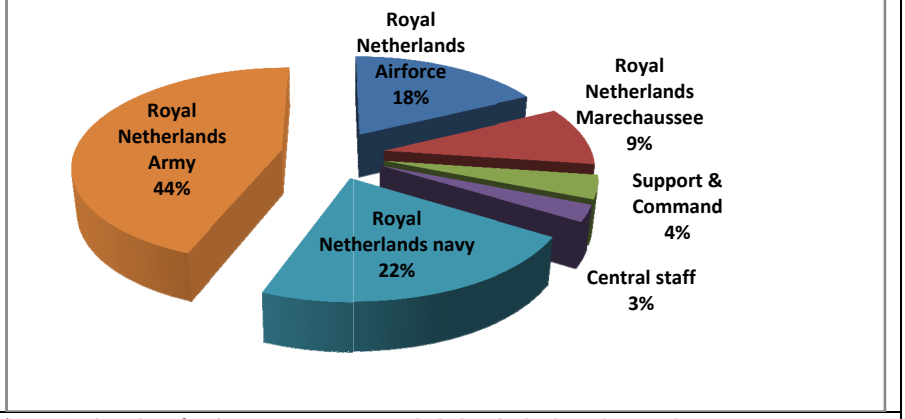
Section 5.4 explains the *process* perspective and emphasises the preceding 1st stage of the ES implementation process up to the beginning of stage 2 (the project stage). This analysis focuses on how the envisioning stage of the ES implementation is deployed. The objectives and the circumstances before the project stage are described and its potential impact on this project stage. The actions of the MINDEF case organization and the main events in this 1st stage are analysed in the perspective of IOD. This is analysed via inspection of the project documentation from stage 1 and the preparatory documentation for stage 2. Secondly, a number of participants in this first stage are interviewed. These include both members from MINDEF as well as change consultants.

During this semi structured interviews the participants are questioned to look back upon way of working, participation and used interventions.
Finally, the design –and change *content* is described in section 5.5. This is analysed via document analysis. First the intended design content is specified based on the project documentation, especially the design and project scope. It will be shown that this description of the design content lacks the relevant organizational change aspects. Therefore, this analysis is expanded with the expected design –and development topics that need to be addressed during the project stage. This is analysed and structured by the use of the systemic template of chapter 4 (Table 22, pp.178).
The last two sections present design part of this chapter; it defines the context specific version of ES*i*OD. First section 5.6 describes the requirements based upon the combined analysis results of sections 5.3 to 5.5. Section 5.7 presents the ideal specific situation and relevant contextual design for the deployment of ES*i*OD in the project stage of the MINDEF case.

5.3 Context: The defence organization and its change program

The case organization is the Dutch ministry of defence. Towards the end of the 1st stage of the implementation program, October 2004, it employs approximately 68000 employees. This includes 51,000 military personnel and 17,000 civilians. According its mission statement the Dutch armed forces have three main tasks:

1. The defence of national and allied territory, including the Netherlands Antilles and Aruba;
2. Promoting the international rule of law and stability;
3. Supporting and assisting civilian authorities in maintaining law and order, providing disaster relief and humanitarian aid, on a national as well as an international scale.



*Personnel working for the agencies are not included in the budgeted strength.
Note: figures have been rounded. Source: National Budget, 2004.

Figure 57 Dutch defence organization in 2004

5.3.1 *MINDEF towards a different organization*

In 2003 the Netherlands aims to have smaller but high-quality and fully deployable armed forces. The means with which the Defence organization intends to carry out its missions are based on the current international security situation and inspired by the nature of the desired military action. There are four units within the Dutch forces: Army, Navy, Air force and Military police. The organization can be seen as separated in two main bodies. The administrative support organization and the operational organization, also called the forces. The forces deliver a proportional amount of staff to the administrative support organization

The defence organization in the last two decades has been confronted with cutbacks in budget and a decrease in personnel. This has resulted in gradual savings programmes within all armed forces and the supporting organization in the last ten years. In spite of these efforts there is an urgent need for a major reorganization programme that starts in 2003. This major reorganization programme of the ministry of Defence is called operation SAMSON.

The minister of defence decides that this is necessary to both create a lean and efficient organization, capable of performing new tasks and objectives, but also realize significant cost savings. In 5 years from 2003 the total personnel is to be decreased with an amount of 11.700 FTE's. This is a major reorganization programme with different subsidiary programs and projects.

One of these programmes focuses on the information system landscape within the ministry. This problem goes back almost a decade earlier from the beginning of the SAMSON program in 2003.

The defence organization and its separate forces since the middle of the nineties are confronted with the need to upgrade a fundamental part of the information systems. A significant part of the systems is technologically outdated and cannot support collaborate or integrated operations between different forces. There is no adequate and efficient system management and exploitation costs are exceeding the accepted figures in the market and the organizations' budgets. Therefore there is a broad acceptance for the vision to replace several outdated information systems with COTS systems. The strategy to adopt an organization wide information system, like an ERP or ES that supports a major part of the main processes, comes up, but during a significant period there is no agreement on the type or vendor of such a system between parts of the administrative organization or singular armed forces.

In 2000 the first positive signals to select an ES package as main information supplier come up, starting with a pioneer role for the royal navy.

From this moment on a significant amount of time and people from the entire defence organization are working and thinking towards an ES implementation. This moment can be defined as the start of the first chartering phase of the implementation process (Stage I). The program gains its critical mass and is named SPEER (Strategic Process and ERP Enabled Reengineering). The main drivers at the start of this stage are cost savings, out phasing of legacy systems and a reorganization program.

5.3.2 *Analysis of the existing organizational culture*

The specification of the particular deployment of ESiOD within this case setting also depends on the characteristics of the organization itself. The organizational culture and its perspective upon organizational change is analysed prior to the beginning of stage 2 (Goslinga, 2005). This is deployed by a sample investigation within the Navy. A group of 20 members of a maintenance organization is interviewed and surveyed on the OCAI and colour profile. The group is a varied composition of different positions from higher management, middle management and maintenance operators.

OCAI Results

The results of the standard OCAI questionnaire show a cultural profile that is dominated by the clan and hierarchy aspects (Figure 58). Both aspects within this specific population can be explained. The formal dependencies and organizational rank structure reverberate in the hierarchical values and norms of the organizational members. This is accompanied by a great sense of solidarity and esprit de corps due to the dependencies on another in either training or real life critical situations. This clan characteristic makes the entire organizational culture so distinctive. As this applies to both the military as well as the civilian staff this characteristic clearly stands out to the hierarchical dominating characteristic that is representative for bureaucratic large organization (Mintzberg, 1993; Cameron, 2004)

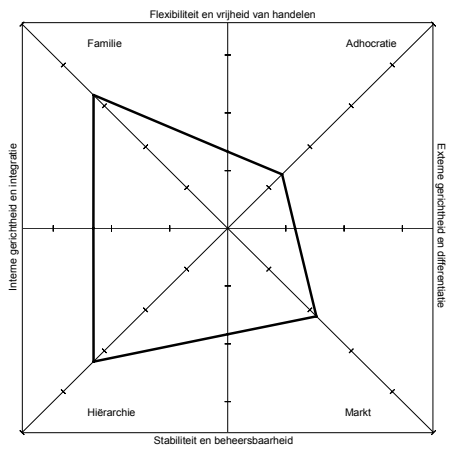


Figure 58. Cultural profile for a sample population of the Dutch defence organization (Goslinga, 2005)

Colour model results

An assessment of the same population shows the dominant ways of thinking and acting addressed by the colour thinking model. Table 24 shows the condensed descriptions behind the colour profiles, whereas Figure 59 shows the results of the respondents within the navy sample group.

White	Change from a self-organization point of view: Change is seen as a perpetual mobile and as an autonomous self-driving that comes from people's own energy and sense making
Green	Change from a learning point of view: DeCaluwé and Vermaak suggest that the green perspective on change consists of giving feedback, facilitating learning and the creation of a safe environment in which people have the opportunity to experiment with new behaviour.
Red	Change from a HRM perspective: Change from this perspective stimulates and motivates people for change, and makes change attractive to them
Blue	Change from a blueprint perspective: It refers to change processes that are based on rational design followed by implementation of change. One of the main assumptions in this perspective is that people or things will change, if a clearly specified result is laid down beforehand
Yellow	Change from a power perspective: this perspective relates to organizational change processes, in which interests, conflicts and power play an important role. This way of looking at realizing change assumes that people will change when you take into account their (own) interest or when you can compel them to accept certain ideas

Table 24 different perspectives upon the change process (de Caluwe & Vermaak, 2003)

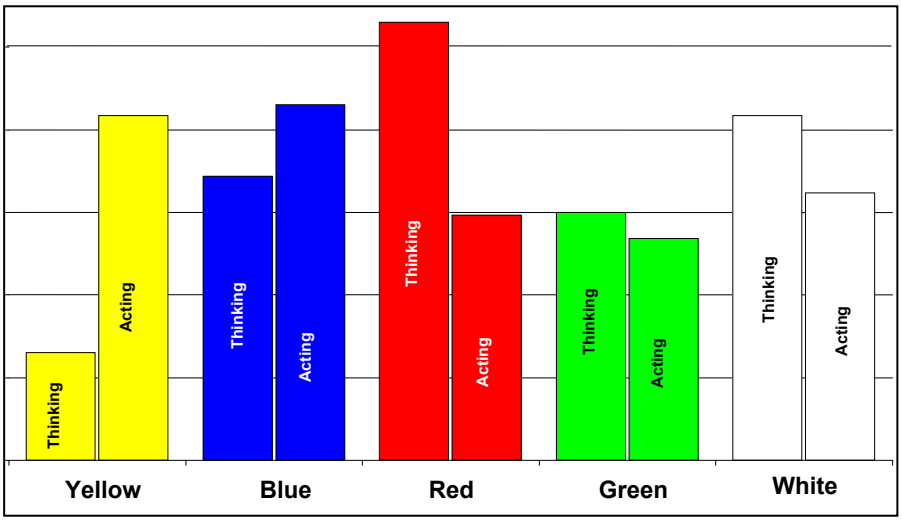


Figure 59 Colour thinking and acting (Goslinga, 2005)

These results show:

- There is an extensive discrepancy between thinking and acting on yellow and red.
- The dominant colours for thinking are red and white.
    - The respondents show a significant high ambition to change after rewards, training and other HRM instruments (Red thinking). Secondly respondents think changes within MINDEF flow by themselves (white thinking).
- In reality their actions within the organization are contradictory as the dominant colours for acting are yellow and blue.
    - The respondents act according to well defined and objective change principles (blue thinking) and also change according to their own interests and the attention for existing power schemes and mutual dependencies (yellow thinking)
- Green is relatively low for both acting and thinking.

These four results are confirmed with results from different interviews and observations:

- Respondents report a low initiative for learning and innovation. Making no mistakes is valued over self initiatives.
- MINDEF is a clear hierarchical structured organization which the members behave according to their rank or positions and after clear formulated objectives.

Conclusions

MINDEF is confronted with a large reorganization in which the ES implementation is a substantial central element to both succeed the cost reduction objective, but also enable the substantial decreased amount of employees to conserve their employability. The investigations in the navy only can give a first indication based upon the sample size in comparison to the entire MINDEF organization. Nevertheless the survey results are confirmed by the interview results with change consultants that reflect upon other parts within MINDEF.

The organization can be characterised as a clan and hierarchical structured organization. The respondents state they aspire a red and white change approach, whereas the actual deployment of change projects shows a clear functionalistic -and power dependent change paradigm. The combined results from organizational characteristics shows low change capabilities. The combination with the change ambition influences the advised initial deployment of ES*i*OD. Based on Boonstra (1992) and Beer & Noria (2000) a design oriented beginning is suggested in which gradually different interventions are introduced to unfreeze the members from their functionalistic perspective upon the change process.

5.4 Process perspective: Stage 1. The chartering phase

There are different reorganization initiatives in the ministry to realize the SAMSON objectives. The SPEER program is responsible for the implementation of an organization wide ES including the necessary organizational changes. A substantial amount of savings and reorganization improvements depend on the successful implementation of the ES, its accompanying transparent information structure and the new standardized process based working routines.

5.4.1 *Overview of stage I*

During the ES implementation the reorganization ambition includes a merger of the departmental management staffs and a new management and control model. The savings and introduction of the new management and control model are dependent on the timely new and adapted information services including the accompanying process - and data standardisation. The ES is seen as the main enabler to accomplish this ambition and attribute significant contributions to this reorganization program. Furthermore the ES is expected to introduce improvements in the financial, accounting and logistic operations.

Figure 60 shows the staging figure from the master plan document (status end of 2004). The three stages that are discerned in Figure 60 can be mapped on the typical ES implementation approach (See also 1.2, pp. 16).

During stage 1 there is no official employment of Integral Organizational Development. In the project documentation there is no special attention for the design and development philosophy. The 1st stage is a result and continuing process of the search for a new information system that can serve the MINDEF organization and accommodate the reorganization (SAMSON).

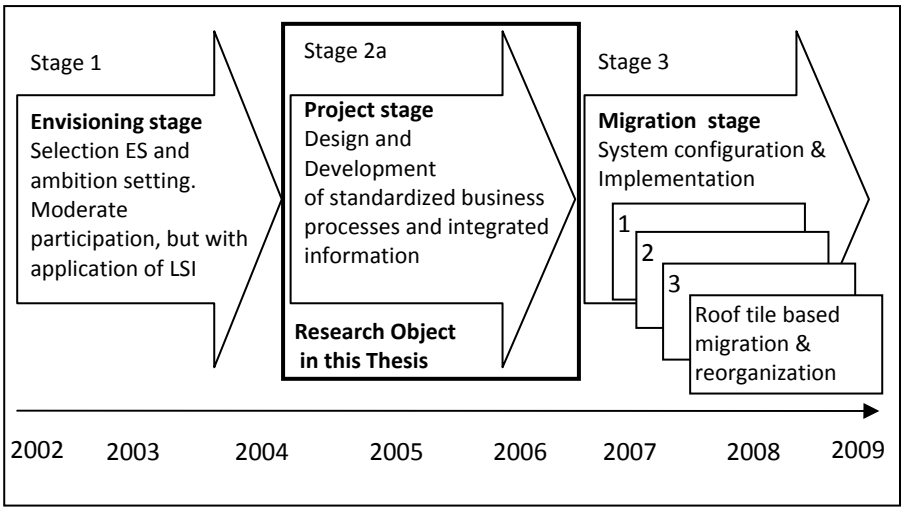


Figure 60 Staging of the SPEER programme

Different forces or departments within the MINDEF organization either collectively or individually investigate ways to renew or innovate their information system requirements. Although the IOD approach is not explicitly followed in this stage specific elements can be recognised later in this stage. The reorganization initiative from 2003 (SAMSON) may be influential on this movement. This is employed by a project called "route 66" in which a limited amount of participants during several LSI's create the vision for the ES implementation. This is exemplified by the application of search conferences and large-scale interventions on vision and strategy not only aimed on package selection, or creating solutions. It can be characterised as vision creation process that is aimed on first specifications of information and system requirements as well as organizational issues (Source: Route 66 project documentation). Stage one chronologically can be described as follows:

From 2000 onwards the royal navy and royal air force independently collect their experiences with the implementation of ES technology. Both organizations in their search for an improved supply -and logistics management start with introducing the ERP concept into their organizations. The royal air force introduces specific modules of SAP. The navy doesn't reach a real implementation but executes different feasibility studies.
These studies help in creating a defence wide knowledge base of implementation experiences and preparation studies that at the end of this period are exchanged amongst the different force units and also used as preparation for the joint implementation ambition. This ambition continues to gain critical mass and in the period 2002-2003 different initiatives are taken to further define business cases and create acceptance from a broad part of the organization. One intervention type, used in this period, that is well perceived by the respondents are the large scale interventions (Dannemillar & Jacobs, 1999). During these sessions a varying part of the organization participates in creating a common vision and start up with the sensemaking process between the different cultural backgrounds of the four defence units. In June 2003 a consortium of two partners, Cap Gemini and Logica CMG, is selected to support the implementation process. The first, together with a selection of internal executives, co-directs the programme. The program and project management structure can be qualified as extensive, based on the documentation analysis and project staffing predictions.

During the rest of 2003 the activities focus around setting up the program structure, control board, and the preliminary design of a new governance -and accounting model. In 2004 the programme organization called SPEER is defined and initiated. SPEER stands for Strategic Process and ERP Enabled Reengineering. During this year a further elaboration of the ambitions (ambition level), the cost and benefits analysis and a risk assessment are executed. The official start of the programme and its projects (stage 2) is postponed twice in 2004. At first (April 2004) a juridical procedure by one of the alternative ES vendors causes for significant delay. Major problems with staffing the internal vacancies for the project organization and contractual problems with the actual ES vendor are the second reason that the initial start is delayed towards the beginning of 2005.

The timeline of the program is extensive compared to more recent implementation. Large scale and extensive ERP or ES implementation programmes were typical in the beginning era of this technology. Experiences and tighter budgets have minimized implementation paths in the last decade considerably (Shields, 2001) or plead for a step-by-step approach (Alleman, 2002). MINDEF deliberately chooses
For the extensive time span as it is a truly complex implementation and reorganization process that stands out by its size, organizational culture and specific process and system functionalities:

- Considering the size aspect it comes down to an estimated population of 10000 end-users from one country, speaking one language, but spread over multiple locations.
- The outbound operations are also supported by the ES, but the main implementation affair is within one country.
- The defence organization for its operations has very specific processes and functionality ambitions. This is partly covered with the branch specific Defence Forces & Public Security (DFPS) solution of SAP. At the end of 2004 DFPS is a rather new development that is implemented or being implemented in a handful of other forces (USA, Norway and Germany). The ES vendor promises the entire functionality to support operational forces will be available by the end of 2005.

The program structure is based on the insights of stage I and is depicted in Figure 61 (Source Project documentation). The SPEER program accommodates five different projects (bottom layer). Each project is staffed with a dedicated project team and project management. These projects and the program itself are supported by one pool of support teams (middle layer).

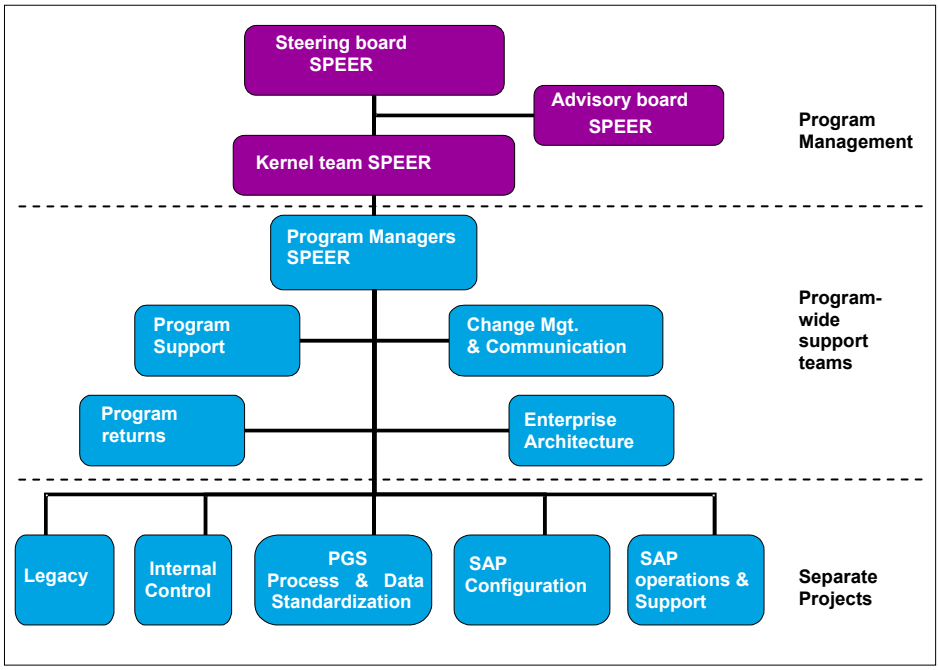


Figure 61 Program organization *SPEER* during stage 2 (2005)

The following project teams are discerned:

*PGS (*Process and data standardization)	This is the largest project in the project stage. The project team is concerned with the reengineering assignment of all relevant business process in the material logistic, financial and maintenance domain.
Legacy	This project team is engaged with the present legacy systems, its disposition and the eventual interfaces towards legacy that will continue working in the new situation
Internal Control (AO/IC)	This team is engaged in the definition of the administrative organization and internal auditing and controlling.
SAP Configuration (Building factory)	This project team is engaged in building the actual SAP modules. This team is dependent upon the process descriptions and system designs of the PGS. This team will start up at the end of the project stage. This team will mostly consist of external SAP experts.
SAP Operational management	This project team is engaged in the operational management of the ES after Go Live.

The project teams are staffed by mostly internal experts from the defence organization. The teams are further staffed with consultants from the implementation partners in the respective domain of the team. Each team is headed by a duo of one internal and one external team manager.
The projects are supported from the following teams:

Programme support	Administrative staff to support in organising work.
Enterprise Architecture	Guides the separate projects towards a consistent technical architecture.
Programme returns	Small team that is engaged to guide projects towards the programme benefits. It assists and quantifies the possible benefits and gains due to the implementation and assists the respective projects.
Change Management & Communication	The change management organization is embedded at the highest program level, but its members (change consultants) are staffed into the respective projects and their teams. From the start there is al focus to set up the program as a large scale technological driven organizational change process with an explicit attention for the integral change approach. In this program called *design and development*.

5.4.2 ***Analysis of stage 1 in the perspective of IOD***

Stage 1 of the SPEER programme is put into the perspective of IOD. This analysis is employed by investigating the general principles of the 1st stage of integral organizational development (§2.4.4 pp. 74) (Boonstra et al. (1998) and the different aspects of participation (Table 14, pp.134).

Orientation and diagnosis

The SPEER first stage resembles the typical orientation and diagnosis activities of IOD. Search conferences and similar LSI's are used. The deliverables are typical outcomes of a first stage ES implementation. It includes the baseline project plan, a business case, the project organization definition, etc.. In the perspective of IOD the project plan should pay significant attention to the organizational change process. It should explicate the theoretical models behind the proposed change approach, specify the role of the advisors, and give a first analysis of the organizational problem from a systemic perspective.

In the investigated documentation and work packages there is attention for these topics, but the problem analysis is very much focused to technological affairs and less to structural, social and behavioural aspects of the change process. The documentation makes clear that the change consultants propose an integral approach in the 2nd stage but the actual employment is left open. Conceptually this is in line with IOD as the development process often requires adapting change strategies (Boonstra et al., 1998).

Organization of participation

By the use of LSI's a group of approximately 50 participants is involved in stage 1. This group is varied and stems from different units and hierarchical levels of the MINDEF organization. During stage 1 this group defines a shared vision for the upcoming ES implementation. The actual amount of participants is low in the perspective of IOD. The IOD concept suggests extensive participation (§3.2.2, pp.110) and the amount of participants is low compared to the personnel size and the amount of organizational members that will be affected by this project (approximately 10000). There are specific limitations in this envisioning process as both SAMSON and the ES selection give specific boundary conditions and requirements. The IOD concept originally gives more design freedom in this envisioning stage. The number of LSI's is low and the propagation of the obtained insights and shared vision into the rest of the line organization is moderate. The planned time schedule for the prospective project stage is extensive. This is in line with the philosophy of IOD to reserve enough time for development-based activities.

Systemic design content

The SPEER program addresses an integral change approach. Based on the analysis of the design content and documentation it can be concluded that up to the start of stage 2 the program does not succeed to adopt a full systemic perspective upon this implementation process. A deliberate vision is formulated that exceeds the mere technical ES introduction, but also addresses the fundamental different business logic and its consequences. The amount of detail in this vision on deeper organizational aspects is low and the subsequent design stage will need an increase in the systemic perspective to further explicate all relevant aspects beside process -and system redesign.

Concluding

The 1st stage of the ES implementation is characterised with a careful and sometimes reserved deployment of the principles from integral organizational development. There are fruitful and promising first results like creation of a shared vision and an increase in acceptance, but the real incorporation of IOD and its way of thinking into the project requires more energy and attention in the 2nd stage.

5.5 Content perspective: design vision and change ambitions

The implementation ambition from the first stage can be subdivided in the following aspects that further specify the context for the change process and topics for the second stage:

I. Description of the ES implementation ambition in the defence organization
II. The explication of business process visions
III. The necessary enhancements for the systemic design notion

5.5.1 *The ES implementation ambition*

Prior to its start and during the beginning stages of SPEER the design vision is formulated. The goals of the SPEER programme that are relevant for this study are formulated as follows:

1. To support in realizing the operational goals of improvement of logistic support of joint force operations (including physical distribution and tracking and tracing) and the introduction of the NH-90 helicopter.
2. To support the introduction of a new governance and accounting model for the entire defence organization. (including performance measurement and management of processes and organization)
3. The effectiveness improvement of the logistic and supply chain, financial and accounting processes and the organization itself.
4. Improvement of the organization wide management of information systems and services

Goals 3 and 4 are direct contributors to the larger SAMSON reorganization programme. The scope of the programme is summarized in Figure 62. The expected revenues for the programme are a onetime saving in personnel of 1030 FTE's and a structural returning savings of € 80 million / year.

	Within project scope	Outside project scope
Processes	• All Logistic processes • All Financial processes • Financial management of the Operational Defence Forces • Exchange of financial & logistic Information with HRM and Battle Management	• HRM • Battle Management • Operational force deployments
Organizational	• All members of the organization concerning Logistic and material processes (including operational force units) in static and operational domain (including educational centres)	• Rearranging the MINDEF organization (collaborative effort, responsibility with the line organization) • Realizing SAMSON savings • Factual realization of improvement of management and operations
Systems	• System support (ES) of all logistic and financial processes • Management and definition of necessary adaptation s to current Legacy systems	• Intranet • MIS MINDEF • Office and Desktop software

Figure 62 Scope definition of *SPEER*

The ambition level in relation to the typology as presented in chapter 2 (§2.5, pp. 78) is as a PER implementation type. There is an explicit reengineering rationale and SPEER concerns an ES implementation that covers the entire organization, except HRM and the typical operational battle information systems. The HRM part is not within scope due to the already finished implementation of the PeopleSoft HRM module in 2000. This HRM solution will be attached to the new ES. There is a specific attention to only prevent the replacement of outdated legacy information systems.
The explicit objective is to improve the organizational efficiency and its management and control by process standardisation, the use of best practices and performance based management and innovation. The responsibilities for the realisation of these ambitions are defined and accommodated in the SAMSON programme. The SPEER programme serves the specific assignment to design and development the future state besides the SAMSON programme. Its task is to define the new working processes, the design of the accompanying ES and both the development and specification of the necessary organizational adaptations. This design assignment should be employed collectively with the line organization of MINDEF.

The timing of the realisation is positioned relatively late in the program during the actual introduction of the system in the respective domains. This does not entirely match the integral organizational development approach, but the rationale is to change and work during the reengineering and design stages prior to the actual implementation plateaus.

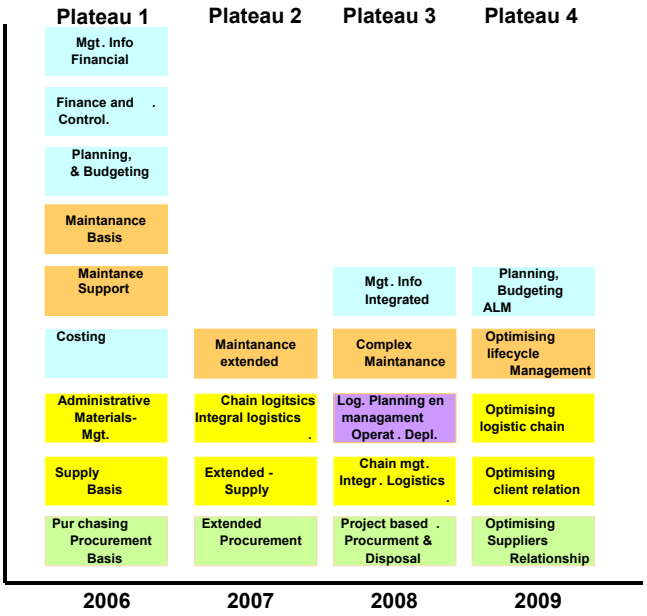


Figure 63 Migration strategy SPEER (project documentation status end of 2004)

5.5.2 *Analysis of first business process visions*

The prior phrased implementation ambition can be specified by a detailed overview of the defined business process visions. By inspection of the internal SPEER project documentation the following design visions for the main business processes visions are specified:

Logistics, Material handling, storage and supply.	Prior to the ES implementation the four armed forces operate their individual material management, logistic and transport concept including the accompanying information systems. This doesn't mean the four forces absolutely do not cooperate, but each force has adopted an individual and characteristic way of working and thinking. One of the main incentives for the ES implementation is to harmonize and standardize the logistic processes in the four forces and also restructure the organization towards one central body that is responsible for the materials management of the entire defence organization (DMO).
Purchasing	MINDEF is an extensive consumer with approximately 60000 employees. Purchasing covers the typical nuts and bolts, office material, but also goods like buildings, machines or tanks. Prior to the ES implementation purchasing is executed by different purchasing departments in the four forces and the administrative staff at the ministry. The design vision includes to integrate and homogenize the purchasing process across the entire organization. This needs to be realised in one generic purchase to pay chain deployed by one purchasing body.
Disposal	Special for this organization is disposal. The Dutch ministry of defence by tradition focuses on far-reaching product life cycles with smart and extensive maintenance, repair -and update instalment programs. Durable products like machines, parts, fighter aircraft or frigates after their official service life are able to continue servicing in other countries or the public domain. The disposal process is envisioned to mirror the purchasing process
Finance	In the current MINDEF organization there are several departments responsible for different financial tasks. A substantial amount of integration has been accomplished (GVKKA), but the final integration between staffs and forces should be accomplished by the ES implementation. The financial cycle should contains a minimal amount of administrative steps and integrate with the logistics, system management and purchasing chains.
Controlling	The ambition of this ES implementation concerns the introduction of a fundamental different financial and controlling system. Instead of budget responsibilities, the MINDEF organization intends to implement result responsible units with a cash system that stems from commercial business. It is also the intention to decrease the number of bureaucratic and control layers if possible with respect to legislation.
Weapon Systems Management	MINDEF consist of four different armed forces. Systems management is above all about the maintenance and instalment of (weapon) systems for these four operational force units. This process touches upon operational processes and should be integrated with the above phrased 'back office' processes.
Interfaces, Architecture and networking	This stream not necessarily covers a future process scenario, but concerns the inventory of existing and future networks, future necessary architecture (scalability and security issues). It also supports the definition of: • Interfacing towards PeopleSoft (HRM) & remaining legacy • Interfacing towards operational weapon information systems • Off line support for missions (Sea, Land)

Table 25 Business process visions (derived from SPEER project documentation)

5.5.3 *Analysis and specification of related development aspects*

The prior business process visions do not include sufficient aspects for a systemic description of the relevant design –and development content. Especially the latter aspects are not specified in these business process vision documentation. There is a strong connection between the SAMSON program and the SPEER implementation program. This relationship affects the further design process of the business process visions substantially. One of the main influences is the so called *verpaarsing* (i.e. Dutch for "becoming purple"). The main idea behind this concept is the blend of the typical uniform colours of navy, air forces, the army and the military police will result in the colour purple. This notion thus stands for *to become one*. Nevertheless, there are some practical limitations to the *one* unified organization.

The ES implementation ambition combined with the specific business process visions specify especially on integrating the supporting back office processes. The four operational forces nevertheless still will be independent in operational tasks and in the respective command and control. The combination of this boundary condition together with the ES implementation ambition and the organizational characteristics (5.3) lead to a set of relevant aspects that define the preliminary systemic design notion. The business process visions can be further specified into systemic design -and development descriptions by the use of the systemic template from chapter 4 (§4.4.3 pp. 178), the project documentation and the analysis results from section 5.3 and 5.4. This especially covers the inclusion of structural, social and behavioural aspects that need to be paid attention to during the development process in the project stage. Table 26 shows the analysis results.

Explication of structural impact	There are three main areas that are affected from a functional perspective: • Logistic distribution and materials management • Finance and controlling • Financial transaction logic with battle management and HRM All organizational units that are affected by these processes both in operational as static domain will need to commit to one standardized way of working and in some cases even to one organizational structure. For example: the logistic support chain in both peacetime and operations will become one organization that is staffed from the four different force units. On the other hand there are also parts that will stay force specific, for example, the Dutch navy still will be in command and control of its ships and seals troops.
New collaboration initiatives and dependencies	The four force units will have to adapt to collaboration experiences that up to now were unthinkable in their schemata. The creation of new processes and dependencies requires a deliberate attention to collaborate sense making, designing and exchanging experiences and collectively come up with an accepted vision and solution(s)
Attention for mutual distrust	There is a substantial amount of distrust between the four forces. This stems from the perception that each force stands for its own specific task and has developed its own core competence that does not match the other. Collaborate missions have been executed in the past and the forces in operational wartime have shown to be able to jointly act considerably well. Nevertheless, the different ways of working in the logistic distribution, the different information systems and still the different disciplinary characteristics of each force is a source for the mutual distrust and misunderstanding. In the new situation the forces will depend on one general and collective distribution concept that will be facilitated by an organization build from the four separate staffs. To work together the people need to approach each other and trust needs to be redefined and build up
Attention for disturbing power structures	Operation SAMSON intends to decrease the amount of staff army personnel significantly. The defence organization is a typical hierarchical structure in which the different levels in the organization each have their own power and responsibilities. By combining four different forces and the substantial decrease of colonels and generals a power struggle is born that will affect the change process substantially.
Define and initiate new Social structures	It is to be expected that the current physical lay-out of locations, buildings etc including the people will be sometimes changed due to reorganization. Though this is not the main focus it is possible such occasions will occur and a substantial amount of the people not only will have to learn new skills and competences, but also will operate in a new social structure or even a different environment.

Table 26 completion of the systemic design -and development vision for the project stage

Attention for cutbacks in personnel	The saving of 1030 FTE's is one of the significant drivers behind the SPEER program. Added to the accompanying personnel cuts of the SAMSON program this will result in letting people go. This requires a social plan but more relevant to the ES implementation this could impact the so called organizational memory with a decrease of specific available existing knowledge in the organization. It is known that in similar reorganization programmes knowledgeable and talented people are the first to leave the organizations that are confronted with such programmes.
Experiences with prior implementations	The navy and air force each on its own already have been implementing ERP systems prior to the SPEER programme. The experiences from these different programmes are collectively not positive. The recent, organization wide, implementation of the HRM supporting system (P&O 2000) that finished 2002 also does not add up to the positive experience of the defence organization with implementing information systems. The general conclusions from all these examples is these projects have been managed very top down without substantial participation of the experts on the work floor. (Internal project and evaluation documentation PeopleSoft project, P&O 2000)
Explicate necessary competences and skills	The ambition level sets out a substantial reengineering perspective upon a large part of the operational processes in the organization. This will require to educate the people involved but also to make explicit what typical competences or behaviour is expected from the people in their new positions. This exceeds classical training and schooling initiatives as they are adopted in ES implementation methodologies. Due to scale size it may sometimes require a "train the trainer" and change agent approach, but moreover an extensive training and development program aims to gradually take along a substantial part of the organizational members towards the go live date. A substantial part of this assignment already is to be specified during the design and development process in the project stage.
Be aware of the pros and cons of the professional organization	The defence organization is a professional organization with highly trained and motivated personnel. Although the organization has been confronted with difficult ICT introductions, the organizational members are used to adapt to changing environments in a top down approach. This is not to be misunderstood with a high change capability of the organization itself. The skills, motivation and competences will help in initiating the change process, but these characteristics also will delay specific parts of the change process that are aimed on self development, increase of change capabilities and setting up different power structures.
Make use of the sense of urgency	The defence organization has been confronted with several budget cuts that have been employed in the last decade by a kind of salami tactics. The Dutch government this time has set up a substantial different budget that forces the entire defence organization to reorganize and strive for survival. This sense of urgency can help the organization in initiating a successful change process (Bartunek, 1987).

Table 26 (Continued). Completion of the systemic design -and development vision for the project stage

5.5.4 ***Conclusions***

The prior 3 sections have explicated the MINDEF specific situation from the organizational context, characteristics of the preceding 1st stage of the ES implementation and the aspects related to the design content and the project 's ambition.. The table underneath summarises the analysis results

Context	*Characteristics of the MINDEF organization:* • Large bureaucratic organization with clan attributes • It has a low change capability with a strong focus on design competences • It is under pressure of a large reorganization with 10 % lay-offs. (though there is not a vast time pressure)
Process	*Analysis of Stage 1:* • Large scale process • This stage is employed with moderate attention for integral organizational change. Participation via different sessions, but vision setting is constrained due to reorganization ambition and ES package • The organizational change process accompanied with restrictions from other projects and programmes *Impact on Stage 2* • Enough time available for stage 2 to accomplish the design assignment and initiate the development process • Stage 2 is defined as a staged "roof tile structure" with recurrent design and configuration phases, called plateaus
Content	*Outcomes from stage 1 influencing stage 2:* • Complex System content (technologically (SAP DFPS, number of lasting legacy systems and interfaces • Complex organizational change content due to the combination of change ambition and organizational characterises (see under context)) • High reengineering and reorganization ambition (financial control model; comprehensiveness of management materials) • Integral organizational development is chosen as process approach for stage 2

Table 27 Main analysis results specifying the ES implementation within MINDEF

5.6 Context specific design requirements for the deployment of ES*i*OD

The context specific aspects for the deployment of ESiOD in the MINDEF situation can be defined by the combined analysis outcomes from the prior three sections.
The analysis is based upon the context specific model (Figure 55, pp.195). By putting into perspective the research outcomes of 5.3, 5.4 and 5.5 an ideal way of working is described by the researcher based upon the elements of ESiOD. The requirements are structured after:

1. The organizational characteristics of MINDEF;
2. The integration of change process -and design content

The second aspect combines the findings from sections 5.4 and 5.5 in line with the integral notion of ES*i*OD.

5.6.1 *Deployment based upon the organizational characteristics*

The analysis in §5.3 shows the characteristics of the MINDEF organization. Based upon the combination of these results and the experiences in the integral organizational change domain (Boonstra et al, 1998) it is recommended to initiate a design-based approach in which the participants recognise their current schemata, way of working, and organizational structures and hierarchies. This pays attention to the dominating blue and yellow colour profiles of MINDEF. The movement towards the integral way of thinking should be accompanied with a twofold approach to stimulate the multi paradigmatic way of thinking and acting.

- By the presentation of the way of thinking behind ES*i*OD in training -and project documentation as well as by a substantial attention on this topic during the introductory training sessions. This approach covers the 'knowing' part of the ES*i*OD philosophy.
- Knowing should be accompanied with experiencing. This implies the gradual, but deliberate deployment of multiparadigmatic session formats like DeBono creativity sessions, Janusian Workshops and collaborative dialogues on the meaning of integral organizational development.

This design based start, accompanied with the described twofold approach, requires external expertise and the release of substantial change agents from the line organization. This requires paying extra attention to the staffing and assessment of people that enter the development organization (externally and internally) combined with attention to the coaching method.

The concrete attention points for the specific deployment of ES*i*OD in the MINDEF situation are:

- A structured and functionalistic approach for the beginning stages of ES*i*OD
- External change capacity is necessary.
- Ensemble collaboration between knowing and experiencing of multiparadigmatic approach for development organization
- Gradual adoption, but swift start with multiparadigmatic workshops

- Attention for the staffing of internal and external development organization members
- Extensive focus on coaching by the external consultants in the beginning of the project stage.

5.6.2 *Deployment dependent on the integration of change process and design content*

The MINDEF ES implementation can be characterised as a complex and extensive ES system implementation with a large amount of legacy systems to replaced. The project contains both standard, but also very innovative -and new ES concepts. Some are new for both the implementation partner and even the ES vendor itself (e.g. DFPS and transport). The approximately 10.000 affected end-users cause for an extensive and complex introduction and migration stage.
One of the main issues of the SPEER induced change process is the merge of four force units into one for several end-to-end business processes and their affected organizational members. This causes for a transfer from four different forces each with their functional dominated organizational structure towards a common and standardized end-to-end process logic. This is challenged by some distrust between a small number of organizational units and also the different background, competences -and culture between the organizational units from the four different forces, and sometimes even diverse within one force.

During the first stage of this ES implementation there is no explicit use and communication of integral organizational development. The project in the beginning is employed as a classic ES implementation accompanied by specific large-scale interventions for vision creation. Participants are gathered from across the entire organization, but with an emphasis to the management staff from the central department in The Hague.
The emphasis in documentation and way of working is functionalistic and a systemic perspective on the organizational change problem is missing. Multiple perspectives have been deliberated, for example: management and control model, basic business processes and the reorganization issue. The real incorporation of a systemic perspective including relationships between these aspects is absent in this first stage. To pay attention to this omission requires to integrate process and design aspects of the ES implementation (based on the findings from 5.4 and 5.5). This is specified by the findings from Table 26 (pp. 217) that define the relating organizational development aspects in dependency of the design content. Specification of the requirements for the deployment of ESiOD in the project stage can be derived by this integrative analysis combined with
the prior described organizational characteristics of MINDEF (§5.3). The interaction especially focuses around the ESiOD assignments and specific points of attention for its deployment. The context analysis of the MINDEF organization not only reveals

sensitive points that need specific attention, but also opportunities to support the change process. Table 28 shows integration between design content, development aspects and both opportunities and challenges based on the MINDEF characteristics and the integration between design content and aspired development process. The organizational challenges that require attention are displayed on the left side. The specific context dependent deployment of ESiOD is explicated in the middle column. On the right side organizational properties are depicted that can be used in favour and to enforce the achievements of the middle column.

Pay attention to →	**Specific Intervention mechanism**	**Make use of ←**
Existing distrust between force elements or departments	Create safe situations Make use of external change agents Alternation of large scale versus small scale sessions	Collective objectives of MINDEF Shared values Experiences of collaboration in collective deployed operations
Power and political structures (Markus, 1983)	Invite participants from various background and ranks Organize sessions that aim for an open dialogue. Accompany these with a strict deployment of rules and extensive sponsorship	Sense of urgency (Kotter, 1995): The reorganization realises a real perceived sense of urgency. This can stimulate or convince participants to give up existing structures Support dialogue between coalitions on their mutual expectations (Mastenbroek, 1993; 1999)
Lack of understanding and knowledge behind the sometimes different adoption of "the same" end to end process	Organize inventory workshops in which different line organization representatives present essentials of unique way of working Extensive socialising (focus on network development)	Professional organization: The MINDEF personnel is especially motivated to excel in skills, tasks and performance. Learning from each other's best practices should be used as attractive stimulation for knowledge and experience exchange

Table 28 specific deployment of ESiOD based upon organizational characteristics

5.6.3 *Requirements specified to ESiOD*

The above analysis results can be combined and give specific attention points for the initiation and deployment of the three assignments in ES*i*OD.

Instalment of the development organization

During the beginning of stage 2 it is required to pay attention the following specific attention to the installation of a development organization, initiate network development and the organization of participation:

- The project requires a development organization assembled by participants from different forces and different ranks.
- Attention to invite change agents with trust and/or mandate in the line organization and not necessarily being experts in design content.
- Development team sub groups should change in composition during the design process

Deployment of network development

The deployment of network development requires to pay attention to:

- Invite participants from different locations
- Make repeated visits to different locations
- Attention for inviting participants from the line organization, explicate :
    - Care for diversity. Explicate different ranks and roles (expert, decision maker, change agent)
    - Background (experience with prior ERP or change programs and change capabilities
    - Existing social network

With respect to the deployment of these topics in collaborative design workshops there should be explicit attention for the following aspects (especially based upon the outcomes of section 5.4)

Deployment of systemic design

The above combined analysis results give specific attention points for the context specific deployment of systemic design:

- The systemic design content should be organized via end-to-end business processes with various participants from different disciplines and power structures that are involved in these processes
- An investigation after collective and common values, cultures and ways of working can be a first initiative to create common understanding for each other's affairs. This can initiate building up trust and or new relationships.
- This can be followed by an explicit focus to explicate the substantial differences between the force units, but also the similarities.
- Pay elaborate attention to trust and socialising during the sessions.
- Functionalistic paradigm is favourite: A balanced way of systemic design should be deployed between problem analysis and real 2nd order reengineering (this ties again to the competence development assignment and the context specific elements as described in 5.6.1
    - Pay attention to real reengineering ambition (2nd order change process)
    - Pay elaborate attention for reflection sessions upon design and development efforts.

Deployment of competence development
The organization has low change capabilities and there is attachment to hierarchical and power structure. These characteristics impede behavioural changes and competence development. The context specific start of competence development requires:

- A functionalistic start up of ESiOD with a gradual transfer to a more interpretative deployment.
- A clear definition and elaboration of the multiparadigmatic design -and development concept in the methodology. This means project manuals, documentation, training material and presentations, etc. should uniformly contain this way of thinking including the explanation of its meaning in the project.
- The organizational capabilities of the MINDEF organization require a deliberate selection process on the project team members. The organization has low change capabilities, favour a functionalistic perspective on the organizational change process and there is not too much experience with the IOD change approach. External change capabilities are necessary to initiate the process. Besides the invited internal project team members should be assessed on competences like change capabilities and prior experiences as change agent within the organization.

These findings complete the combined requirements analysis and can be used to explicate the context specific elements of ES*i*OD in the MINDEF case. This is discussed in the next section.

5.7 Case specific and contextual design

The organizational context clearly requires a design based initiation of the project stage. MINDEF has low change capabilities, is known for its hierarchical and professional structure, but on the other hand is confronted with an ES implementation that impacts multiple end to end business process that currently are deployed in different situations and organizational settings in the organization
This combination requires an elaborate structure of the project stage and therefore the generic ES*i*OD format is expanded with two main guiding structures

1. Planned setup of the development organization and the participation process
2. Detailed stage model to give guidance and grip towards the participants

First the concepts to organize the participation process are introduced. This includes the organization of the different participating groups including their participation levels. Also requirements for staffing and the successful accomplishment of assignments and adopting behaviour as participants are explained in the participating organization Next the generic stages and way of working during the design stages are explicated. This will be done in a chronological order.

5.7.1 *Arrange the development organization and the participation process*

As explained in section 5.4 a growing approach is necessary to increase participation and gradually involve and develop the organizational members. The organization of participation should be tuned with appropriate tools and interventions. The networking concept is employed with circles. These circles can be compared to radial waves in a fluid substance when touched upon. During the design stage three different groups can be discerned. A core development organization will start of the design and development process. This group of people therefore resembles the stone falling into the water that drives the radial waves.

Initial Development organization (*Core*)

This is the initial core team that starts of the change process. The core development organization is staffed proportional to the number of organizational members within each division of the MINDEF organization.

In order of size these are Army (largest), Department, Navy, Air force (all three approximately the same size) and finally the Military police). The participants in the development organization preferably spend between 50% up to 100% of their time in the project to enable a high participation level (Passmore & Fagans, 1992) . The amount of full time members should be significantly higher than the part time members (ratio 75/25). Each division transfers people according to the staffing criteria described underneath. Figure 64 shows the proportional sourcing of the different members from the separate divisions within MINDEF towards the development organization.

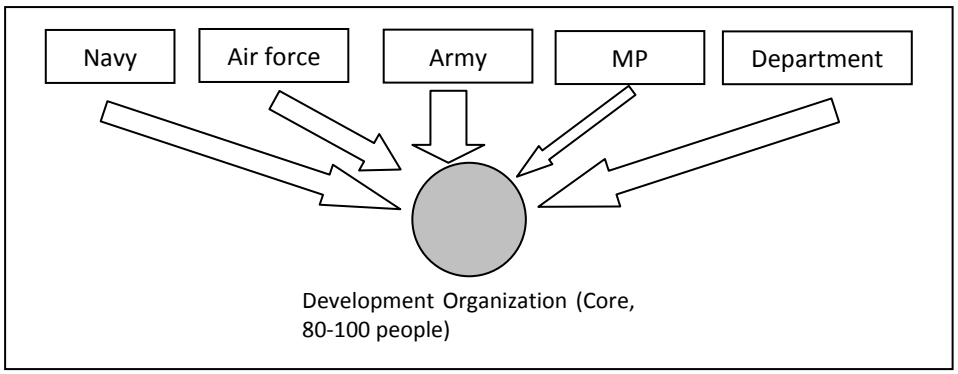


Figure 64 Stage 1: Main subdivisions from MINDEF as sourcing partners for the development organization

Growing development organization (*The network*)

The initial development organization initiates and also is the driving motor behind the change process. By new invitations to the line organization the development organization will start to grow. People from the line are requested to participate in the change process and take up a role in the development organization. The development organization from that moment is becoming a network combined from the initial core

and the repeatedly growing group of invited organizational members from the line organization.
These new members of the development organization spend significant less time in the change process compared to the members of the initial development organization (i.e. the core). Their main tasks and assignments still are within the line organization, but approximately 5-20% of their time is spent in participation during the design and change process. The entire development organization will participate using the level of creating. Nevertheless the ratio in spend time will put the initial core members of the development organization in the driver's seat to create detailed designs. The entire development organization is expected to reflect and recreate these design proposals.

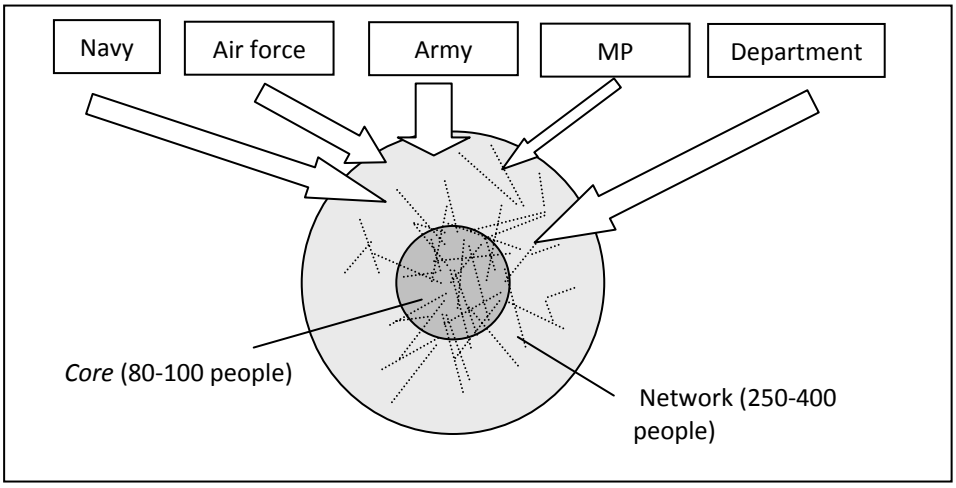


Figure 65 Stage 2: Extension of the development organization by new networks from the MINDEF line organization as sourcing partners

Introduction organization(s)
The introduction organization is the well defined group, department or organizational part that is affected by the factual system introduction. Figure 60 (pp. 206) shows the staged system introduction via a roofing tile structure due to the amount of total end users (app. 10000). It is expected that a total amount of 6-12 different system introduction projects will be accomplished after another. This implies the same total of introduction organizations.

The introduction organization(s) will play a minor role during the design stage and will come into play in the second stage of Figure 56 (pp. 197). Nevertheless it is an important target audience for feedback and reflection on the ideas generated within the network. Due to the size of introduction organization(s) the level of participation will be limited to informing. Figure 66 shows a limited amount of introduction organizations, due to space limitations.

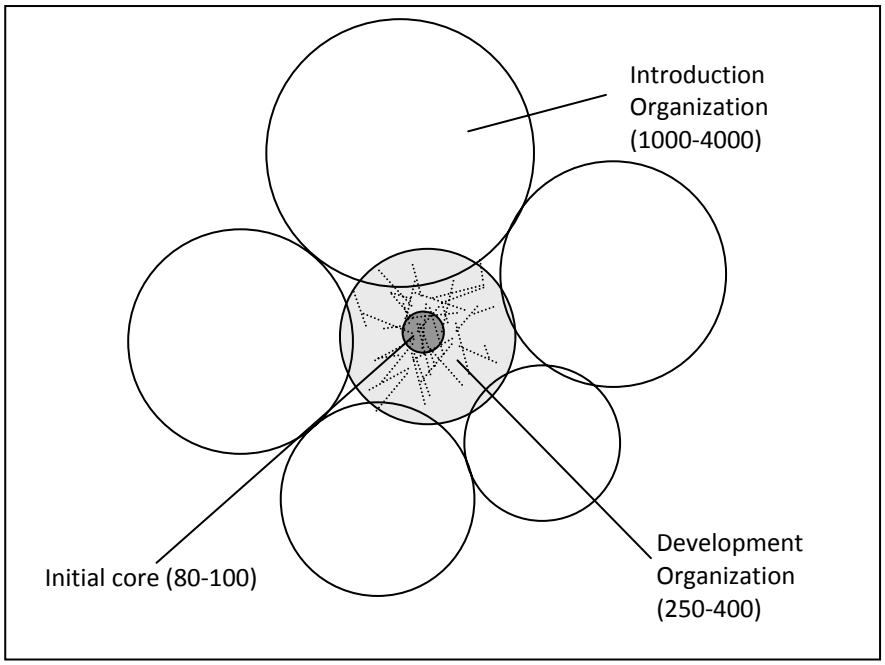


Figure 66 Introduction of the ES in separate projects during the MINDEF case

Members from the development organization stem from different introduction organizations. The exact relationships between the introduction organizations and the new envisioned organizational structure is not clear. As one of the main assignments within the design stage is to come up with a new organizational structure that fits the underlying business processes. The design vision only explicates a distinction between four operational forces and one servicing unit that consists from the servicing and supporting staff of the prior 5 divisions. One lightweight management body will steer these organizational entities. Service level agreements will be closed between operational forces and the service unit. This newly formed service unit can be characterized with the generic end-to-end business processes, like purchase to pay. These end-to-end processes guide the formation of clusters.

Cluster

A cluster is a temporal collection of members from the development organization. During a limited period clusters will be formed and concentrate their resources to work on a specific assignment. Clusters are intended to create cooperation without creating inflexible group or team structures. The idea behind clusters is to leave the functional or hierarchical project team structure, but to repeatedly assign development organization members to specific tasks that match their skills, role and /or development prospect.

Participants within a cluster sometimes can have significantly different competences than their main core competence in the line organization, but with a role that fits their short term ambition or their already existing experiences. The division of work and assignments via clusters stimulates the development process on the structural as well as the behavioural level. The idea of clusters stems from Beers rapid changing teams during a change process (Beer, 1980). Clusters can initiate and facilitate knowledge exchange, experiencing new social interactions and structural change. It is a more dynamic way of organizing the design -and participation process compared to classic ES implementations that arrange the project team either based on ES modules (business functional division) or after an end to end process structure. Figure 68, pp. 235 will give an overview how clusters during the design stage contribute and cooperate.

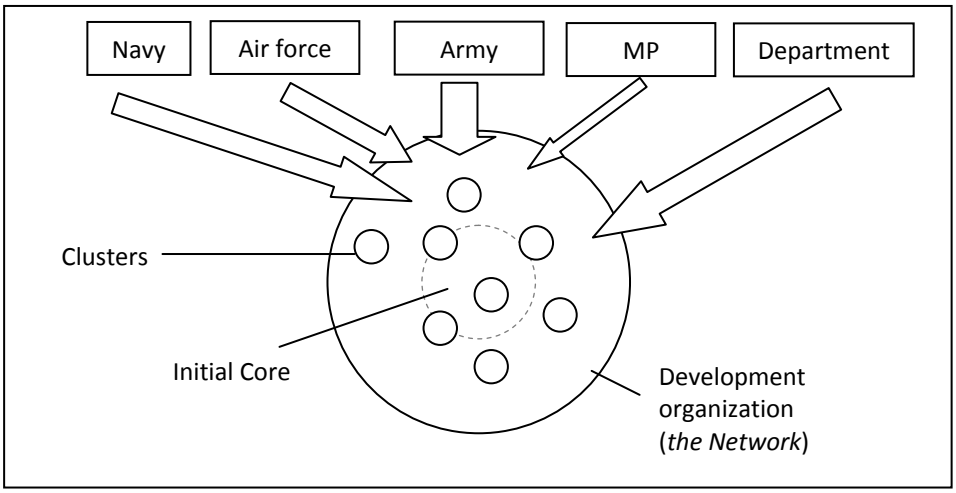


Figure 67 Participation in clusters by both the members of the development organization during collaborative design workshops

5.7.2 *Staffing and start-up of the Initial Development organization*

The setup and starting process of the initial development organization should be accompanied with an extensive assessment and introduction program. This should consist of the following elements:

1. Assessment
2. Introduction program
3. Competence based learning
4. Role deployment

1. Assessment

To set up the development organization it is important to assess the incoming participants on their competences.

Classical ES implementation approaches often select 'experts' either in existing legacy systems (so called key users) or experienced employees that have detailed knowledge on existing business processes and middle management that often focuses on remaining power structures. To employ ES*i*OD in the MINDEF case it is necessary to leave this way of working and create a solid team blended of participants with different capacities. Off course experts are necessary, but participants should also show an increased interest in changing existing structures and ways of working. Participants should not be afraid of complex social processes and dare to challenge existing practices or behaviour on the job. Based upon the initial competence profiles of the roles explained in section 4.3.3, pp.162 the assessment of applicants for the development organization should focus on three main criteria that in a combined blend should be present in all development organization members.

1.1. General process knowledge. Organizational members should possess average general knowledge of existing business processes and structures and have good relationships within the line organization to further specify detailed knowledge.

1.2. Affinity or already proven track record in design assignments. Participants of the development organization especially will be creating or assisting in redesign and improvement tasks and therefore

1.3. Show either predisposition or already experience within organizational change processes. Typical capacities that characterize such organizational members are:

- A critical attitude towards existing practices,
- Highly motivated for innovative and new improvement initiatives. (This is either known from prior examples/ accomplishments or recorded in their personnel file as basic competence)
- Exceptionally good social relationships and networks within the line organization, but without the restraints of a substantial existing political position.

The specific staffing towards the individual role deployment in the development organization should be based on personal interest, group composition and assessment based upon personal files, interviews and different personality typing tools and methods like MBTI, Structogram, Belbin, etc.

2. Starting program and training

A second important driver of the staffing process is to acknowledge the basic philosophy behind the IOD approach. This means the development organization itself will consist of people with a basic competence level, but the followed implementation approach is focused on competence increase and personal development of the team members during the design stage.

In the beginning of the project stage a significant amount of time should be spent on group creation, sensemaking process and the equation of knowledge -and competence levels. During this stage the development organization will be formed and the understanding for the future process is exchanged. Characteristic for IOD is the lack of understanding or knowledge on development. Participants in general and the MINDEF members in particular, show affinity with design based approaches to cope with uncertainties and create a future plan.

During the starting program it is important to enable the development organization members to create a common understanding of the meaning of development and how the development process can be matched with the different design activities. Experienced change consultants should guide this process; give different examples how to accomplish specific goals and show exemplary behaviour. They should especially facilitate sharing knowledge and mutual understanding without steering towards predestined outcomes. Characteristic for this part of the ES*i*OD approach is the collective sensemaking process about what processes, activities, participants are necessary in the future months to accomplish organizational development during the design activities.

During the initial stage it is important to pay a significant amount of time on group building and informal sessions. The development organization should be formed from different members of the line organization. Each member has its background and several beacons towards their prior part in the line organization. Experiences from change literature, but also the MINDEF culture show the development organization will be challenged with a difficult task that can be accomplished if mutual understanding and trust is present or at least the fundament for these ingredients are present within the entire team. Therefore the entire development organization and in particular the starting clusters need to be invited in informal group sessions to strengthen these aspects.

A last necessary element of this introductory program should be the creation of personal development plans (PDP's) for all members of the development organization. Based upon the PDP's the team members will receive different training programs and individual coaching. Necessary methods or tools during this second step are training material, LSI and a PDP template.

3. Education, competence based learning and coaching

The members of the development organization are the driving engine behind the design -and development process. Therefore specific attention should be given to succeed the starting program and facilitate the members in their personal development process. Classic ES implementation approaches focus their education and training plan around project management and IS design approaches. Participants in the development organization should be offered this same training material as one of their main assignments is to create process designs. But this training material should be extended with a dedicated training and education program based on IOD. Possible subjects during these training: presentation techniques, speaking in public, organizing, facilitating or acting in different kind of sessions and workshops (e.g. collaborative design, LSI, Janusian workshop), creation and fostering social networks.

The training programs also should be tuned upon the PDP's as competence increase or personal development is one of the key fundaments behind the development process. A repeatedly reviewing of the development of individual members according to their PDP in dialogue with a coach can facilitate this process.

4. Adoption of Roles

The participants in the development organization stem from the line organization. They have been working in a specific position with a function description and tasks. This position is embedded in a specific organizational setting accompanied with political -and power structures. To enable and facilitate the participants in loosening from their prior function the development organization members are assigned with specific roles.

Based upon the expected workload, available time, team sizes from prior ES -and change experiences the development organization can be composed in an exemplary reference size of 100-110 participants. This development organization can be composed from the following members (ration after current personnel size of the five forces and the department). The appendix (pp. 485) shows an example of the staffing of the several clusters and the different roles per cluster are presented (Table 103 and Table 104,)

Staffing and training of the invited members from the line organization (The network)

ES*i*OD assumes the amount of involved members in the development organization will increase as the initial core of the development organization will invite members from the line organization via network development. These network participants should be selected after the same capabilities as the initial members of the development organization. Nevertheless it is not feasible to facilitate these new members in the development organization with a comparable extensive training and development program as the initial development organization. Nevertheless these participants should be facilitated in their two main tasks:

- Reflecting upon systemic designs
- Informing and reflecting with members of the line organization.

These network members of the development organization have a kind of sluice position between towards the line organization. They need to think with the designers in the core of the development organization, but secondly they also have to inform a selection of the line organization on the progress and developments of the project. This requires members from the development organization to be able to think in design structures and change problems, whereas they also should be able to translate these sometimes complex topics towards simpler ‘designs; that are understandable for the appropriate audience in the line organization. The new network members of the development organization should be trained and facilitated in this task by the initial members of the development organization. As an example tandems or small groups from the initial development organization (clusters) can collectively visit the line organization and jointly perform these sessions.

5.7.3 *Detailed stage model*

The clusters to a certain degree are autonomous units that are self-responsible to structure their design and development process and come up with deliverables in line with the agreed project milestones. A generic sequential pattern is supplied to the clusters that covers the 1,5 year time span of the design assignment. The generic pattern acknowledges the systemic design content template and covers different patterns that each cluster to a certain degree can employ according to their situational specific situation. Figure 68 shows the process structure that includes 3 columns to explicate:

1. The different patterns as generic way of working that can facilitate each cluster in its basic design and development process. Including:
    a. A generic '3 staged collaborative design approach' that clusters can employ in their own appropriate pace and number of repetitions (Each subsequent stage incorporates an increasing advanced incorporation of collaborative design, role play and prototype experience).
2. A schematized overview of the involved participants and the increasing network development towards the end of the design stage (explication the sourcing line organization, the initial development organization (Core) and the growing development organization (the Network).
3. A number of specific complementary methods or tools per cycle to support the participants during their activities including the necessary tools or training material for the involved participants.

	Generic cycles	Participation and network development	Specific components & instruments
Setup	1.The Core starts up the process • Staffing of the Core • Inventory of possible clusters around problems and implementation vision • Training and start up program for the core participants • formation of clusters around defined assignments 2. Road show on start of the design project • In different sessions the line organization is informed on the Project objectives and the future way of working • A request for participation is expressed to the line organization		• Training on IOD • MBTI/ Structogram survey • LSI [Road show format] • Training on process modelling and design
Start	3. The Core creates basic designs • individuals or small groups from the clusters collect situational specific info and start selecting future network members from the line organization • first design concepts are established		• Program wide modelling method for process design. • Training on collaborative design
Collaborative design & development	4. Collaborative sessions within the Network about the designs and the followed process in the Network • During collaborative workshops the clusters within the network review, enhance and specify the designs. • Clusters are enlarged or rearranged if necessary • Design process is evaluated		• Collaborative design workshop template • Collaborative WS and LSI • Program wide modelling method for process design. • Role Play and Gaming
Reflection	5. Inward sessions for individual clusters to reflect on the design and development process 6. Outward reflective sessions between clusters to exchange experiences and tune design commonalities		• Small scale inward reflection WS (Intervision) • SFA and Coaching • LSI for reflection on project level

Feedback & specification	7. Feedback from the Network towards the line organization • Network members return to their own line organization and inform about design concepts • in depth detailed information is collected if necessary for design specification	8. Specification and alteration of designs by the Core • Based on input from the Network and possibly from the line organization • Inward reflective sessions • Clusters are rearranged if necessary		• LSI Network session (feedback) session) •
Finalisation of collaborative design	9. LSI's on finishing final design • Old clusters are rearranged and merged to larger clusters • Complete process designs are experienced by piloting, simulation and role play • Interaction between new clusters is assessed and reviewed	10. Core finalizes design • documentation, • implementation plan, communication, training and development plan		• Combined PD -LSI workshop format
	11. Formal decision and approval of the designs • Formal decision makers approve the designs ready for configuration within the ES			• Decision making sessions
Preparation	12. Road show on system introduction • Information on upcoming events • Preliminary training schedules • Migration plan	13. Start of System configuration • Set up of final training, development and migration plan		• Extensive Training program • (Competence based)

Figure 68 Step Template to organize work and participation

5.7.4 *Four perspectives during the deployment of the assignments*

The design and development process needs to be initiated with a first translation of the grand vision from the 1st stage towards conceptual process designs. From that point onwards the clusters can work through the several topics and each cluster itself decides how to deploy the three assignments in ES*i*OD and order the relevant themes. To facilitate the cluster in its design and development process the template offers four different perspectives upon content and process. First the themes can be divided in a mere content based -and a process perspective. Secondly the way of working of the clusters themselves can be perceived in an active and reflective mode. Clusters themselves decide how they apply these different perspectives and modes.

Active Mode

The active mode is best described as the ongoing design practice in clusters where the development organization works on their systemic designs. During repeated sessions the holistic puzzle of all design fragments is solved step by step and finally completed. During this active mode two perspectives on the systemic design are addressed.

1. Content perspective

The content perspective includes the several properties and characteristics that define the future situation for the ES and the adopting organization. The content perspective answers the 'what' question and superficially perceives the design as a static object or artefact. During repeated sessions the development organization in clusters comes up with more and more specific proposals or representations of the information system, the underlying business process, the accompanying organizational structure and the necessary competences, skills and behaviour.

2. Process perspective

The process perspective includes the several aspects that evolve from the developments of the content perspective and have a direct impact for the future design and development process itself. This process perspective creates a balance against the prior mentioned superficial static or artefact like perspective upon design content. This process perspective helps clusters in their consciousness development process to perceive this design assignment as an ongoing process. If for example the requirements related to the information system evolve during the design activities this may imply that prospective data cleansing activities need to be reformulated. Or in another example the specification of the design may touch upon an organizational structure that will require a substantial reorganization process prior to or simultaneously with the ES introduction. Both prospective processes including the changes should also be recorded in the design. The process perspective facilitates the clusters in explicating the relationships towards future events in time. For example the design and content of training programmes or the migration and system introduction plan. Clusters need to answer questions on what to train shortly prior to system introduction, but also what topics require a more extensive timeframe. The latter aspects need to be incorporated in earlier training or development programs already during this design stage. In present methodologies these aspects in a process perspective often are embedded in the

project management method and left to a selective group of project management. To facilitate the clusters in a real systemic perspective upon their design assignment these aspects also should be recorded in the design and also be the subject matter during the collaborative design workshops. Still this process perspective cannot fully facilitate the development process as it more aims to focus the clusters on systemic designs and only partly takes away their attention from their core business, i.e. designing. To facilitate the clusters more in their development process a second reflective mode is necessary.

Reflective Mode

The reflecting mode is explicitly meant to initiate and support the development process. During the reflective mode the participants of the development organization review and evaluate the design process followed by the different clusters. The topics dealt with are both process as well as content related. During the reflective mode the distinction is made between an inward and outward assessment.

1. Inward

First individual clusters reflect upon their own initiatives and the development of the process. Each clusters especially reflects within its own cluster. In free format sessions the participants are asked to reflect upon the course of the events, individual acting and especially the collective notion of how clusters value the results of the change process. Small surveys and interviews among the development organization may help to asses topics like attitude or schemata change, but especially the collective discussion within clusters can bring insights in how well network development evolves and if participants start showing different behaviour. Clusters consist of different individuals each with their own valuable observations. It is especially the sensemaking process and the collective dialogue about these observations that at the end should describe a complete picture and assessment of the followed approach, its results and possible adaptations to the approach.

2. Outward

Besides inward reflection within each cluster, clusters also can learn from each other's development. To stimulate learning -and knowledge exchange between clusters, they are requested to share experiences between the several clusters. During outward reflection the clusters present typical best practices and success stories, but clusters also are requested to share difficulties and failures. People at first feel ashamed about the latter two topics and are hesitant to share such experiences, but it are especially these topics that clusters help to learn from each other and also increase social bonding when comparable experiences are shared or help is offered. Therefore both the success stories as well as creative attempts that failed need to be exchanged between the clusters. Each cluster decides for itself how the collective knowledge is applied in their future way of working.

5.7.5 *Deliberate limitations in the generic process model*

The generic process model explicates the different steps during the planned period of 1,5 year of process design -and organizational development. This approach deliberately also limits the development process to a specific group within the entire MINDEF organization. The size of the MINDEF organization combined with the complexity of the design assignment complicates a simultaneous development process of the entire MINDEF organization. Therefore a staged set up is chosen in this MINDEF specific IOD approach. The staged set up first creates a change capacity in a substantial part of the MINDEF organization combined with an elaborate communication program for the members that are less involved in the design activities and the development process. The latter organizational members will participate after the design stage in the so called implementation waves (Figure 66).

The development organization from the design stage will play a significant role in the continuation of the development process. The experiences from the role play, simulation, training -and informal sessions during the designing stage will help in defining training sessions that exceed a mere system functionalities training program for the rest of the MINDEF organization. In each implementation wave the development organization prior and during the system introduction will facilitate the development process from current social structures, skills and behaviour towards the new situation. This is one of the reasons why the outcomes of the design stage not only explicate system definitions, but also the new required skills, social interactions and behaviour on the job.

Mapping these outcomes to each unique situation in the different introduction organizations defines the development program for the involved organizational members. Due to the scale of the introduction organization (1000-6000) LSI's can be used as one of the main starting methods. The experiences of the design stage and the experience of the development organization play an important role in the accomplishment of these sessions and the organization of this process. Again a network-based approach is suggested to reach all members of the introduction organization and include them in the development process. Smaller setting sessions can follow up the LSI sessions to aim training and development in smaller situational specific settings

6. Process evaluation: Deployment of ESiOD

I never guess. It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts
--Sir Arthur Conan Doyle (1859 - 1930) --

6.1 Introduction

In chapter 6 the deployment of ES*i*OD in the MINDEF case is described and analysed in the ex post process evaluation. It explicates how the approach is deployed, how this differs from its intentional descriptions, and how this knowledge can be used to further explain the effects of its use in chapter 7. The process evaluation is divided into different perspectives that correspond to the participating groups in the project (Figure 69). The objective of this structure is to show how participation is organized in the MINDEF case.
ES*i*OD stimulates extensive participation by a network approach. MINDEF deploys this by installing an initial core development organization that is labelled *PGS*. PGS resembles the core as explicated in §5.7.1 (Figure 64, pp.225) and consists of different teams, e.g. the purchasing team. This core development organization grows by involving participants from the line organization. In the MINDEF case these invited participants from the line organization are labelled *the network*. The participants in the network spend significantly less time on the project than the PGS members who are mostly fully occupied with the design and development assignments. The combination of *network* and *PGS* shapes the entire development organization.
ES*i*OD leaves room for the practitioners to select and choose their appropriate way of working. It is expected that the deployment of ES*i*OD will be different for the distinctive participating groups within the development organization. An in-depth analysis from different perspectives shows how the approach is deployed and perceived by these different groups. In chapter 7 the effects of the approach will also be discussed separately for each of these distinctive participating groups so that the possible relationships between deployment and effects can be analysed.

This chapter continues with section 6.2, which explains the research methods deployed in this process evaluation. Section 6.3 gives the process evaluation from a macro perspective. This section describes the process chronologically and is composed of participant observation and the collection of statements from several sources within the project. This macro perspective positions the most striking events in the timeline and helps the reader understand the course of the entire project. In §6.4 the change approach present on t0 is analysed and compared to ES*i*OD. This analysis explicates the delta between the formulated ES*i*OD in chapter 5 and the applied approach in the MINDEF case.

The process evaluation then continues in three micro perspectives in sections 6.5, 6.6 and 6.7. This includes two teams from PGS (purchasing and materials management) and the invited participants in the network respectively. Based on the collection of observations, statements from interviews, responses to surveys and documentation inspection a complete picture of the process is given from multiple perspectives.
This chapter is concluded in §6.8 with an overall analysis of the deployment of ES*i*OD in the MINDEF case setting. This section combines the results from the micro and macro perspectives.

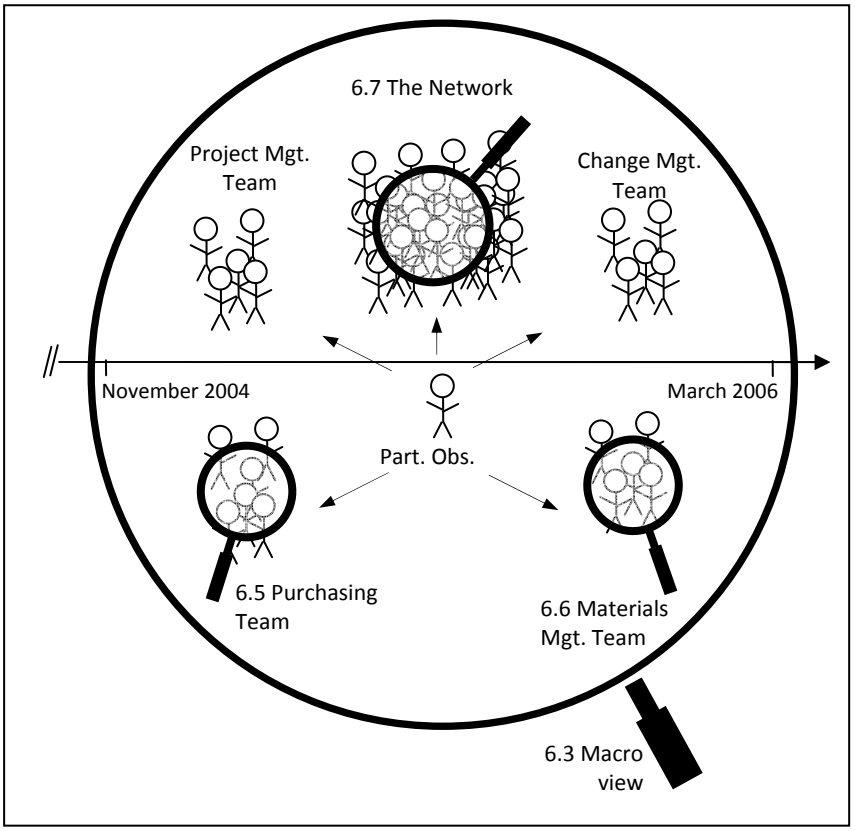


Figure 69. Structure of research populations during the longitudinal case

6.2 Research operationalization in the MINDEF case.

6.2.1 *Process evaluation*

Process evaluation analyses the employment of ES*i*OD. It analyses the process followed by the participants and explains the differences between the deployment and the intentional design of ES*i*OD as explicated in chapter 5 (§5.7, pp. 224). Based on (Hulscher et al. 2003; Swanborn, 1999)this process evaluation is structured according to the following subjects:

1. An in-depth description of the process during the project stage. This includes:
    a. Describing significant events and incidents
    b. Explicating events and side effects that were not anticipated
2. Analysis of the correspondence and deviations between the design of ES*i*OD and the actual employment. This is separated on:
    a. δ1: difference between ES*i*OD and the deployed approach (labelled *the MINDEF integral approach*) present at t0 (A comparison of the artefacts)
    b. δ2: differences between the context-specific prescriptions in *the MINDEF integral approach* and its deployment by the different participants
3. Reflection on the deployed approach by the participants. This is divided into:
    a. The experiences and perceptions of the participants
    b. Assessment of the approach by the different participants

We will use three data formats based on Eisenhard's theory to derive theory from case studies (Eisenhard, 1989).

1. Process data: observations along the project timeline, in other words clinical data or process observations.
2. Experience data: This is the collection of experiences of the different participants during the process. It includes results from questionnaires and notable statements during interviews.
3. Contextual data: Information about the situational context of the interventions, documentation, applied methods, sessions and formats.

6.2.2 *Timing and research populations*

The PGS project, introduced in §5.4, pp. 206, is followed from November 2004 to March 2006. This period also spans the approximate original planned timeline. During this period the researcher is participant observer in the project. The researcher participates during this period with a minimum of two days a week. During this period he is officially added as participating member to both the purchasing and materials management team. The researcher has no official PGS project assignment, but in some cases helps individual change consultants and or team members prepare and deploy interventions or sessions for both teams. During the period the researcher attends workshops, various meetings, conferences, visits to the line organization and other relevant events.

He also attends meetings and workshops specifically organized by the change management team and the project management and integration team.
Figure 69 shows the position of the researcher, the different groups that participate in the project and the sections in which their "perspective" on the process evaluation is discussed.
The process evaluation is not only based on the researcher's observations, but also on the statements and experiences from distinct participating groups. To further explain the deployment of process evaluation an important distinction should be made between the development organization and the network:

1) The development organization includes all participants who are formally appointed to the PGS project organization and mostly have a full time occupation in the PGS project. It includes the functionally organized teams like, Weapons Systems management, Purchasing, Finance & controlling and Supply & Materials management. The development organization also includes the supporting teams such as Change management and Project management & integration.
2) The network is the collection of invited members from the line organization to participate in various settings. These participants are formally not appointed in the PGS project, but remain in their original position. Their participation efforts add to their normal daily tasks. This participation can be either very frequent or only during a selected number of workshops or sessions throughout this period.

6.2.3 *Research instruments:*

The following research instruments are used during the longitudinal case to support the participant observation.

Diary
The participant observer keeps a diary during the period of fourteen months in which he notes observations, small interview results, and reports on significant events.

Audio recordings
During several workshops audio recordings are made with the approval of the case organization. These recordings help recollect or support findings from observations.

Interviews
During the case study period several participants have been interviewed. These interviews add extra information to the questionnaires and the observations of the researcher. Main objective of the interviews is to get a richer picture and an extensive description of *what* happens during the design and change process, *how* the respondents perceive specific events or incidents and *why* respondents show specific behaviour or perform their actions.

There are different types of interviews during this case study.

1) Short interviews (max 25 minutes): Mostly structured interviews to check observations or repeatedly get perceptions or opinions from different participants after workshops, meetings or sessions.
2) Long interviews (max of 60 minutes): Structured to unstructured interviews to reflect upon the actions of participants.

After Yin (1994) the respondents are grouped according to their role in the design and development process. The interviews are held among five different groups within the population. Within each group a minimum of three respondents is repeatedly interviewed. The following groups are distinguished:

1. Team leaders
2. Team members
3. Participants from the line organization
4. External consultants
5. Project management staff

Questionnaire

The participation process is assessed on t2 (December 2005) with an extensive questionnaire among the members of the line organization who are involved by the different teams. The main objective of this questionnaire is to get a more detailed view of the participation process beside the interviews and observations. As such it also is a validation of these research data. In different categories it investigates:

- How the participation process is organized and also how members from the line organization deploy networking further on in the line organization itself
- The type of workshops and interventions that are deployed and the topics dealt with
- How participants perceive the participation process and how they evaluate the deployment of the integral approach.

These questions are included in the results in this chapter.

Action research

The researcher mainly follows the design process as participant observer. To a limited extent the researcher also intervenes in the process. The interventions the researcher used are:

- Playing a consultant role in a small number of sessions. The deployment of these sessions will be described in the micro perspective sections 6.5 and 6.6. Its results will be explicated isolated from the other findings
- Advising the project management and change management team at t1 and t2 based on his findings.

Figure 70 gives an overview of the essential research methods versus time and research population. Table 29 shows the detailed deployment of the methods in time, the investigated topics and the research population.

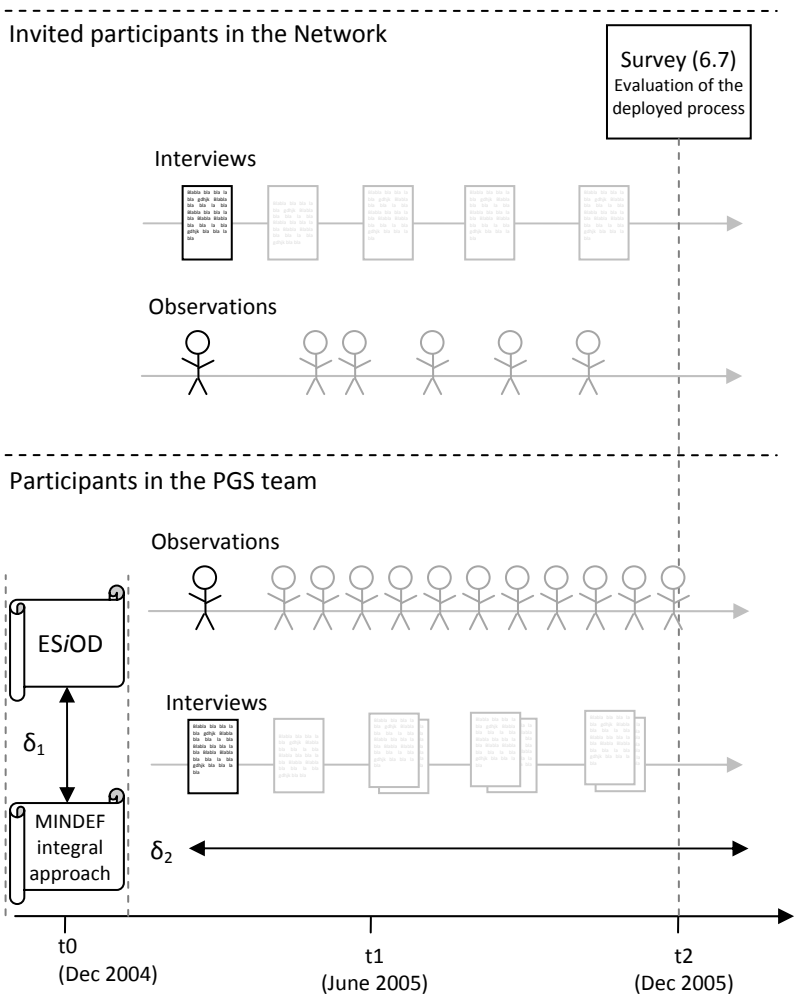


Figure 70 Deployed research methods versus time and research population

Research topic	Research population	Research methods	Explanation of deployment	Items	Time
Comparison between ESiOD and the integral approach δ1	1. Change mgt. - and project mgt. team 2. Emphasis on purchasing and materials mgt. Team 3. Network participants	Document inspection	Comparison of project documentation and design from chapter 5	Employment of philosophy, framework and tools	t0
		Interviews			
In-depth analysis of the process Comparison between the integral approach and its deployment. δ 2	1. Change mgt. - and project mgt. team 2. Emphasis on purchasing and materials mgt. Team 3. Network participants	Participative observation	Ethnographic description of the process	Critical incidents and significant events	From t0 to t2
		Interviews	Semi structured	Reflection on incidents or events by the participants	From t0 to t2
				Participant analysis (expertise and background)	From t0 to t2
	Network participants	Survey	Closed questions	Explicating way of working Organization of Participation Interventions and workshop formats Discussed topics	t2
	PGS Project	Document inspection	Inspection of development within the integral approach	Employment of framework and methods and instruments Differences compared to t0	From t0 to t2
Assessment of the process and the deployed approach	Network participants	Survey	Closed questions	Evaluation of the deployed approach Evaluation of sessions, way of working and organization of participation	t2
	1. Change mgt. - and project mgt. team 2. Emphasis on purchasing and materials mgt. Team	Interviews	Semi structured	Evaluation of the deployed approach	t2
		Reflective group sessions	Workshop	Collective assessment of the deployed approach	t2

Table 29 Used research methods, their population and items during process evaluation

6.3 Macro perspective: Employment of ESiOD in the PGS project

In this section a chronological overview is given from the PGS project perspective. This means no individual team efforts or incidents will be specified. The objective is to give the reader an overview of the essential events during the fourteen months. The impact of some of these events and incidents on teams or individuals and more detailed analyses are explicated in the separate micro perspectives.

6.3.1 *Timeline and significant events (Macro view)*

November 2004- January 2005

- Difficulties in the start-up program. Staffing is difficult due to labour legislation. The formation of the PGS is an official reorganization.
- Training and initial team set up. IOD approach is ambiguously introduced and incorporated by the several team members. The emphasis is on SAP training, whereas teambuilding and team assessment are underrated
- There is a staged project plan, but the employment of development is ambiguously understood and incorporated by team members, leaders and even change consultants.
- Process design is used as driver in the staged time plan. (Teams are responsible for incrementally creating different versions of business process designs).
- Development is implicit in this stage model except explicit sharing with a selected set of participants from the line organization, called the network.
- Forming of the defence logistics organization (DLO). This is an important stakeholder and a powerful driver in the design process and takes up initiative after “the mandate issue” (See February 2005) is decided in favour of line organization.
- Officially installing the development organization (i.e. Special Organization Unit SPEER). Introduction of roles versus functions in the PGS. Process owners are appointed

February 2005

- As the SPEER program organization is gradually installed the line organization gradually also is confronted with the objectives, ideas and ambitions of this program. In the beginning of 2005 this leads to a discussion between the SPEER organization and the line organization on the responsibilities for the final designs. Internally this is characterized as “the mandate issue”.
- The majority of the PGS project team members from installing the teams assumes that the responsibility for the process designs lies with the project organization, whereas the management of the line organization clearly holds the position that the final approval lies with the line organization.

- This leads to a hardening between the line organization and the SPEER teams. So-called “front offices” are installed in the line organization as channels to formally organize the communication and participation
- This clearly affects the process and the motivation by the PGS. The PGS feels they are working on something they at the end will not decide upon. Some of the PGS members feel inaccurately informed since their expectations to join the PGS clearly exceeded this objective. This challenges the change process and especially the relationships between line organization and the PGS. The individual team members also feel that their options to create a social network of crucial players and participants in the upcoming design process are restricted. At this moment in the process there is stiff contact between team members and the line organization (especially due to the formalization). Individual contacts and initiatives are sometimes whistled back.

“If for each trifle we need to officially go via the front office, our networking initiatives will become less effective and certainly less efficient. Of course we understand that some amount of agreement is necessary between PGS members and the line organization, because otherwise individual members may be flooded with requests, but on the other hand this bureaucratization is way too much. This could have been organized and agreed otherwise.”

This is a typical development that was not explicitly foreseen and can be seen as a power struggle between the development organization and the line organization.

March / April 2005

- Official start of networking by a road show in which the SPEER program is presented to the line organization. Explanation of objectives and mutual expectations of collaboration between SPEER and line organization.
- The PGS is recovering from the mandate issue and gradually trust and collaboration with the line organization is increasing. The PGS organizes the contact with the line organization and more and more succeeds in creating a growing network of listeners and participants.
- By relevant content, the use of old contacts, and word of mouth the acceptance of the line organization for the way of working increases. Carefully the first ideas on global process design are exchanged between the network and the PGS.
- Purchasing starts as first team with the first large-scale collaborative workshop by the end of April.

May / June 2005

- The different teams continue networking and creating conceptual designs. Sometimes disagreement between the teams over each other's approaches as the four-step approach is employed differently and the teams start deviating in time and outputs.
- The Purchasing team is ahead of the rest. Both admirers as well as critics of the "Purchasing" approach. Finance and controlling attempt to follow this approach, but in their own way. Materials management copes with intense workload and persists with its own approach.
- All teams are now on their way each with their own format of collaborative workshops. Nevertheless in May the first signs of a backlog appear compared with the original timeline. Both the Weapons system management as well as the materials management team find it difficult to proceed with the expected time path.
    - Purchasing: open to network, many extensive sessions. Development approach; Workshop Format in collaboration with all participants.
    - Weapon systems management and Materials management: first focus on internal quality in small internal workshops, later on formal large-scale workshops with the network.
    - Finance and controlling: spreading the complex content over small sub teams that organize many small workshops within the network.
- PGS management does not interfere. Each team is free to employ its own way of working. But the PGS management does not succeed in creating a shared feeling between the sub teams. A deliberate information sharing or knowledge exchange between the teams on the way of working is lacking. The Change Management team attempts to create a more common base but fails. Main reasons are the insufficient material to explain why this can be beneficial and how this can be done (this was neglected in the early beginning). Also a lack of sponsorship as project management does not direct the different team leaders and fails to show exemplary behaviour.
- The different teams' employment of the approach starts drifting apart. Too little attention is given to knowledge sharing and exchanging experiences between the teams
- Mid-June a large-scale session is held within the entire SPEER program to discuss the problems with the progress in the entire program. The focus is on problems in the program to do with collaboration between the different projects (legacy, architecture and PGS). It is considered whether a different way of working that is founded by Large scale interventions LSI can be beneficial. It is agreed that a second LSI in the PGS project will be used for further analysis of its feasibility.

July 2005. "*Halfway and time for reflection".*

- Shortly before the summer break the PGS reflects upon the first six months in this LSI. The LSI, called rapid solution workshop (RSW), is realized by external consultant party A. (this format will be described in detail in §6.6.2 pp.292)
- During the LSI the results, way of working are analysed and discussed and a future path is agreed upon. The issue of backlog pushes the entire PGS and a more efficient way of working is argued for.
- The Materials management team will adopt the RSW concept to speed up their design assignment. RSW stands for rapid solution workshop and is variant of LSI aimed at collaborative redesign.
- The contact with the network is reduced during the summer break.

August / September 2005

- Adoption of the RSW concept by the Materials management team, first as a pilot and later on for real.
- Employment of the RSW concept emphasizes throughput, and efficient knowledge exchange. The time and room for development are negligible.
- The atmosphere and culture in the PGS changes from being a change team towards a project team. The atmosphere sometimes hardens. Team members are especially busy creating content.
- Each team now really chooses its own way of working and contact to the network
- Teams also start to lose touch with each other's design content due to an in-depth focus on their 'own' design complexity and the time pressure. The Integration management team has a hard time due to this aspect.

October/November 2005

- The deadline (December) to finish the process designs is approaching.
- Large differences between teams in output and realization and also in design content.
- PGS management does not decide to shift workforce or resources between the teams.
- Purchasing team is still ahead of the rest and early with decision sessions
- Remarks on design quality and completeness in general cause all teams to put a lot of effort in finalizing designs.

December 2005 / January 2006

- Reflection session within the PGS. Six months after the LSI again an internal session is held to reflect upon the IOD approach, its contributions, results and possibilities for improvement.(This session will be described extensively in chapter 8)
- Not all work is finished, but the start of the SAP configuration process is troubled due to contractual disagreements. This gives the sub teams some extra time to finish.
- Transfer period in which teams are dissolved.
- Team members move towards either migration teams, SAP configuration factory or stay in the PGS2 team that focus on stage 2 of the new designs (the SPEER program is organized in a roof tile structure in which different cycles of design-configuration-implementation alternate (Figure 60, pp. 206)
- PGS continues finalizing the designs
- After January the networking approach receives significantly less attention.

6.3.2 *Analysis of the process from a macro perspective*

The project stage is confronted with several incidents that influence the course of the process and the eventual delay. The project especially is affected by the staffing problems in the beginning. This causes a messy start-up phase in which the integral approach is deployed in different ways by the several teams.
Each team gradually develops its own way of working. This is not necessarily problematic as the integral approach allows and sometimes even stimulates doing so.
Nevertheless, the component of knowledge and experience sharing between the teams is omitted. This is a somewhat strange observation at first sight, because all teams succeed in creating a vast network of stakeholders and interested parties that participate in the process. This however is the first cause of the imperfect internal communication within the development organization. All teams are very much
focused on the line organization as it perceives these members as their final customers.
The second aspect is the existing hierarchical culture that relatively quickly returns to the typical way of working. Each separate team has its own task and objective and knowledge or experience sharing is not in the nature of most of the military or civilian department members. The last influencing factor is the combination of failure avoiding behaviour combined with the extensive new and sometimes complex topics the teams are confronted with. Table 29 gives an overview of the planned time schedule and the realized timing of events.
Sections 6.5, 6.6 and 6.7 will explicate the process in a detailed perspective, but first the integral approach is compared with ES*i*OD in the next section.

	Master project plan (status January 2005)	Actual employment
2005		
January	Instalment of Program organization SPEER and PGS project organization	Difficulties in staffing
February	Creation of conceptual designs	PGS development team up and running
March	Vision ready on implementation and processes	Road show as LSI to present PGS Creation of conceptual designs
April	Collaborative design and networking to specify systemic designs	Creation of conceptual designs Visits to the line organization
May	Collaborative design and networking to specify systemic designs	In-depth design sessions Network workshops
June	Finalization of designs	
July	Decision process and acceptance of final systemic design and implementation path	LSI reflecting on way of working
August	Validated systemic designs by SAP configuration factory	Adoption of LSI concept by selected sub teams
September	SAP configuration factory starts to create ES	Sub teams start deviating in pace and results
October	Preparation of migration and implementation SAP configuration	Decision workshops started
November	Preparation of migration and implementation SAP configuration	
December	Preparation of migration and implementation SAP configuration	Individual sub teams finished, others lag behind.

Table 30 Planned versus realized time schedule

2006		
January	Preparation of migration and implementation Testing and possible rework SAP configuration factory	Transfer stage in which configuration factory starts up and designs get improved
February	Starting with competence based end user training	
March	Preparation of migration and implementation Dedicated competence based Training in the line organization	Finalization of designs in viable Version 1.0 format. Ready for the SAP configuration factory
April	Sap configuration ready Dedicated competence based Training in the line organization	
May	Testing SAP System and last preparations Dedicated competence based Training in the line organization	Project comes to a halt due to budget affairs
June	Testing SAP System and last preparations Dedicated competence based Training in the line organization	
July	Last preparations for the implementation End of design and configuration stage (plateau 1).	
August	Start of the implementation of SAP packages in the several parts of the line organization	

Table 30 (continued) Planned versus realized time schedule

6.4 Comparison between ESiOD and the applied approach

As explained in section 6.2 the first detailed step after the macro perspective is the in-depth analysis of the deployed approach at t0 versus the derived ES*i*OD. In the plan evaluation of chapter 5 the ES*i*OD design is presented by deriving the theoretical generic design from chapter 4 towards the MINDEF specific context. This version is defined by the researcher and differs from the change approach applied in the MINDEF case itself. The assessment of the original change approach is necessary as initial measurement to analyse the process during the longitudinal study. This section presents the version of the change approach that was available by the end of 2004 (status December 2004/January 2005). It is analysed by the methodological artefacts present at that moment, the adoption of this artefact and the representation of way of thinking behind ES*i*OD expressed by different participants of the development organization.

ES*i*OD in the MINDEF case situation is labelled *the integral approach*. The integral approach develops throughout the longitudinal study, as will be explained in sections 6.5-6.7, but this section gives a good insight into the discrepancies between the theoretically derived ES*i*OD of chapter 5 and the contents and format of the deployed version of ES*i*OD that the case organization started with. By document inspection, interviews and observations in workshops and meetings during November 2004 to January 2005 the integral approach is analysed in the three elements of the ESIMM (philosophy, framework and tools).

6.4.1 ***Philosophy: "Design and Development" as program motto***

Philosophy in this section is assessed first by investigating the original project and training documentation and secondly by assessing how the way of thinking is adopted by the participants in the beginning of the project (November 2004- January 2005). The documentation is compared with the ES*i*OD of section 5.6 by document inspection and analysis. The way of thinking, as adopted by the participants, is explicated by the analysis of the collected statements and opinions from several interviews and observations during these three start-up months.

Philosophy or way of thinking is fundamental to the subsequent way of working by the different practitioners. It is fundamental, but it is also dynamical since images and the meaning of the philosophy will start developing during the process. This also happens in the MINDEF situation. There is a small group of up to ten people that starts thinking about the change management approach and how to integrate this with the project. This group is already involved in the implementation process and its preparations since approximately 2000 and consists of internal material experts from the field and external change consultants. Several have extensive experience in and/or scientific knowledge of integral organizational development and some have obtained extensive sponsorship from top management. The researcher is not directly involved in this period, but exchanges ideas and recommendations with three individuals of this group.

In the beginning of the project stage (November 2004- January 2006) this group put together different documents and organizes a few sessions to apply this line of thinking and embed it in the project and preparation documentation. In this period there are two different categories of documents: project and training material. These documents influence the adoption of the way of thinking by the participants. The analysis will focus on the following three determinants:

1. Philosophy in the Master project documents
2. Philosophy in the Training and introductory material for the PGS
3. Adoption of the philosophy by the members of the PGS

1. Philosophy in the Master project documentation.

The entire SPEER program is initiated with a deliberate focus as an ES implementation accompanied by an organizational development program.

> *The already changing Defence organization is confronted with the introduction of SAP. This leads to great changes in way of working, functions and positions, but also organizational behaviour. SAP essentially enables, but also forces the organizational development project.*

The preparatory project documentation is based upon two main frameworks: MSP (Managing successful Programs) and the DELIVER methodology from external party A. The integral approach is regarded as an approach attached to the program and project management documents. The Master plan and project initiation document (PID) resemble standard templates of ES implementation or large programs (compare §2.3.4, pp.67).

Philosophy in the integral approach is verbalized as *'design and development'*. This way of thinking is expressed not as the basic rationale behind the entire program. It is regarded as the strategy behind the organizational change process. In the documentation there are two main reasons for the adoption of this O&O strategy:

1. Based upon the experiences of the slow decision making process (2004) to speed up the decision making process
2. To create more acceptance in the line organization for the new ways of working based upon standards and best practices.

The change strategy is based upon two objectives:

To obtain active commitment from top management for the process vision and the Business benefits case. This is mainly achieved by direct involvement of top management in the program management (steering group and the Top management of MINDEF)

Obtaining commitment and active sponsoring from the top management of the Ministry for the process visions and the accompanying business benefits case. This is especially achieved by direct participation of top management in directing the SPEER program (via steering board team and kernel team)

Elaborating a change strategy around business processes and the organization. This is the counterpart of the migration strategy and is mainly aimed at the way in which and in what order the changes in work, organizational structure and systems will be implemented. The phrased strategy "Design & Development" realises this ambition by explicating standard processes and data that are brought up and thus are accepted by the stakeholders. This facilitates the necessary quick decision-making routines and accelerates making design choices.

All included documents breathe the format and content of standard ES implementation templates (compare §2.3.4, pp.67). The integral way of thinking is included like an add-on, especially in the process design and change management sections. Change management still is aimed at supporting leadership, installing communication channels and assessing risks in the perspective of the change process. It is embraced with an O&O strategy to speed up the decision-making process and create acceptance within the line organization. This does not encompass the philosophy of simultaneous design and development as phrased in chapter 5 (§3.2, pp.103).
This is exemplified by the adaptation of the standard leadership and change management track from the DELIVER methodology

Leadership and Change management. *This stream focuses on the development and facilitation of leadership on several hierarchical levels. Its main ambition is to elaborate, propagate and realize the programs vision.*
Change Management is aimed at managing change risks, facilitate communication and develop the organization's change capabilities. Also based on the experiences from 2004 the approach is adapted speed up decision making of business processes and data standardization.

A strategy of design and development is created to achieve these objectives. This strategy is based on collaborative design of standard processes and data (design) integrated with the preparation of the changes in the organization (development). Authorized experts and middle management in the line organization will either participate during this elaboration process or have a say in the mutual discussion on its results. Besides PGS this strategy is also applicable within the entire SPEER program for the delivery of other objectives and milestones including its timely approval.

Figure 71 Leadership and Change Management for the Project stage

2. Philosophy in the training and introductory material

The training and introductory material is a heterogeneous collection that includes the integral design and development concept in different formats. First there is a special training on the concept and line of thinking behind design and development. Secondly some specific methods are presented to assist this way of working (process quality workshop, explication of roles within the PGS and network development as one of the main assignments for the PGS members).

The training material better explains the way of thinking behind design and development, but not all participants receive this training during the beginning stage due to the gradual staffing and the staffing problems. The training material is not published by a knowledge-based intranet portal or E-learning environment. It is published in organized folders, merely facilitated by the Windows OS directory structure via the internal network. Secondly there is no real stimulation to analyse or study these materials. In comparison with the project plan documentation the material makes a less mature impression and is also less accessible. This influences the different adoption of the philosophy by various participants.

3. Adoption of philosophy by the members of the PGS

During the beginning stage (November 2004-Januari 2005) the participants receive project documentation, attend the introductory training and start discussing design & development. From different interviews and observations it becomes clear that there are significant differences in the perceived meaning of design and development by the different members of the PGS. At that moment in time there is no special attention given to these deviations and no special sessions are organized to set up a dialogue on creating a common or shared vision of design and development.

The participants of the PGS can be classified into three different groups characterizing the different perceptions of design & development after mutual discussions and their introductory training sessions:

I. A first group takes the objective in the available project documentation very literally. It takes a distinct perception on design and development. From the beginning, but also throughout the project, this group perceives development as *the* way to create acceptance in the line organization for the designs. Design is the task for the PGS to create feasible process designs.

This first group counts for approximately 40 % of the PGS, is heterogeneously spread across the PGS and consists both of team members and leaders. Development in their perception is equal to enabling the line organization to have a say in the process and as the measure to create quick acceptance and speed up the decision making process.

II Another group (approximately 40% of the entire PGS, heterogeneously dispersed) is aware of the existing differences in the meaning of the concept. This group extensively discusses design and development. This group includes most of the change consultants (both internal as well as external ones), but also a significant group of team members and team leaders. This group broadens the notions from the project documentation and continues the training material.

This group also continues to improve and extend the project material on the integral approach with written explanations, help, or short manuals on tools and way of working. By discussion this group also tries to exchange the way of thinking with others, also members of group I. Along the project stage this results in a transfer of people who adopt this second notion of the philosophy behind design and development. To this group the meaning of design and development encompasses the original philosophy as stated in chapter 5. One team member during the project stage expresses:

> *To me design and development together with the network experience is our future situation and by investigating structures, behaviour and information requirements we try to specify this situation in designs*

III. There is a third group that does not take a real interest in the design and development approach. This group (app. 20%) does not contain team leaders, mostly consists of the rest of the team members including external SAP consultants. This group expresses that they are hired to help translate ways of working to process design and SAP practices. Informing the line organization is perceived as important, but SAP will significantly define the future state and the design freedom is very limited. In an interview on collaborative design workshops one of the internal respondents expresses his opinion on the networking approach:

> *Collaborative design sessions? Ah, to me it means we are nicely going to put some effort in showing our results. We'll let the audience see what we have been doing and let them have their say and afterwards we can continue with our real work again.*

6.4.2 ***Comparative analysis of philosophy in the integral approach at t0***

The way of thinking behind ES*i*OD is derived and explicated in §3.2.50 (pp.122). To explicate the comparative analysis with the deployed approach only a condensed description of the way of thinking behind ES*i*OD is given in this section.

Summary of the philosophy behind ESiOD

A PER ES implementation is a technologically driven organizational change process that requires giving equal attention to designing technological artefacts as well as developing social structures and behaviour. This requires an integral approach of simultaneous systemic design and organizational development. The integral approach deploys a multiparadigmatic perspective on the implementation process, i.e.: alternating interpretative and functionalistic perspectives on change process and design content.

To support the organizational members the integral approach should put a balanced effort in a systemic attention to the design, extensive participation to stimulate socializing and new organizational structures as well as giving attention to competence development as method for behavioural change and personal development.

This way of thinking should not only be the fundament behind the integral approach, but also be explicitly stated in the documentation. In the beginning stage this artefact should be taken at hand and way of thinking should be discussed and exchanged to create a shared view on the meaning of this way of thinking. This should be the basis for the way of working and controlling including its accompanying methods and instruments.

Analysis of philosophy behind the integral approach
The actual way of thinking behind the integral approach around t0 can be seen divided into:
1) The actual way of thinking of different participants around t0
2) The presence of philosophy in the available documentation around t0.

Considering the actual adoption of the IOD philosophy there is a distinction between the original thinkers of the integrated design and development philosophy and the participants that 'arrive' in the project around t0.
The first group of people, though small in number, incorporates the original integrated thinking to a very large extent. This group includes both internal as well as external people who started with the change and ES implementation theme significantly earlier. They have a collective experience with the MINDEF organization itself and the change problems that accompany such system implementations. The group can be characterized as change consultants, internal experts both in logistics and IT as well as organizational science (internal change consultants).
The second group shows a clear distinction in adopting the way of thinking in three different categories.

I. The significant contribution of development beside design is to create acceptance and speed up the decision making process.
II. Design and development is an integral approach to collectively define and change our organization during the implementation process.
III. Design and development is nothing new; it is about informing participants and the line organization on our progress and future system functionalities.

During the project there is a transfer from group II to I of app 20%. The rest of the participants show persistence in their way of thinking. This will be explicated in chapter 7.
The distinction between the adoption of the way of thinking in this beginning period can be explained by the lack of explicit attention paid to sharing and exchanging the way of thinking and the fragmented presence and immatureness of the documentation and training material.

A significant amount of the philosophy is not completely incorporated in all documentation and the organizational members also interpret it differently.

"Design and Development" receive their position within the documentation, but it is not the main driving force behind the SPEER program. Inspection of the project and training documentation results in the following contrasting observations:

1. Project documentation makes a mature and extensive impression. It is elaborate in size and information, is accessible in format and location and builds upon existing ES implementation templates. Nevertheless it treats design and development as an add-on. Design and development is seen as strategy to organize participation and speed up the decision making process. This does not match the way of thinking behind ES*i*OD.
2. Training and introductory documentation specifically aimed at explaining the integral change approach makes an immature and unfinished impression, but takes a more elaborate perspective upon design and development. This documentation is very well structured, the readability and presentation quality is low and it is hard to find in deeply nested folders on the projects directory structure.

This paradoxical contrast significantly influences the adoption of the philosophy during the beginning period.
The discussions and sessions in the beginning contribute to partly spreading the word and to mutual sense making processes. But the freshly arrived participants in the PGS mostly have low change competences, often can be characterized by blue colour profiles (Figure 59, pp. 204) and search for a grip in the new situation. These participants expect these discussions to be accompanied by extensive project documentation that is also easy to find. The elaborate Project plans and other project documentation meet their expectations. Unfortunately this only shallowly includes design and development and even worse discusses the topics in a rather functionalistic manner. The introductory and training material on the other hand in many occasions breathes the multiparadigmatic way of thinking and uses a lot of the ES*i*OD concepts, but the format, accessibility and readability are far from satisfactory.

This influences the deviating opinions of the philosophy as different members clearly have distinct views upon the change process and its objectives. A missing element in the employment of the integral approach in the beginning is the explicit time to exchange these images and create a more common view upon design and development. Such a deliberate sense making process could especially have helped group I. This group originally embraces the integral approach as way to speed up the decision-making process and increase acceptance. It will be shown in forthcoming sections that this image for part of this group will change during the project. This process is nevertheless slow and the group as such could have taken advantage of a more deliberate dialogue in the beginning.

6.4.3 *Deployment of framework in the integral approach*

Framework is analysed by document inspection of the project documentation around t0 and participant observation during the start-up months.
During this three-month period (November 2004- January 2005) framework in the MINDEF case is represented by the initiation of the project, installing the PGS, the final definition of the project documentation including a four-step integral change approach. The main elements of this combination are:

1. Organizing the project with a development organization existing of4 process teams, invited participants from the line organization in the network and supporting teams for project and integration management, communication and change management.
2. Appointing process owners in the four teams responsible for the change process. Defining the multidisciplinary assignment of process design and network development for these different process teams.
3. A four-stage time plan to structure the work. The four-stage template is a generic timing/objectives framework that offers each process team multiple degrees of freedom for the deployment. Each process team may decide how networking, designing and collaborative workshops are organized and what methods or interventions are applied.
4. Way of working/way of controlling. Different documents accompany and enhance the four-step approach and explicate the way of working and deployment of project management and controlling.

1. Installing the PGS and organizing the process

The PGS is composed of the following sub teams:

Team	*Internal*	*External*
Purchasing: Purchasing and disposal	11	3
Materials management: Management materials and logistics & transport	13	5
Finance and controlling: Financial planning and budget	14	4
Weapon systems management: Weapon Systems Management and interfaces towards	12	4

Table 31 Main business process teams within PGS project including the cast

Each team is composed according to the following template:

Position	*MINDEF*	*External*
Team leader	1	1
SAP consultant		N
Change consultant	1	1
Team members	N	

Table 32 generic team format

These four teams are supported by one project & integration management team and one change management team:

Position	*MINDEF*	*External*
Project team leader	1	1
Integration /SAP consultant (external from A and/or B)		4
Representatives from the other teams (all MINDEF internal preferably from different forces)	4	

Table 33 project and Integration management team within PGS including the cast

Position	*MINDEF*	*External*
Change team leader	1	1
External change consultant (external from A and/or B)		6
Internal change consultants (all MINDEF internal preferably from different forces)	3 (2 army, 1 navy)	

Table 34 Change management team within PGS project including the cast

2. *Organization and Staffing of the different teams*

During September 2004 - January 2005 the PGS project is staffed with the different members from within the MINDEF organization and the respective consultants from the external implementation partners A and B. The internal staffing is deployed by the Ministry itself without the help of the external consultant parties.

There are significant difficulties during this staffing process since only a small number of MINDEF personnel shows interest to work in the project. This is caused by the existing SAMSON reorganization program and its goal of diminishing the total personnel size. Job legislation and agreements result in no opportunities to offer prospective applicants better job opportunities. This stalls the staffing process significantly, but also has another important influence.

Roles and competences for the members of the PGS are defined explicitly in the available documentation. Due to the hesitant number of applications only a moderate number of participants of the PGS meet these criteria. This influences the initial training program and the competence development of the PGS afterwards.

During the months November 2004- January 2005 the teams are gradually staffed and receive different training programs.

1. There is a general introduction on the SPEER program and the specific PGS project: This explicates the SPEER program ambition and goals; the in-depth project plan and documentation and includes a socializing "getting to know" part.
2. There are specific SAP training sessions. This multiple day training is facilitated by SAP and focuses on the special topics within each team (procurement, finance, etc.)
3. Specific training on 'Design and Development'. This two-day training introduces the change management team. Ina one-day workshop it explains the integral organizational development approach, explicates the roles of the team members as process owners and introduces vision development.

This period is characterized by a somewhat untidy adoption of these training programs. This is especially caused by the gradual entrance of new team members, but also because the official starting date of the design stage is unclear.

3. Generic 4 steps template

All four teams are instructed to use the MINDEF integral approach in a 4 staged set up. The project management and change management team collectively generate this template. The essential elements of this four-step way of working include:

Step 1 Explore feasibility best practices & impact of the change (delta)

Step 1 is characterized as start-up phase to get organized and define conceptual designs. During step 1 the teams initiate contacts with the line organization, create first conceptual designs based on the visions and objectives from the envisioning stage (prior to the project stage) and prepare the collaborative way of working with the line organization during step 2. The main activities in the template are:

- Charting stakeholders and network
- Evaluating MINDEF desires and ambitions
- Preparation process design
- List SAP options and applicable best practices
- Initiating and starting up network
- Process design sessions (including SAP examples)
- Evaluating future designs and wishes
- Finalizing design alternatives
- Explicating problems (what are current concerns)
- Create concept design alternatives for collaborative network sessions
- Prepare step 2

Step 2 Field research

Step 2 moves the different teams to the line organization. Via networking and sessions (free in format for each team) the conceptual designs are shown and discussed with the network, issues explicated and incorporated in improvements. Step 2 in its logic is an iterative process and during multiple contact moments this stage should result in feasible design proposals both in SAP as well as accepted and understood by the line organization. The main activities in step 2 are:

- Discuss design variants and issues with the network
- Prepare network sessions
- Network sessions (List and discuss alternatives and issues with network)
- Investigate complexity of the change (interviews with the network)
- Internally investigate design issues from network workshops
- Create final design concepts
- Assessment of designs after control and quality procedures and legislation (AOIC)
- Assessment of designs after Business case benefits scenario

Step 3 Validation (SPEER internal)

During Step 3 the inputs from step 2 are incorporated in the designs. This step more takes place within the PGS, whereas the prior step more involves the line organization. By internal discussion designs are attuned between the different teams with finishing sessions the designs are presented to the line organization and via last comments finalized. The main steps in step 3 are:

- Prepare validation Business scenario files (BSF) and Process master files (PMF)[6]
- Validate BSF/PMF within the PGS
- Rework after internal validation
- Presentation of results towards the network

Step 4 Decision making

Step 4 is the formal approval of the designs by the decision makers from the line organization. The teams are requested to prepare decision workshops in which the decision makers formally approve the final proposals. The decision makers can be accompanied by line organization participants from steps 2 and 3 for assistance. Step 4 includes:

- Prepare decision making
- Decision making process by decision makers in the network
- Define and create definite design proposal for kernel team and steering committee
- Create final business benefits case based upon design
- Formal approval by steering group

[6] BSF and PMF are prefab templates to create business process models of different levels of detail

4. Way of working, way of controlling and way of support

The four step approach is deliberately presented as generic framework containing the main objectives and assignments within a sequential order that fits the general project time frame. Each team is offered flexibility and freedom to employ different ways of working during the different steps. This means the choice for sequential or more iterative or cyclical approaches are left to each team, but also the use of tools and instruments. There is a limited number of fixed tools like for example the collaborative process modelling tool MAVIM, but the employment of workshop formats and/or the use of the SAP Sandpit[7] are left to each process team individually.

Way of controlling and support are organized entangled. The four process teams are supported via different supporting teams. These are the Business Benefits Case (BBC) team, the change management team, communication team and the project & Integration management team. Members from these teams either are available to accompany workshops and network sessions or help in design issues.

The project and integration management team takes the lead for the care of the collaboration between the teams, keeps an eye on quality, progress and integration between the deliverables of the singular teams. This means the harmonization of each teams results and their way of working. This is accomplished by:

- Periodical team leader meetings (each two weeks) in which the team leaders and project management discuss progress, results and possible issues.
- A reporting structure in which the individual process teams periodically report their progress towards project & integration management. Project & integration management periodically reports to the steering committee.
- The collaboration of integration management team members in the several workshops and meetings of the individual process teams. These members assist in explicating possible integration issues both technically as well in the perspective of organizational or process logic affairs.
- The appointment of so called mutual team members that belong to two different process teams. This is primarily organized around the financial back bone process. The financial and controlling team delegates two team members to both the purchasing as well as the management materials teams.
- The collaboration of BBC team members in the several workshops and meetings of the individual process teams. These members assist in explicating design and development issues in the perspective of the originally phrased BBC.
- The facilitation of change management consultants within the process teams. These consultants are permanent members of the process teams. During the project these consultants assist in coaching, suggest workshop formats and facilitate in internal or external sessions.

[7] The SAP Sandpit is a SAP testing environment. It includes a SAP system that includes the respective modules and release version adopted by MINDEF. Consultants from parties A and B can configure the Sandpit and internal team members can view the screens and also try functionality with some limitations

- Returning reporting structure from project management team towards steering committee and programme management board.

6.4.4 *Comparative analysis of Framework in the integral approach at t0*

Framework within ES*i*OD is extensively described in 4.3 to 4.5. To explicate the comparative analysis with the deployed approach only a condensed description of ES*i*OD is given in this section.

Summary of framework within ESiOD
Framework is explicated by three distinctive, but integrated assignments.

1) Network development
   a) Organizes extensive and growing participation in a network model
   b) Organizes way of controlling via participative project management, rules and roles
2) Systemic design
   a) Holistic perspective upon design content (deliberate attention for competence elements in the design)
   b) From problem analysis towards process vision development
   c) Encourages different perspectives by designers
   d) Facilitates collaborative or participatory design
3) Competence development
   a) Stimulation for a constructive dialogue on meaning and explication of competence
   b) Simulation and gaming as ways to stimulate experimental learning during the design process
   c) Attention for sense making, reflection and reframing schemata

The deployment of these three assignments is explained in a 12 step approach with internal repetitive elements and feedback loops on which the participants themselves decide timing and amount of iterations (Figure 68, pp.235).
Analysis of framework within the integral approach
From the document inspection and observations during November 2004- January 2005 the following similarities and differences appear between ES*i*OD and the integral approach in the perspective of framework:

Organization of teams and project
The setup of development organization is in many ways comparable to the definitions in ES*i*OD. This is exemplified by e.g.: the change management team that is strongly embedded in the functional teams, the diverse participation in the teams, the clear formulation of the development organization and its objectives.
The project instalment phase is confronted with difficulties. This results in a difficult staffing process in which participants do vary considering background and original organizational unit, but their profile does not always match the prerequisites. This sometimes leads to abandoning the focus for roles within the teams. This not necessarily is problematic, as coaching and attention for role development can

compensate this (4.3.3, pp.162). Nevertheless this deployment of coaching and focus for role development also is underexposed. This further on causes for troubles as expectancies of the members in the development organization sometimes start deviating from the development ambitions in the project.
One important difference between the organization of participation and how this is described in ES*i*OD is the absence of the cluster (Figure 67, pp. 228.). In 5.6 the cluster is explicated as a dynamic way to organize groups around specific assignments or objectives. PGS clearly chooses a more classic organization in functional teams, without the explicit attention (both in the documentation as in the way of working at t0) for quicker changes of people in the development organization.

Way of working
The generic 4 step template is an important structuring aid to plan and organize the work, teams and participation process across the timeline. The used 4 step template is coarser in comparison to ES*i*OD (Figure 68, pp.235). It does explicate way of working but is less explicit about the use of workshops and contacts with the line organization. Secondly the used 4 step template emphasizes the decision making step, where ES*i*OD takes a more equal perspective upon this last step in the process. ES*i*OD also more explicates the internal reflection moments within the teams and stimulates reiterations with several workshops. Table 35 shows the essential steps in comparison. ES*i*OD also suggests specific deployment of sessions or interventions in respective cycles, whereas the used 4 step template more leaves space to the teams themselves. The latter is a combination by two phenomena.

1. First: from the project documentation analysis it is obvious that parts of the change approach are unfinished and this results in a less explicit allocation and timing of change mechanisms or interventions in the 4 step template.
2. Secondly: The deliberate deployment of a 'development perspective' as intention to freely let teams select and pick methods or tools they think are appropriate in specific moments during the project.

Different interviewees respond both phenomena are true. Both the change management team as well the project management team does not succeed in creating a satisfactory level of detail in the change approach around t0, whereas on the other hand the intentions of a rather free method format are genuine. Teams really should be put in the position to self select interventions and mechanism they feel are appropriate in time and matching their audience.

Way of controlling
In comparison ES*i*OD is less explicit on the way of controlling compared to the actual integral approach. The instalment of a special BBC team is deployed in the MINDEF case and the reporting structure resembles standard practices from project management methodologies like PRINCE2. ES*i*OD suggests reporting structures, but in a less extensive format and with a more participative approach towards collective progress evaluation and project management.

The deployment of rules and roles, on the other hand, is not elaborately described in the project documentation as explicit controlling mechanism. In ES*i*OD rules and sponsoring roles are specified to facilitate the participative way of controlling and competence development from top management including sustaining sponsorship. The deployed integral approach marks for sponsorship, but only with the instalment of a steering team and classical reporting structures. Staffing problems result in a lower attention for roles in the development organization and the explicit presentation and sharing of rules as way of controlling is absent in this beginning period.

The integral approach	**ES*i*OD**
1 Explore	**Setup** 1. Instalment of teams First contacts to line organization Initiate networking 2. Road shows
2 Field research	**Start** 3. Clusters (Teams) create conceptual designs and proposals Small group setting and information collection from the line organization
	Collaborative design & Development 4. Network participates in several session to specify and enhance design proposals Clusters
3 Validation	**Reflection** 5. Inward (within team) 6. Outward (between teams, within development organization)
	Feedback & Specification 7 & 8. Final review round together with the line organization on issues
	Finalisation 9.LSI's on Approval of final designs 10.Final approval and decision making on the designs
4 Decision making	**Preparation** 11.Roadshows to broadly inform line organization of status and prospective events 12.Migration preparations 13.Preparation of Training and introduction

Table 35 Comparison of ES*i*OD Step approach versus 4 step integral approach

Summarizing:
The MINDEF integral approach clearly shows parallels with ES*i*OD in its fundamentals and the deployment of framework. The initial set-up nevertheless also shows some significant differences.
Way of working is mainly constructed around a sequential 4 step approach. This staged model also can be recognized in the context specific design in §5.7 (pp. 233) that is also accompanied with a more detailed stage model. The way of support by a structure of methods and instruments in the MINDEF integral approach also is less explicit. ES*i*OD presents three assignments to facilitate the participants in the integral deployment of design and development with an explicit structure of the respective instruments and tools. This aid is lacking in the MINDEF case situation. The MINDEF integral approach focuses on extensive participation to create acceptance, but neglects a more elaborate focus on competence development and its deployment. This holds for the members of the PGS itself as well as the members from the line organization that participate via the network. Way of controlling is organized classically and seems more an add-on via existing project management principles and reporting structures.

6.4.5 *Deployment of tools in the MINDEF integral approach*

The researcher analyses the tools, that are either prepared and described in the documentation or otherwise deployed in the start up phase, by document inspection and observations.
In the beginning of the PGS project only a small selective set of methods and tools really is deployed. This includes introductory training and the project documentation itself.
The following tools and instruments are explicitly phrased in the project -and instruction documentation.

Project Documentation

The project is accompanied with PMS and DELIVER as the programme management and implementation methodology. The teams are supported or contribute to the following main documents in several versions during the project:

Master plan SPEER	*Overall Master plan*
Migration strategy	*(definition of the migration process explicating Go Live, timing, necessary training, system migration and reorganization affairs)*
MINDEF integral approach	*(Gives a short introduction on the principles of design and development and routes towards other documents that explicate 4 step approach, networking assignment, roles and rules)*
Project Initiation Document PGS	*(Baseline Project plan)*
Fundament	*(This document includes the basic concept designs from the different teams after step 1. This document is the foundation for the in-depth design and development process in step 2). Improved version proceed even after step 2 is already started*
Building block definitions	*(This document includes all detailed process designs of the teams organized around two main building blocks Business scenario files and Process master files (PMF & BSF)*
Business Scenario File:	*Template. overall general description of an end to end business process*
Process Master File	*These documents contain in-depth pieces or parts of the BSF.*

Table 36 Relevant project documentation in the SPEER program

Shared network drive

The documents are saved and shared via a normal directory structure on a shared windows based server structure. There is no collaborative working space or web based search tool.

Modelling Tool

The teams are facilitated via Mavim SIS. This is Visio based collaboration tool with web enabled export to the line organization. This web export is used towards the network. It displays process master files and business scenario files in html pages.

Commenting is employed via mail or standard issue word templates. The selection for this tool and later on its deployment is an extensive source of debate. Disagreements on its appropriateness and dissatisfaction with the tool cause for passionate discussions between the different participants and also consultants. This discussion distracts the participants from their essential tasks. Later on in the project, around June 2006, the MAVIM tool is replaced by the ARIS toolkit.

SAP Sandpit/SAP demonstrations:
A representative SAP test system in which processes or design alternatives can be tested, tried out and shown to network or PGS members

Role Map:
A document that records necessary participants, their background, their role in the process and the reasons why this person should participate. No template is given so this can be a word or excel document that lists these participants in table format.

Documentation inspection
This method describes inspection of exiting documentation within the ministry of defence. Policy documents and prior strategic documentation are an important source of information of each team to guide their conceptual design alternatives in the first explore stage (step 1)

Workshop process flow/ process quality:
This is a template for a collaborative design workshop in which the organizers are requested to focus the design workshop around process design, but simultaneously investigate acceptance and the accompanying change aspects like necessary future competences and organizational structure. The workshop template has an open set up, but focuses around outcomes. The workshop ties in process design with a deliberate amount of time to let the participants reflect upon problems and experiences via storytelling and exchanging schemata or images. Important aspect is to explicate affairs that are perceived problematic, but also discuss the topics participants value and are proud about. The workshop uses the Cause maps as embedded method to elicit cause and effect relationships for current problems in both process logic as well as behaviour.

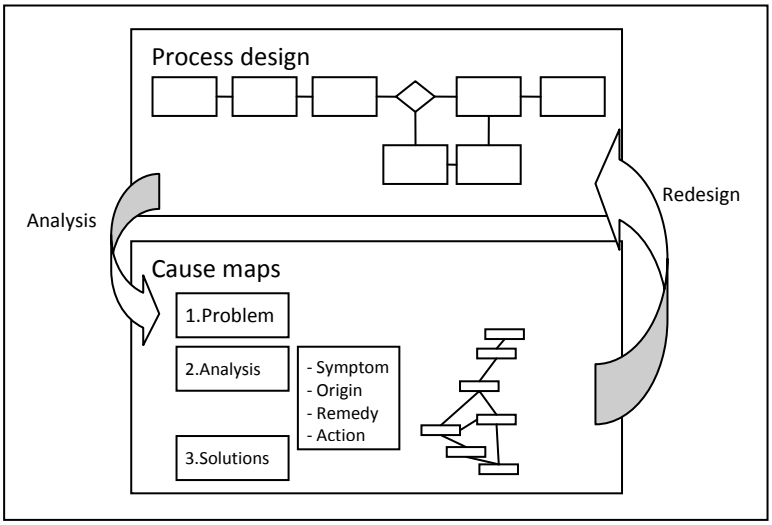


Figure 72. Basic template for cause mapping during the process quality workshop

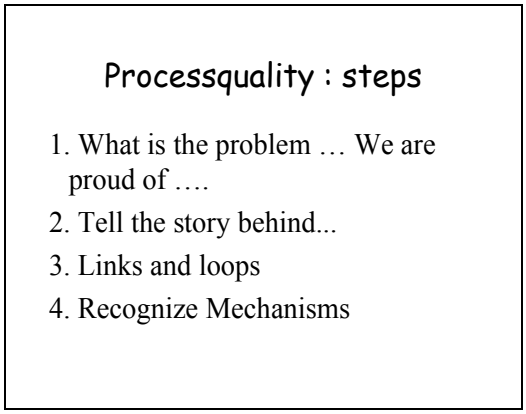


Figure 73 Slide example from the process quality workshop template

Brown paper sessions

Brown paper sessions stand out for their simple employment, but their sometimes powerful results. The session format is very accessible and by its simple nature participants are open to contribute freely.

The session format can be used to explicate and share priorities or standpoints facilitate simple process modelling sessions, the creation of mind maps or to simply support group discussion.

Interviews:

This is used as a formal tool to elicit positions, opinions and acceptance from experts and decision makers. Interviews are recommended in sensible situations or in the case of complex content matter.

Decision support room/ decision workshop

This is a special room and workshop format to facilitate the decision session at the end of the project stage. In short the room is separated in one part for the active decision makers in a round table set up. The other part of this room is reserved for the audience. This audience consists of experts and advisors to the decision makers. In case of necessary information or knowledge the decision makers can call in the help of their seconds. The decision makers are accompanied by the second space an active and consulting

Roles and Rules for the development organization

The instalment of the development organization is not officially stated as method or instrument, but their assignment and objectives are stated in different project documents (PID, Fundament, educational materials)

One of the accompanying methods to support the participants of the development organization are roles and rules. This method is explained in one short text based manual and during the starting training sessions introduced.

The educational program does not go into detail on coaching to improve participants in staying in their role. The manual in short explicates the differences between roles in the development organization and the counterpart functions in the line organization. The rules are aimed on awareness creation for the balance between design and development consciousness

6.4.6 *Comparative analysis of tools in the integral approach at t0*

Tools and instruments of ES*i*OD are extensively described in sections 4.3 to 4.5. To explicate the comparative analysis with the deployed approach only a condensed description of ES*i*OD is given in this section. Table 37 shows the direct comparison between the integral MINDEF approach and ES*i*OD.

ESiOD	*Integral MINDEF Approach*	*Explanation*
Development organization	Development organization	Similar
LSI	LSI	Similar
Roles and Rules	Role Map	Rules are mentioned in the project documentation, but explicit deployment is omitted
Collaborative design	Brown paper sessions Workshop process quality	The combination of both methods in the integral approach are comparable to the notion behind the collaborative workshops within ES*i*OD
Various modelling methods	EPC, Mavim Modelling tool	Bound to business process modelling method
Systemic design structure	BSF and PMF template	Templates do not incorporate systemic view. Focus on defining process design properties and adjacent aspects without the necessary profundity
Janusian workshops/Creativity sessions	X	Not applicable in the integral approach
Coaching	Coaching	Similar descriptions
Simulation and gaming	Sandpit	Simulation and gaming is omitted. The only simulation environment is the SAP testing system
Survey feedback analysis	X	Not applicable in the integral approach
X	Decision support Room	Not applicable in ES*i*OD
X	Project documentation/ network drive	Not explicated in ES*i*OD

Table 37 comparison of tools within ESiOD and the integral approach

In short the instruments and tools of ES*i*OD incorporate the integral way of thinking behind designing technological artefacts and developing social structures. It is an extensive set of tools and methods that are generically described and allocated to the different assignments in framework of ES*i*OD. Around t0 the MINDEF integral approach includes an extensive overview of available methods and tools. In this period only a very small set of tools is deployed by the participants. On the one hand this is caused by irrelevance. In the beginning of the project a significant amount of the methods is not relevant for deployment in the field.
On the other hand the overview and structuring of the tools is far from organized and accessible. There is not one specific spot where the tools and instruments can be found, nor is there a document or aid in which the tools and their locations can be found. This is attributed to the different creators of content that not always tune their contributions. (See also 6.5.2 analysis of philosophy).

6.4.7 *Concluding comparison between ESiOD and the integral MINDEF approach*

In the prior sections each element of ESIMM (Figure 15, pp. 59) is specified in a comparison of ES*i*OD versus the actual integral approach around t0. This comparison explicates δ1.
The initial integral MINDEF approach is not a complete different approach compared to ES*i*OD. It encompasses the fundamental principles and clearly is founded upon the ES*i*OD way of thinking. Important elements like network development, a development organization and the ambition to simultaneously design and develop the organization are already embedded in this initial approach. Remarkable is the fact that there is critical mass available to really try out something new in this ES implementation. It is after all the most extensive ES implementation in the Netherlands up to that moment in time and the stakes are high for both the adopting organization as well as the external partners.
Both external advisory organizations are experienced implementers, but the integration of the current ES implementation practice with organizational development is new terrain for both of them. The developers and thinkers of the integral approach have extensive sponsorship within the MINDEF organization, but top management is not able to embrace the way of thinking behind integral organizational development. They embrace the content aspects of the change process. This means the top and higher management is convinced about the necessity of a new direction and believes the ES can help MINDEF in achieving so. Nevertheless, the process side of the change process is disregarded and the specific role of sponsors and change agents that demonstrate exemplary behaviour is not deployed.
The original designers of the approach in collaboration with the project -and change management team do not succeed in quickly spreading out the way of thinking, create a more elaborate methodology and present sufficient mature material. This is also caused by the internal staffing problem in the beginning of the project. This causes a rather messy start up phase and the teams are confronted with various short term staffing problems and organizational objectives that deviate from their original intentions.

It can be concluded that the way of thinking and ambitions of ES*i*OD are included in the initial approach. The integral MINDEF approach also includes valuable and relevant methods, but unfortunately its presentation and overview is not in a mature state at t0. This phenomenon combined with the lacking proper deployment of the 'change sponsor' role by top management results in a difficult start of the process.
Based on the analysis from the prior sections the significant differences between the initial state of the integral approach and ES*i*OD are summarized in Table 38, Table 39 and Table 40. ES*i*OD deliberately is phrased in its essential elements as the detailed version can be inspected in § 5.7, pp.224.

ES*i*OD	Integral MINDEF Approach
Integral approach towards simultaneous systemic design -and organizational development. This requires a multi paradigmatic perspective upon the implementation process (alternating interpretative and functionalistic perspectives upon change process and design content) Attention for systemic approach towards the design Network development as methods to stimulate socializing and new organizational structures Attention for competence development as method for behavioural change and personal development. Explicit notation in the documentation	Fragmented definition in the documentation. Project documentation shows functionalistic perspective with development add-ons. Training material shows real incorporation of integral organizational development. Adoption of philosophy is fragmented and three distinctive perceptions on integral organizational development can be distinguished in three groups of the PGS.

Table 38 Philosophy: analysis results of the integral approach around t0

ES*i*OD	Integral MINDEF Approach
Based on three distinctive but integrated assignments: A. Network development • Organizes extensive participation • Organizes way of controlling via rules and roles B. Systemic design • Holistic perspective upon design content (deliberate attention for competence elements in the design) • Encourages different perspectives by designers • Facilitates collaborative or participatory design C. Competence development • Stimulation for a constructive dialogue on meaning and explication of competence • Simulation and gaming as ways to stimulate experimental learning • Attention for Sense making and reflection	Initiation of PGS. Strong focus on existing program- and project management; Organization of extensive participation. Organize way of working in a generic 4 step template with great similarities towards ES*i*OD. Generic template leaves open for initiative and self deployment.

Table 39 Framework: analysis results of the integral approach around t0

ES*i*OD	Integral MINDEF Approach
Extensive set of tools and methods that are allocated to the different assignments, but also incorporate the integral way of thinking behind designing technological artefacts and developing social structures LSI 1. LSI 2. Collaborative design 3. Janusian workshops 4. Creativity sessions 5. Coaching 6. Roles and Rules 7. Simulation and gaming 8. Systemic design structure 9. Various modelling methods	Incorporation of several similar tools from ES*i*OD. Nevertheless there is a strong focus on process design, project management, collaborative workshops and network development. No clear elaborate specification of behavioural interventions like gaming, role play or SFA. The latter category interventions lack an explicit description or explanation and fail also accompanying training material.

Table 40 Tools: analysis results of the integral approach around t0

6.5 Micro perspective 1: The purchasing team

In this section the first micro perspective is presented. It includes the in-depth context - and process analysis in view of the purchasing team. First, the team, its members and their assignments are described. Second, the process analysis is deployed in the perspective of the integral approach. This explicates δ2. If appropriate in-depth details that further elucidate δ1, explicated in the prior section, also will be discussed along this section.

6.5.1 *Team description, context and global process overview*

The purchasing team consists of 14 members. This team is composed of two military officers and mostly civilian team members with different backgrounds.

	Internal (Different backgrounds within MINDEF)	***External*** (From external partner A or B)
Team leaders	1	1 (also SAP consultant)
Change consultant		1
SAP consultant		1 (2 after July 2005)
Team members	11	

Table 41 composition of the Purchasing team

From the civilian members only one official purchaser is part of the team, whereas the other team members have either affinity in information system design or purchasing processes within the MINDEF organization. There is an equal representation of members from both the ministerial department as well as the forces (air force, navy and army).

This team is also special considering its composition with one of the team leaders performing a PhD dissertation as well (Schimmel, 2007) and one external experienced change consultant with affinity for the integral change approach. Both members are original developers and thinkers of the integral approach as phrased in section 6.4.1 (pp.253). The external team leader also is responsive and open to adopting the integral change approach. There is no internal change consultant. The triumvirate of team leaders and change consultant from the beginning has a high ambition to succeed in employing and adopting the integral change approach.

The purchasing team is staffed with two members from the financial and controlling team and also supported by one dedicated member from the business benefits team and the integration management team respectively. The design content requires

collaboration with especially the materials management team and finance and controlling team.

The Purchasing team chooses an iterative approach with many visits and contact moments with the line organization. Figure 74 gives a chronological overview of the relevant events that will be described in-depth in the subsequent sections.

January	Starting up, composition of the team. Training and mutual exchange of knowledge.
February	Information visits to the line organization
March	Creation of First conceptual designs Participation in the PGS Road show
April	First Collaborative workshop
May	Second collaborative workshop
June	Third collaborative workshop
July	Rework and finishing designs Small setting bilateral sessions with the network
August	
September	Fourth collaborative workshop (series of 4)
October	Rework and finishing designs Small setting bilateral sessions with the network
November	Preparation of decision making sessions
December	Decision making session (preparations)
January	Rework and finishing designs

Figure 74 Chronological overview of relevant events organized by the purchasing team.

In retrospect the purchasing team's process can be described on a high level in three main stages:

1. A start up period with the typical difficulties in getting a grip on the SAP and process design content, but significant more difficulties to get a grip on the impalpable integral design -and development approach. The change consultant and team management It is not concrete. This period takes approximately four months up to the first collaborative workshop in April.
2. A fruitful period in which the team grows together and excels in preparing and deploying several collaborative workshops. With each collaborative workshop the team develops and improves both its internal way of working and the contacts to the network. This period lasts approximately 5 months to the last sequence of collaborative workshops in October 2005.
3. A downswing due to the lack of new incentives and also because the team becomes weary. The team is approximately finished, but it is turned down in their request to already continue assignments for plateau 2. In this situation the team management and change management consultant do not see possibilities for new challenges although the team could have developed further or propagated their experiences. Other teams have a backlog and the team members partly are deployed in the remaining sessions of these teams. These however differ significantly from the purchasing teams' set up and are quite fixed so that an exchange of experiences is rather low. The events in this period have a significant impact to the work pleasure and motivation in the purchasing team.

The next section gives an in-depth description of the followed approach by the team in the perspective of the integral change approach

6.5.2 *Process analysis: Employment of the integral approach*

This team is a precursor compared to the other three teams. It quickly starts to look outside the team and initiate network development with the line organization.
The purchasing team from the start uses a development driven approach in which the team members have a say in how to organize the work and reflect upon the way of working in regular team meetings. This approach nevertheless is not well received by the majority of the team members that feel upset and request for more guidance and objective setting by the team leaders.

"I have the absolute need to receive more plans, timetables and tasks. This way of working is driving me nuts".

The purchasing team takes a rather iterative deployment of the generic 4 step approach as described in section 6.4 (Explore, Field research, Validation, Decision making). A clear sequential ordering can be recognized in the beginning as step 1 (Explore) is initiated and gone through once. After this step the purchasing team democratically chooses for a more iterative deployment of steps 2 (Field research) and 3 (Validation).

In retrospect different team members state this is not a deliberate and conscious selection, but more a natural and logical deployment of activities one after another. During the period March to October 2005 the activities within the team and the collaborative sessions include elements of both steps 2 and 3, although through time the emphasis more is put into validating activities (Step 3).
Step 4 then again is deployed once in a more sequential setup. The team in hindsight also expresses its concerns considering step 4. The real deployment of decision making does not take place during this period. In step 4 the sessions are employed by explicating the last issues and or concerns, but decision making sessions in which decision makers formally approve designs are not deployed. This is uniform over the entire PGS as other teams also do not deploy formal decision making sessions.
Table 42 shows the deployment of the 4 step approach by the purchasing team.

<table>
<tr><th>The integral approach Steps</th><th>Team deployment</th><th>Timing</th></tr>
<tr><td>1
Explore</td><td>Quick and pragmatic team start. Visits to the line and initiation of informal networks</td><td>January - March 2005</td></tr>
<tr><td>2
Field research</td><td rowspan="2">Iterative approach to:
▪ Extensive networking by :
o large scale workshops and
o small scale informal sessions with the network
▪ Internal and PGS validation
▪ Presentation to the network</td><td rowspan="2">April - September 2005</td></tr>
<tr><td>3
Validation</td></tr>
<tr><td>4
Decision making</td><td>Resolving last issues
Formal completion and approval of last issues and or concerns</td><td>October-December 2005</td></tr>
</table>

Table 42 Deployment of the 4 step template by the purchasing team

The following sections describe the 4 steps in-depth and explicate the deployed process by the purchasing team

Step 1. Explore

Information visits across the network (February- April)
During the first two months of 2005 the Purchasing team pays information visits to important bases and the several forces in the Netherlands. The army, navy and air force are visited by mostly the entire team or a significant representation in total five times. During such a visit the team is presented, The Purchasing way of working is proposed, contact persons exchanged and if possible informal networks are initiated.

This ambitious approach not only results in successes. The enthusiast contacting of network members is discouraged by higher military staff members that request for one standardized approach to realize the contact between the SPEER organization and the line organization.
Several members of the purchasing team feel disappointed by this reaction and even worse the instalment of the Front offices results in some frustration of the network development process. The front offices are formally appointed to structure the communication and participation between the teams within PGS and the line organization.

Road show 14 march 2005
During the first road show the Purchasing team performs the afternoon program. The chosen set up is to separate the participants in seven small groups each facilitated by pairs of team members. The objective is to discuss expectations of the networking approach and how to organize participation. During a following plenary session the group results are exchanged.

Steps 2 &3. Field research and validation

After the road show the team chooses a cascade approach of workshops that need to start as early as possible. The early approach towards the network also within the PGS organization results in criticism. Several team members and team leaders of other teams condemn the purchasing team for this early walk towards the line organization with immature ideas or concepts.

"How in heavens name can you confront the line organization with such conceptual plans?"

Project team management also takes a slight disapproving perspective towards this way of working, but lets the team continue.

Preparation of the workshops

From the work in the preceding months the team comes up with a set of business scenarios that cover the essential steps in the procurement process for the entire defence organization.

These scenarios are realized via regular team sessions within the Purchasing team itself, sometimes accompanied with members invited from the network. But also visits towards the network for idea generation and presentation are part of this way of working.

The first workshop is organized at the end of April 2005. One week prior to this workshop the Purchasing team has prepared so called improvement schemes to guide a discussion and sense making amongst the participants. The team thus does not introduce complete business process designs as content, but envisioned improvement possibilities in the different steps of the purchasing chain. The improvement schemes comprehend efficiency, financial and control issues, possibilities for standardization of the procurement process, catalogue buying, blanket orders, two way match versus three way match and invoice free payments.

The team itself is requested to come up with a format for the workshop. This way of working causes some team members to doubt the integral change approach. Some team members have difficulties with the participative approach to create the workshop and challenge the team leaders to come up with a format that the team can apply. The change consultant deliberately challenges the team itself to come up with an appropriate approach that matches the workshop content. In a later interview the change consultant explains his actions.

*Let them do it. The whole preparation, organization, but also the employment of the workshops. We will facilitate them, but they have to do it. If **I** do it they will sit and watch. It's better to let the team run into a wall once, because otherwise they will not learn from it".*

After all the Purchasing team succeeds to formulate an approach, but fails to specify in-depth methods or interventions or test out the first workshop session. The format is focused on creating small groups, initiate a sense making process in this small setting and finally exchange the group results in the entire group. There are no extensive preparations considering the content as a few improvement schemes and business scenarios are prepared as a4 printouts and several separate rooms are present on the project location itself.

Reflection on the first four months

In the first four months this results in a somewhat strange paradox in which the team is somehow forced to a development approach, but either fears or refuses to fully comply. This group behaviour is responded by one of the team leaders by interfering in the design process and the content matter in particular.

This team leader is perseverant in getting his ideas accepted by the team. This concerns typical design content and the team members independently report in interviews they do not like this.

"*If he knows better then let him do the designing and not play team leader".*

The team leader in a later interview gives his response to this behaviour can be explained twofold. First he is honest in acknowledging the difficulties to not to interfere in the design content as he is knowledgeable due to his earlier positions. Secondly he also explains his actions as design based measures to direct the team that sometimes in a kind of apathy is not able to continue, shows low change capabilities and does not proceed. Later on in the project this issue improves by explicating the issue within the team and due bilateral coaching sessions by the change consultant.
The team leaders and change consultant deliberately continue with the emphasis on a development based way of working.

After the first three months the purchasing team chooses for a more iterative way of working in which an extensive amount of participants are invited to four subsequent collaborative workshops.

Timing	Session	Topic	Summarized deployment
27 April 2005	W1	Presentation of conceptual designs	- Program takes two full consecutive days, - Approximately 60 participants. - Session alternates between plenary sessions and small group discussions
31 May 2005	W2	Detailing designs	- Program takes two full consecutive days, - App. 80 participants, - Session alternates between plenary sessions and small group discussions
29 June 2005	W3	Showing prototypes	- Program takes two full consecutive days, - App. 40 participants, - Day 1: alternating between plenary sessions and small group discussions. - Day 2: small scale sessions with limited number of invited participants (app. 15)
September & October 2005	W4	Finalization and definition towards decision workshops	- Sequential set up of four different one day sessions in small scale setting (up to 15 participants each workshop)

Table 43 time plan of the Purchasing team workshops and its main topics

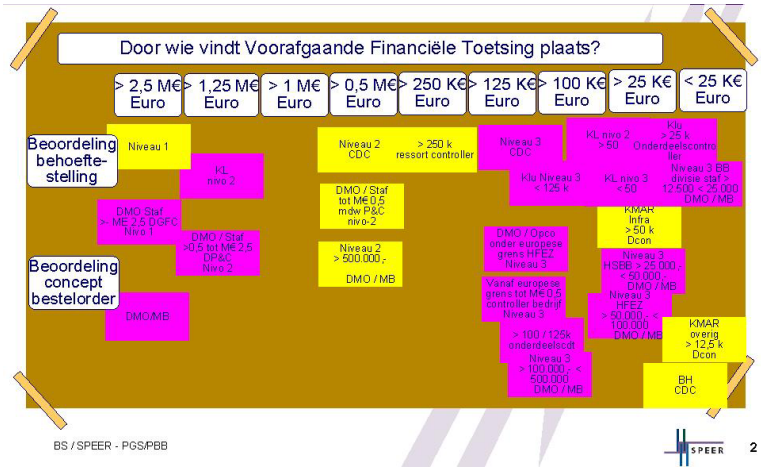


Figure 75 Example from a brown paper result from a collaborative workshop

Step 4. Decision making

The purchasing team deploys step four with a cascade of preparation workshops, but finally does not deploy the planned decision making workshop in which decision makers of the different organizational units in the line organization formally have to approve the design proposals. This last event is first delayed and finally omitted in 2005 as the real decision workshops are postponed to the first half of 2006. Nevertheless the purchasing team organizes different preparatory workshops to smoothen the decision making process and explicate and resolve the last remaining issues in the design proposals.

6.5.3 *Concluding process analysis of the purchasing team*

In section 6.2 process evaluation is explicated after three different determinants.

1. In-depth description of the process
2. Analysis of the deployment of the approach (Differences between deployment and prescriptions of the integral approach)
3. Evaluation of the approach by the team members

This concluding analysis is structured along these determinants and synthesises the in-depth analysis of the purchasing team from the prior sections. The analysis will combine determinants 1 and 2 and explicate the deployment of the approach by the purchasing team during the process. Secondly it will explicate how the members of the purchasing team evaluated this way of working.

1&2. Process description/Analysis of the Deployment

The Purchasing team deploys an iterative, pragmatic and rather development based version of the integral approach. It chooses for an early visit to the line organization and gives participants from the line organization large influence.

Team composition/participants from the line organization

The team is a balanced mix of different mostly civilian participants in the team itself. Its composition is heterogeneous with different personalities and qualities that enforce each other. It is staffed appropriately with enough resources for the assigned workload. Considering the necessary expertise and knowledge the background of most members meets the criteria. There is a balance between members with purchasing knowledge, organizational change, and designing information systems. The members also have substantial ties to the line organization to create social networks of stakeholders and interested parties.

The purchasing team includes three influencing members that strive for an interpretative emphasized deployment of the approach. As such they match group II of the three groups divided by their different perspectives upon the integral approach and its philosophy (§6.4.2, pp.257). Both team leaders as well as the change consultant deploy their role as process owner according to the specifications in ES*i*OD. They take a very interpretative perspective upon the change process, stimulate participants to deploy new work forms, are perseverant in this approach and also do not fear the confrontation with project management.

The participants in the network represent a balanced network of the relevant future adopters in the line organization. Different departments and units are represented with mostly a sufficient knowledge level on purchasing specific or its relating financial or logistic aspects.

Way of controlling

The purchasing team chooses a no-nonsense approach in which group learning and reflection play an important role. Project management and progress reporting is deployed pragmatic and there is no extensive internal progress reporting system, but repetitive group meetings in which progress and experiences are shared via dialogue and discussion. This also holds for quality and its control as it is managed via intervision and not supervision. The team leaders often are criticised for this approach by project management, but they are perseverant and protect their team members from too extensive progress -and project reporting.

Way of working

The teams' generic way of working more resembles the iterative step approach explicated in steps 4 to 9 in ES*i*OD (Figure 68, pp. 235) versus the 4 step approach of the integral approach (§5.7, pp.260).

In the perspective of the three assignments in ES*i*OD (Figure 76) the purchasing team clearly has an emphasized attention for network and competence development, but lacks to pay enough attention to the systemic design:

	Systemic design	Network development	Competence development
Framework	• Problem analysis • Process vision development	• Participation in a growing network model • Exchanging participants	• Competence increase • Reframing schemata

Figure 76 condensed overview of ESiOD framework

1. First the way of working especially is aimed at competence development within the purchasing team itself. The team members in the beginning months sometimes are pushed to their limit and respond fierce feelings, difficulties and sometimes even resistance against the way of working. Most team members have difficulties with the leaning on the job approach. Formal and organized training is limited to SAP and process design. Coaching is deployed extensively as well as group learning
2. Secondly, the objective to give the line organization a real influence, but also take them along in a frame breaking learning process. During the workshops there is implicit attention to change cognitive schemata within the network of participants. This means a frame breaking understanding of the new situation and its meaning (cognitions), but also the acceptance and validation of these new concepts (attitudes).
3. Thirdly, the omission to treat design content systemically as competences and social interactions are not explicated in the designs. But the stronger the team chooses to be disobedient and follow its own approach; the less critical is its adoption of the design templates supplied by project and integration management. In the analysis of methods and tools in the deployed integral approach (Table 37, pp. 272) it is shown that both these templates (BSF and PMF template) do not facilitate a systemic perspective upon the design content. This actually is a pity as the team's way of working and its collaborative workshops in some situations delivered relevant results, like different values in the network and different understandings for available competences. Although these aspects are taken along as valuable input in the design proposals and find their way in design decisions they end up in a rather implicit state as most of the time these properties are not explicated in the PMF and BSF templates. In some situations the team members state these aspects are not relevant for the desired design template and do belong in the later actual system migration and introduction phase. In the perspective of integral organizational design -and development this is a missed opportunity that was well within reach and could have functioned as exemplary behaviour for the other teams.

Side effects and unexpected events

The deployment analysis should be put in the perspective of its context by explicating possible side effects and unexpected events that are independent from the integral approach. In that perspective the process is influenced by the following aspects:

- The purchasing team is confronted with a lower workload than other teams and secondly with mostly easy process logic, but some stubborn financial side aspects that define design content.
- After the summer break the team is confronted with the dialectics of progress (Romein, 1937). Other teams are lagging behind and specific touch points with these teams cannot be explicated. The team clearly is affected by the decline to continue plateau 2 in October 2005. This decision is defended with the other teams' backlog, but has a considerable effect on the motivation within the team. Nevertheless the members of the purchasing team at that moment in time are deployed far from efficiently in the other teams. This leads to no increase in working pleasure or a significant exchange of knowledge and experiences. During the last period of 2005 the members of the purchasing team focus their attention to self deployment and development by various individual interests like extra SAP courses.

Methods and instruments

The use and selection of methods and tools is scarce compared to the integral approach and ES*i*OD. Table 44 shows the application of methods and instruments by the team in 4 categories (N: No application; S: Little application; M; Moderate application; L: Extensive application)

Element	Explanation of Deployment	ESiOD[8]			
		N	S	M	L
Collaborative design workshops/ LSI	The Purchasing team from the start chooses a mix between collaborative design and medium to large scale interventions. One of the effective mechanisms in the applied approach is the alternation between small and larger group settings.				X
Diverse modelling methods	The Purchasing team stayed within the prescribed modus of process modelling using the EPC technique. Brown paper sessions and post it notes were used frequently, but almost all within the same sequential process modelling way. Sporadically mind mapping models were used by participants from the network, but the team itself does not deliberately use or suggest the use of causal loop diagrams or rich picture techniques.		X		
Systemic template	The Purchasing team stayed within the prescribed templates of process master files and business scenario files. These templates are emphasized around collecting process information (functionality in steps, logic, information, range and scope). These templates lack the real integration with development based aspects like necessary competences and new organization of work. The Purchasing team on the other hand neglects to fully utilize the existing organizational items in the BSF and PMF templates and elaborately explicate aspects like impact on the organization.		X		
Development organization	The Purchasing team is embedded in a development organization. The clear-cut collection of the different sub teams starts up as a heterogeneous collection that is motivated to initiate a development process, but gradually the PGS turns into a classical project team that focuses on its outputs. The knowledge exchange between sub teams cease and the PGS shows the same characteristics as the MINDEF organization in miniature.			X	

Table 44 deployment of instruments by the purchasing team

[8] N: No application; S: Little application; M; Moderate application; L: Extensive application

Element	Explanation of Deployment	ESiOD			
		N	S	M	L
Roles & Rules	Roles and rules are moderately adopted by the Purchasing team. Rules in some situations are explicated and deployed in workshops. The explicit use of roles as competence development instrument is not used extensively by the entire team. The adoption of the process owner role by both team leaders is successful and goes accompanied from extensive coaching by the external change consultant. This triumvirate drives the team and its network towards a more interpretative based deployment of ES*i*OD in which the participants implicitly develop their roles according to their affinities.		X	X[9]	
SFA:	SFA is only deployed by the researcher and the internal team leader as research method. It is not deployed as deliberate method to facilitate the development process of the PGS or the participants from the network. The feedback sessions only have contributed to awareness creation. An extensive dialogue and feedback process on the surveyed data was left out.		X		
Gaming	No use of gaming. The Purchasing team is the first to show SAP prototypes beside process master files. This contributes to a lot of extra insights, understanding and approval with the audience		X		
Coaching	The team leaders and change consultant extensively performed coaching during the project. The coaching role gradually also is adopted by individual team members.				X

Table 44 (Continued) deployment of instruments by the purchasing team

[9] Process Owner role

3. Reflection on the approach by the team

The team is composed of a heterogeneous group of mainly civilians and from the start only a small number feels comfortable with the interpretative deployment of the integral approach. The rest of the team members have difficulties with this approach, but little by little 50% of these members are getting more comfortable with this way of working.

The Purchasing team continuously was ahead of the other teams. In output versus performance ratio the used approach can be valued as very efficient. This observation is coloured by the fact that there is a significant difference between the workload and complexity of the content of the purchasing team on the one hand and the materials management or financial team on the other hand.

After 12 months the majority of the team is positive on the approach, but also feels there are opportunities for improvements. The following reflections are stated in a reflection by the team itself.

- Large influence of change consultant and team leaders on the approach. This is a rather directive deployment of a multiparadigmatic approach. It even can be perceived as a rather functionalist directive towards development.
- The approach or *"Design and development"* should not be branded as something *very* special without a proper and accessible (understandable) clarification or manual. From the beginning the concept is introduced rather grandiloquent, but that does not hide the lack of sufficient backgrounds or material. Soon this causes team members to take it less seriously and it takes a significant amount of time to win their convictions back.
- It takes some time to get used to the approach. Development approach was leading ("let the team members do the job")
- Perceived as a difficult and sometimes unclear approach by the team members (struggling, affective behaviour)
- Room for individual or small scale initiatives is sometimes turned down, due to project management. This may be independent from the approach, but the interpretative deployment of the purchasing team often is disturbed by this aspect. It is seen as a kind of schizophrenic way of working. Like stimulate your kids to bake a cake, but with the handcuffs on.
- Role adoption for the network members should be clearer. A lot of time is invested in building bridges and getting to know each other. More energy should be put in helping these participants to get their messages across. This means facilitating and helping them in explaining "our work" towards the rest of the line organization.

6.6 Micro Perspective 2: The Materials management team

6.6.1 *Team description, context and global process overview*

This team is labelled the Materials management team and consists of 19 members. It has a significantly different composition compared to the Purchasing team as only two civilian team members are combined with several military officers from different forces. The team is split up in three sub disciplines

- Transportation,
- Supply locations
- Force elements

Each sub team is facilitated by at least one SAP consultant. The two internal team leaders alternate the position in a 50/50 ratio due to obligations from the line organization and upon self request. The external change consultant has experience with the "Design and Development" concept and also with ICT implementation. The internal change manager has no real experience in change programs, but between 1999 and 2001 facilitates the PeopleSoft HRM implementation.

	Internal (Different backgrounds within MINDEF)	***External*** (From external partner A or B)
Team leaders	2	1 (also SAP consultant)
Change consultant	1	1
SAP consultant		3 (total of 4 SAP consultants)
Team members	11 (one shared with financial team)	

Table 45 Materials management team

Figure 77 gives a chronological overview of the relevant events that will be described in-depth in the subsequent sections.

January	Starting up, composition of the team. Training and mutual exchange of knowledge.
February	Information visits to the line organization
March	Creation of First conceptual designs Participation in the PGS Road show
April	Internal workshops and creation of conceptual designs
May	Detailing first design proposals
June	First Collaborative workshop
July	Backlog issue and Adoption of the RSW concept
August	
September	First RSW workshop
October	Several sequential RSW workshops
November	
December	Preparation of decision making sessions
January	Decision making session (preparations)

Figure 77 Chronological overview of relevant events organized by the materials management team.

In retrospect the materials management team's process can be described on a high level in three main stages:

1. A start up period in which the team is gradually staffed is introduced in SAP and process design content. During this period three sub teams are created and conceptual process deigns are crafted. During this period the team takes an extensive amount of time in getting grip on the complex content of logistics and supply. By company visits to the line organization a network of interested and necessary members of the line organization is created. A selected number of participants is invited to the internal workshops to finalize the design proposals. This period takes significant longer than the purchasing team

2. A period in which the team prepares the collaborative workshop set up. With each collaborative workshop the team develops and improves both its internal way of working and the contacts to the network. This period lasts approximately 5 months to the last sequence of collaborative workshops in October 2005.
3. The third period marks August 2005 – December 2005. During this period the team has to get used to the new workshop approach, called RSW. This approach and its accompanying preparations have a great impact upon the team and its way of working. The throughput of the team increases significantly, but the team more resembles a good oiled process design machine instead of being part of the development organization. During this period the main focus is on finishing in time with acceptable quality in perspective of the SAP configuration criteria. Workshops are used to receive as much as possible input on the design proposals. The input is focused around omissions, mistakes and possible issues. The higher goals of sense making, sharing experiences, simulating new work settings are driven to the background during this stage.

The next section gives an in-depth description of the followed approach by the team in the perspective of the integral change approach

6.6.2 *Process analysis: Employment of the integral approach*

The Materials management team chooses a different deployment of the integral approach compared to the purchasing team. The materials management team follows the generic 4 step approach in a sequential way, instead of using iterations between the 4 steps. There is also a discrepancy between the external change consultant and the team leaders about the ideas and notions on how to employ the integral approach. The team leaders clearly favour a more functionalistic project management driven approach in which change management plays a facilitating role. The employment of development is downplayed considerably. In this situation the external change consultant chooses to adapt to the teams' culture and gradually tries to initiate a development plan with the team where possible.
Table 46 shows the deployment of 4 step structure b the materials management team.

The integral approach	Team deployment	Timing
1 Explore	• Team starts up with an inward focus. • First objective is to get a grip on the design content and create one common vision on this topic within the team • Visits to the line organization and initiation of informal networks	January - April 2005
2 Field research	• Creation of design proposals takes an extensive amount of time as the team does not want to confront the line organization with unfinished proposals • Harmonization between design proposals of the three internal sub teams complicates the process • small scale informal sessions with the network, mostly organized in the teams environment and setting. • Internal and PGS validation • First large scale presentation to the network in beginning of June.	April - July 2005
3 Validation	• Adoption and deployment of the RSW concept. Designs are created by the team itself. Network participants are called in on an a small or individual basis for help and suggestions • Large scale RSW's are organized fro validation purposes.	August-December 2005
4 Decision making	• Continuation of validation and resolving last issues • Formal completion and approval of last issues and or concerns	December 2005-January 2006

Table 46 Deployment of the 4 step template by the materials management team

Step 1. Explore

This team takes a thorough approach to first investigate and analyses its own problem domain. Instead of the rather pragmatic approach of the purchasing team this team uses different notions to get a grip on the different perspectives and notions of materials and supply management. After a while and several internal sessions the team succeeds and agrees to select the Supply Chain Operations Reference-model (SCOR) model as main perspective and design rational to organize the team's business scenarios and process files. The model is adapted to the specific situation of MINDEF as it is not a manufacturing organization:

Source - Processes that procure goods and services to meet planned or actual demand.
Maintain - Manage Quality and quantity of the present goods or services. Maintains is a MINDEF specific interpretation of the Make Scenario.
Deliver - Processes that provide finished goods and services to meet planned or actual demand.
Return source - Returning goods after defects, errors, superfluity, etc. This is the return process of Source.
Return deliver - Transactions of the reception of returned goods. This is the return process of Deliver.
Plan - Processes that balance aggregate demand and supply to develop a course of action which best meets sourcing and delivery requirements.
Enable - Initiating, facilitating and managing the above phrased processes.

Figure 78 Adaptation of the SCOR model for the MINDEF situation

The team has a clear argumentation for the adoption of this model. First it had difficulties to create one common vision and understanding within the team on the different aspects of delivery, material and supply management. Secondly the team insists on a robust and thorough preparation and foundation for their cooperation with the line organization. The team clearly chooses to first come up with good concepts before the members of the line organization are involved.

"One cannot bother people in the network with unfinished concepts or just ideas. Those people make time available to think with you and help you although their operational processes continue. One should only invite such people if you are confident, satisfied and well prepared with your own outputs"

The upper quote characterizes the Materials management team and its situation elegantly. The Materials management team is staffed with a majority of military staff that opt for a functionalistic problem solving approach.
Secondly their assignment is complex and extensive. It requires multiple different processes that currently are embedded in different parts of the MINDEF organization.

Step 2. Field research
The Materials management team has good contacts in the line organization, but is hesitant to extensively use them. The beginning period towards April 2005 is characterized by creating extensive design knowledge within the team by several internal sessions. In some of these sessions a selected set of external participants from the line organization is invited. This way of working also is selected by other teams, but earlier in the project. The materials management team also takes significantly more time than the purchasing team for this step.

In May 2005 the Materials management team decides on an extensive plan for collaborative workshops from June to October. At that moment in time the other teams already are deploying collaborative workshops with the line organization.

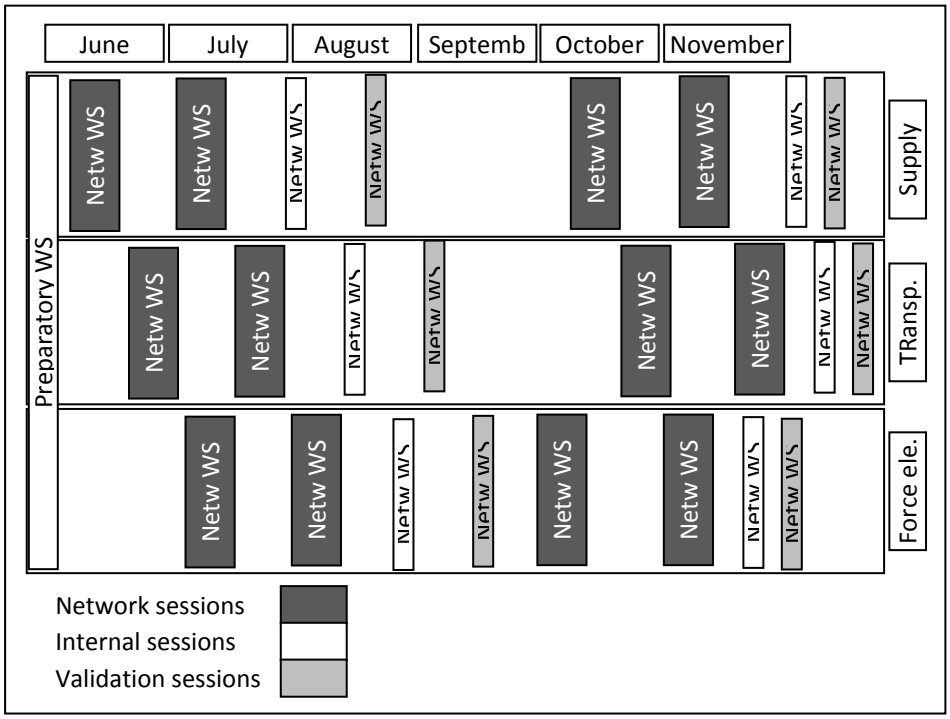


Figure 79 Materials management planning for collaborative workshops with the line organization

May/June: First network sessions of the Materials management team
The Materials management team has difficulties to agree upon a feasible format for the collaborative workshops. According to both change consultants the Materials management team members have difficulties to think about and incorporate interactive work forms. According to the internal change consultant this was mainly caused by the change capabilities of the team at that moment in time and the careful approach by the team leaders that more stuck to project planning than stimulating the team with daring interventions.

I tried to motivate as much as possible to apply different work forms, but the Materials management team clearly had its limitations in the beginning. In a team assessment the low change capabilities are explicated. At that time I decided to slowly challenge the team. But not to overstress.

Format
The first sequence of preparatory workshops is split after the sub teams (Supply, Transport and Force elements). This implies that in each workshop only approximately 40 % of the entire team is present. This requires an extra internal feedback session afterwards to share and exchange experiences and insights. The Purchasing team chose for a collective approach to prevent this. The generic format for these workshops is a full plenary workshops alternating introduction, presentation of process designs and forum discussion. The latter is facilitated by the external change consultant and the forum is staffed from the Materials management team members.

Deployment
The sessions are held at the same room as the Purchasing team uses for its plenary sessions. The Purchasing team chooses to alternate large scale introductory sessions with smaller sessions in other smaller locations. At this moment in time the Materials management team stays in the large room and adopts a presentation format followed by a forum set up.
During the presentations the process designs are presented to the audience. The Purchasing team gives the participants room to reflect and collectively think about issues. During the Materials management workshops there is a tendency to collect issues from the audience and pass these on to the decision makers.

Results
The Materials management team members are satisfied. Only concern is if the appropriate people participated. Respondents from the line organization later on reply these workshops are visited by the right people and even better prepared compared to the Purchasing workshops.
An important result that is comparable with the results of the Purchasing team workshops is the socialization process between the participants. In the Materials management workshops also a kaleidoscopic group of people from different backgrounds (both forces and hierarchical levels) get to know each other and exchange knowledge and opinions. It is a pity that this exchange happens in the informal brakes, because the bilateral discussions are contributing the development process, but a group wise sense making process could have brought even better results.

The participants from the line organization show a divided opinion. First the larger part is satisfied that information is starting to drop in and become concrete. A point of concern is the timing between the workshops and the possibilities to reflect and react. The Materials management planning suggests a reaction time of one week between workshops. Secondly the participants also express their concern considering the profundity of the presented process designs. One of the statements in an interview captures this general concern:

The showed process designs all look well at first sight, but they lack detail. If we request for more details we are hampered in the discussion and told that issues will either discussed later on or resolved at a later time. I have the feeling we sail by the real interesting issues and do not touch upon defence specific topics. It all looks to generic and high level as far as I'm concerned

July: the progress issue

Towards the end of June it becomes clear that Materials management has a progress issue that is starting to affect the entire PGS project. The Materials management team has serious difficulties with the workload and the organization of the collaborative design process. At the SPEER Programme level Steering team and project management team discuss if other work formats should be employed by the team (or later on possibly by the entire project). During several sessions on the project team -and programme level it is suggested to speed up the process by the use of the Rapid Solution Workshop (RSW) concept. RSW is a concept from external consultant A and is based on a generic LSI template. The main objectives of a RSW are to facilitate a relative large group of people (up to 100 participants) in a sequence of several days during different design sessions. By extensive facilitation the participants can speed up the design process towards a final design that is accepted and approved by the significant majority of the group.

July the 6th the RSW concept is put to the test for the entire PGS community. This coincides with the reflection of the PGS members of the past 6 months.

During a cascade of meetings and two LSI's it is decided that the Materials management team adopts the RSW session format after the summer break

Step 3. Validation

August-December: deployment of RSW's

The first RSW in the beginning of September is facilitated by a professional very experienced team. Because of cost savings, but also to initiate a development in the team it is decided the following RSW's will be facilitated and organized by the Materials management team themselves. They are helped by some consultants from the change management team.

Format

During the day approximately 50 participants exchange information and experiences of the past months in a Scan-Focus-Act set up.

First during a large group meeting issues are freely elicited, although there are some prepared topics to guide this discussion. Based on the outcomes of this large group session, several groups break up and in a smaller setting discus on the issues and weaknesses of the way of working in the groups during the prior months. During so called roving report sessions the main results of the smaller groups are presented to a larger audience. Individuals thus are enabled to share information with each other, attend topics that feel relevant and collectively work towards a common and shared future vision that can be acted upon in the forthcoming months.

Deployment
The program is well organized and facilitated. Participants get enough time and space to reflect and exchange ideas, feelings and experiences outside their normal setting and also outside their normal social group setting. The pace is relatively high and this is also perceived by most participants. There is a mixed feeling of the benefits of the LSI concept for the PGS project amongst participants. Some change management consultants doubt if the concept is able to facilitate competence development and therefore are not in favour to apply the concept in the project. The majority of the participants nevertheless is positive on the format of the day.

Results
The LSI is planned somewhat unfortunate, just prior to the summer break. Nevertheless agreements are broadly accepted and concrete appointments are fixed.
It is decided the Materials management team will adopt the LSI concept as this team has the greatest backlog. The team will immediately start after the summer break.
Dependent on the findings of this trial other teams are enabled to also adopt this concept.
In short it can be concluded that the employment of the first workshop in September succeeds in creating a better balance between developing people and making progress in creating process designs. Still the emphasis is on the latter.

The researcher played different roles in the cascade of RSW sessions from September onwards. In the first session the researcher was one of the process consultants. In the following workshops the researcher was participant observer.
The deployment of the RSW concept after this first issue can be compared to “foie gras” (statement by one of the participants). During several long and extended sessions a numerous amount of process designs is spread out over the audience.

Step 4. Decision making
At the end of December the Materials management team still has to perform workshops toward the decision sessions. The team has succeeded in catching up, but at the expense of internal and especially external development.

6.6.3 *Condensed analysis of the process by the Management Materials team*

In section 6.2 process evaluation is explicated after three different determinants.

1. In-depth description of the process
2. Analysis of the deployment of the approach (Differences between the deployment and prescriptions of the integral approach)
3. Evaluation of the approach by the team members

This concluding analysis is structured along these determinants and synthesises the in-depth analysis of the materials management team from the prior sections. The analysis will combine determinants 1 and 2 and explicate the deployment of the approach by the team during the process. Secondly it will explicate how the members of the materials management team evaluated this way of working.

Team composition/participants from the line organization

The deployment of Materials management can be characterized as careful, introvert and serious. Where the Purchasing team in some situations does not have a plan for collaborative workshops one or two days before the actual date. The Materials management team always prepares its workshops meticulously.

The Materials management team itself is composed monomorphic as almost all team members show the same team and individual profile. This hampers the team in its competence development and effectiveness. The team is characterized by a careful and deliberate attitude. Both the team leaders as well as the team members attach importance to an extensive project planning and management of uncertainties over trying out new interventions formats.

The Materials management team is well equipped with knowledge and expertise in the content matter of logistics, transport and supply. Nevertheless the complex SCOR model challenges the team to incorporate new ideas and schemata considering these topics.

The team leaders do not deploy their role as process owner according the specifications of ES*i*OD. They strive for a functionalistic emphasized deployment of the approach in which development is equated with creating acceptance and accelerating the decision making process.

There is a strong focus on creating excellent designs and extensive communication towards the network, but the integration with competence development is missing. As such they match group I of the three groups divided by their different perspectives upon the integral approach and its philosophy (§6.4.2, pp.257). The external change consultant is limited in its possibilities and chooses to facilitate the team where possible. Its position and cooperation with both team leaders cannot be compared with the situation in the purchasing team. Enforcing a more interpretative deployment is not possible, also due to lack of support from the project management and also due to the different personalities of the team leaders.

The participants from the line organization represent a balanced network of the relevant future adopters in the line organization. Different departments and units are represented with mostly a sufficient knowledge level on transportation, logistics and materials management.

Way of controlling

The materials management team chooses an extensive project management approach. Plan boards are leading and progress reporting is deployed both pragmatic but also formally. There is a repetitive team meeting (mostly in a weekly interval) in which via a structured agenda the progress is discussed. Quality and its control is managed via both intervision and supervision. The external SAP consultants play a major role in this procedure.

Way of working
The teams' generic way of working more fits the 4 step approach of the integral approach (§6.4.30, pp.260). In the perspective of the three assignments in ES*i*OD (Figure 80) the Materials management team emphasizes network development as measure to create acceptance and validation of design proposals combined with a rather functionalist deployment of process design. The latter is not to be misunderstood with systemic design as the team does not succeed in deploying this assignment.

	Systemic design	**Network development**	**Competence development**
Framework	• Problem analysis • Process vision development	• Participation in a growing network model • Exchanging participants	• Competence increase • Reframing schemata

Figure 80 condensed framework elements of ESiOD

The Materials management team succeeds in creating an extensive network. This is to be thanked by the good social contacts of the team members, but also by the interest in the supply subject.
The third assignment of competence development is undervalued. Training within the team is focused on logistics and specific functionalities of SAP. The external change consultant moderately coaches the team members, but in general these members do not express the needs for further coaching or development. The team leaders, contrary to the purchasing team, do not force this development path and therefore this results in a light adoption of competence development in which facilitation during workshops and offering suggestions for deployment are the main aspects.
The adoption of the complete new RSW workshop concept after the summer break causes the team to get used to. The deployment of this RSW concept accelerates, but it does not succeed in shifting the team towards a different perspective or paradigm upon the design and development process.

Side effects and unexpected events
The deployment analysis should be put in the perspective of its context by explicating possible side effects and unexpected events that are independent from the integral approach. In that perspective the process is influenced by the following aspects:

- The materials management team clearly has to contend with an extensive workload. On the other hand the team also is deliberate to do a lot of the design work itself and to the lesser degree call on the help and support of the line organization. This combination causes the backlog mid 2005.
- The adoption of the RSW concept not entirely is a free selection as the PGS project management and change management team suggest to adopt to this approach also as a test case for the entire project.

Methods and instruments

The use and selection of methods and tools is scarce compared to the integral approach and ES*i*OD. shows the application of methods and instruments by the team in 4 categories (N: No application; S: Little application; M; Moderate application; L: Extensive application)

Element	Deployment	ESiOD[10]			
		N	S	M	L
Collaborative design workshops/ LSI	The Materials management team limits the collaborative design workshops to the team's inner circle. In the beginning the participants from the line organization are invited, but their participation level is limited to informing and challenging. After the summer break the Materials management team adopts the RSW concept from external consultant part A. The deployment improves the participating level. *(This explains the movement from S towards L on the right)* Nevertheless participants perceive this LSI set up as "Foie grois". This is caused by the already existing backlog, the persistence in explicating all source material (extensive number of PMF and BSF), the explicit persistence in the deadline and the facilitation by the Materials management team itself supported by partial change consultants from the change team.		X	→	X
Diverse modelling methods	The Materials management team stays within the prescribed modus of process modelling using the EPC technique. Brown paper sessions and post it notes were used frequently, but almost all within the same sequential process modelling way. The team itself does not deliberately use or suggest the use of causal loop diagrams or rich picture techniques.		X		

Table 47 deployment of instruments by the materials management team

[10] N: No application; S: Litle application; M; Moderate application; L: Extensive application

Element	Deployment	ESiOD			
		N	S	M	L
Systemic template	The Materials management team stays within the prescribed templates of process master files and business scenario files. These templates are emphasized around collecting process information (functionality in steps, logic, information, range and scope). These templates lack the real integration with development based aspects like necessary competences and new organization of work. The Materials management team on the other hand neglects to fully utilize the existing organizational items in the BSF and PMF templates and elaborately explicate aspects like impact on the organization.		X		
Development organization	The Materials management team is embedded in a development organization. The clear-cut collection of the different sub teams starts up as a heterogeneous collection that is motivated to initiate a development process, but gradually the PGS turns into a classical project team that focuses on its outputs..			X	
Roles & Rules	Roles and rules are only scarcely deployed or incorrect. It is limited to positioning in the team and allocation of tasks. Team members often are experts. Process owner role is deployed in appropriately focusing on optimizing the creation of expert designs	X	X		
SFA:	SFA is only deployed by the researcher and the internal team leader of the Purchasing team as research method. It is not deployed as deliberate method to facilitate the development process of the PGS or the participants from the network. The feedback sessions only have contributed to awareness creation. An extensive dialogue and feedback process on the surveyed data was left out.		X		
Gaming	Simulation is used during the RSW sessions in the second half of 2005. In smaller groups the suggested process models designs are experienced and played through. Though this setup is beneficial the number of playful elements is scarce. EPC process models are depicted and small groups step by step go through the process and recollect possible issues. There is no role adoption and the setting is only slightly to be labelled as gaming.		X		
Coaching	The external change consultant performs moderate coaching during the project.			X	

Table 47 (continued) deployment of instruments by the materials management team

3. Reflection on the approach

The team is composed of a homogeneous group of mainly military officers stemming from different force units. The materials management team was at the back of the other teams. After 12 months the team is mixed on the benefits if the approach. Approximately 50 percent of the team members do not see this approach as something special and judge design and development as an exaggerated labelling. In their opinion it sometimes seems to compare much ado about nothing whereas valuable time can be spend in creating and validating design proposals. The other 50% values the approach, but wants to put more energy in creating acceptance and development within the line organization compared to a competence development process within the team itself The following reflections are stated in a reflection by the team itself.

- The MINDEF integral approach should not be branded as something *very* special because it isn't.
- It takes some time to get used to the approach. The team should have asked for more help by the other teams
- Networking workshops are overvalued and do consume an enormous amount of time from both sides. This should be managed more efficiently
- Position and expectations for the network members should be clearer. More energy should be put in giving the network members appropriate material that they can process in the prospected amount of time.

6.7 Micro Perspective 3: Invited Participants in the Network

In this section the last micro perspective of the process analysis -and evaluation is presented. It is a special perspective because it presents the analysis results from the perspective of the network. This is a validation and enhancement of the results from the prior two sections that present the in-depth results in the perspective of two separate teams in the development organization. The investigation is deployed via several interviews with participants during and after workshops or meetings and secondly via an extensive survey. The survey is deployed at the end of 2005 after the major network sessions are finished (Rapid solution workshops, collaborative design sessions, decision preparation, etc.).
This section includes a similar structure as the prior two sections and distinguishes its results after process description, analysis of the deployment and an assessment of the followed approach by the teams. The questions and outcomes of the survey are presented in the respective different sections and will be accompanied with observations and interview results.

6.7.1 *Deployment of the survey and interviews*

The different teams in the development organization start inviting several members from the line organization approximately from February 2005. The assignment is to create a homogeneous network of participants from different forces, departments and ranks/function. By doing so the line organization gradually becomes involved in the project. This leads to an approximate number of 350 different participants from the line organization that attends the network during the project stage in 2005. From the contact information and project documentation (communication notes between different teams and the network) the following composition can be derived:

Civilian	Army	Navy	Air force	MP
100	90	80	60	20

The participants from the line organization are requested in three different roles that reflect their position or experience in the line organization:

- Expert: An expert has detailed knowledge on specific content matter. His/her contribution is sometimes essential in complex or very specific situations.
- Advisor: An advisor is more a generalist than the expert, has a larger experience -and scope to the business process or situation. He advises Decision makers and therefore can be seen as bridge between material expert and decision makers. Typical military attendees are rank colonel)
- Decision maker: Decision makers are formally authorized to make decisions on design topics. In the PGS project it are either top management department officials or high rank military officers (rank general)

Multiple role adoption is possible. Some participants from the line organization report it is difficult to really separate the roles ("*where does the advising role start and where stops the role of expert?*)

Respondents of the questionnaire

The questionnaire was sent out via paper and email to an audience of 289 respondents. 55 respondents completed the questionnaire. Table 48, Table 49and Table 50 show the characteristics of the respondents:

Organizational Unit	**Respondents**
MP	2%
Army	42%
Navy	17%
Air force	9%
Administration	30%

Table 48 composition of the questionnaire respondents

Participating group	**Respondents**[11]
Materials management	46%
Purchasing	20%
Finance and controlling	28 %
Weapon systems management	13%
Other (AO/IC, Architecture, System management)	11%

Table 49 Target groups of the respondents

Role	**Respondents**[12]
Expert	76%
Advisor	30%
Decision maker	4 %

Table 50 Roles of the respondents

[11] Respondents may attend multiple teams. 8% attends both the Materials Mgt. and Purchasing team. Another 8% attends the Financial and Purchasing team)

[12] Respondents may adopt multiple roles. 10 % adopts both expert as well as advisor

6.7.2 *Process analysis and deployment of the approach*

The line organization perceives there is a large attention for network development and participation by the teams in the development organization. The questionnaire shows that the teams in the development organization use a wide variety of formats to get in touch and facilitate the networking process (Table 51). A deeper analysis of the questionnaire results shows no significant differences in the amount of different organized contact moments or workshops over the 12 months by the different teams of the development organization. The bilateral contacts are perceived very important by the respondents (stated 6 times in different interviews). These are frequently accompanied by phone and email.

Mark the amount of different contact moments between you and the people from the PGS	**0**	**1-5**	**5-15**	**>15**
1:1; bilateral discussions with PGS members	13%	37%	22%	28%
Small group sessions	15%	54%	26%	5%
Large group sessions	7%	44%	40%	9%
Email	6%	19%	36%	39%
By phone	19%	31%	24%	26%

Table 51 Results (in % of respondents): Number of different contact moments with PGS in 2005

The contact moments with the team members are expanded with internal networking. This means the participants of workshops are stimulated to further initiate network development. The suggested way of working is called “To collect and to return”. Participants explain the relevant issues and topics for their companions in the line organization and send these with possible comments or issues in return to the teams. Table 52 shows the questionnaire results on how the majority of the respondents put time and effort in delivering feedback towards their own organizational unit and a significant lower amount outside its direct working environment.

	0	**1-3**	**4-6**	**7-9**	**>9**
How often did you present information towards your direct working environment	13%	30%	26%	11%	20%
How often did you present information outside your direct working environment, but within your force element	28%	42%	17%	6%	7%

Table 52 Results (in % of the respondents): Networking initiatives by the line organization themselves

An in-depth analysis shows this is independent from the PGS, the respondents role (expert, advisor, or decision maker) or the force background. During the workshops the participants in the network also are stimulated to gradually increase the participating network. Table 53 shows the results on these initiatives. There is a triptych division on participants that put a lot of effort in stimulating network extension (33 %) and participants that do not (32%).

	Totally agree	**agree**	**neutral**	**Disagree**	**Totally disagree**
I personally help to increase the network by involving, bringing or suggesting participants to the network	2%	31%	35%	28%	4%

Table 53 Results: Network growth by the line organization themselves

Discussed topics during the workshops

The topics are assessed via closed questions in the questionnaire and by a classification of statements from open questions in interviews. The respondents have scored the several discussed topics in a 5 class scale (never, a few, regular, often, very often). A class analysis shows there are three different classes of topics (little(never), regular, often(very often)). The underneath table shows the classification of the results in three classes. These three classes are derived by skewness analysis in the histograms of the respective topics mentioned by the respondents.

	Discussed topics during the sessions	Little	Regular	Often
Scarcely	The impact on individual work situations	64%	24%	11%
	The reason why things need to be changed	71%	18%	7%
	New skills that are necessary in the future work situation	71%	22%	5%
	Tasks and/or Positions in the future work situation	71%	24%	4%
	The future organizational structure	75%	20%	4%
	Different forms of collaboration between the force units or departments compared to the past	55%	38%	6%
	Responsibilities in the future work situation	69%	27%	5%
	Authorisations in the future work situation	73%	20%	4%
	Roles in the future work situation	56%	29%	11%
Regularly	The impact on the entire MINDEF organization	40%	36%	22%
	Different way of thinking for the in the future work situation	41%	33%	23%
	Different required behaviour in the future work situation	49%	35%	15%
	De explanation of the reasons behind the new business processes	44%	40%	13%
	Timing of expected changes to prepare participants	41%	40%	17%
	Functionality of current processes including a systemic problem analysis from various perspectives	44%	42%	13%
Often	Future business process designs	11%	25%	62%
	Explanation of the functionality of the Enterprise system	28%	36%	34%

Table 54 Classification of discussed topics during the workshops

Discussed topics assessed via open questions (interview)

The interviewees are classified after generic distinguishable interview groups (Yin,1994). Both the role of the respondent and their organizational background are used to classify interview groups.

Force	Role	Number of interviewees
Army	Expert	4
	Advisor	
	Decision Maker	1
Navy	Expert	4
	Advisor	2
	Decision Maker	1
Air Force	Expert	4
	Advisor	2
	Decision Maker	
MP	Expert	1
	Advisor	1
	Decision Maker	

Table 55 Interviewees within the line organization

Combined analysis from questionnaire and interview results

The results from the questionnaire show there is a specific bias by the teams in debated topics during the workshops. All teams emphasis information requirements and business process logic. The organizational aspects or organizational problems are often left out or only scarcely discussed.

This discussed content is often perceived very complex and it requires the participants a lot of extra time to get started. Once up to speed the content starts to change rapidly and there is a very narrow focus on process design and logical interaction with the future information system. The organizational impact is receiving a low amount of attention ("*absurd little time is spent on these affairs").*

The Network plays an important role in making relationships and connections between the process designs of the different PGS. Most respondents report this as a clear confirmation that people within PGS do not work together tightly.

The expectations of functioning as bridge towards other line organizational members are exaggerated. First the content is too complex, secondly there is no support from the PGS to facilitate this process and last there is little time besides the already tight combination of normal work and participating within network sessions. PGS people should pay more attention to creating work packages for the PGS themselves and work packages that can be understood and used more easily in the line organization. Then a fruitful back and forth between PGS and line organization can start.

From the different interviews the respondents unanimously report the following concerns.

- Too many and too one-sided participation content (overload in process designs)
- PGS are sometimes rather quick in sending new materials and expectations are high
- Appropriate influence on the design content
- Relationships between the different teams are created and signalled by the network participants not by the teams themselves.
- Most of the design material is too complex to comprehend at short notice
- Details focused on process logic, no detail on relevant issues for the line organization (impact on organization, possible transfers, education and training)

6.7.3 *Assessment of the approach*

The integral approach is evaluated via closed questions in the questionnaire and by a classification of statements from open questions in interviews. From the interviews a mixed image appears. Participants have difficulties to value the balance between the necessary effort and the obtained benefits. The integral approach is extensive and time consuming.

The amount of information is way too much for one single person to handle. Dealing with this amount of extra documentation besides my normal job is unfeasible. Also the coherence between the different PGS teams is unclear, this requires adjustments in the future

The respondents feel committed and involved in the design process, but report the difficulties to create further development and increase in the network (lack of time and competence). As stated under content the topics dealt with still are very much focused on business processes, and information system functionality. This deteriorates the effort/benefit ratio.

I value the involvement and our role, but the abstraction level of the designs often is high. Business processes are talked over taking giant leaps and with a TGV like speed. As material expert I receive the documentation (80 pages) three days in advance. This is too extensive, often too complex and on a way too short notice for appropriate feedback with my colleagues or deeper into the network.

Participants from the line organization unanimously have the need to both be informed and also have influence on the future work situation and organizational affairs. This is not or only scarcely met in the contact moments with the PGS. Therefore the main results of the networking approach are acceptance and knowledge sharing -and increase. Real explication of organizational issues, like new collaborations or future behaviour and competences is omitted or when discussed not explicated in the design documentation.

Collaborative workshops take an important part of the integral MINDEF approach. The teams organize these sessions in both smaller as well as large scale settings. In the questionnaire these network workshops, as they are called during the project stage, are assessed with specific questions.

Participants are moderately positive on the different characteristics of the workshops.

- Moderately positive on the different work forms within the workshops (45 % agrees, 42 % is neutral).
- Participants are positive on their influence and the mutual knowledge increase during the workshops.

These results are acknowledged by the interviews as almost half of the respondents criticize the approach for being monotonous. Whereas the other half of the respondents welcomes uniformity as they then know what to expect. Secondly the interviewees value the time and space for their input and most of the interviewees perceive they really have significant influence on important issues.
On the other hand several interviewees also state that most topics are difficult to transfer to the direct working situation.

An important improvement aspect that participants of the line organization unanimously state is the adjustment of both the content as well as to some degree the way of working between the several teams. Though uniform design templates are used teams employ slightly different ways of explicating and completing these templates. The employment of workshops also differs per team. Participants state this is confusing and inefficient

The approaches and ways of working of the different PGS teams need to be adjusted

6.7.4 ***Concluding analysis of micro perspective 3***

This section explicates the followed approach and its results on the process, but from the opposite perspective in respect to sections 6.5 and 6.6. In this section the participating members from the line organization, also known as the network, are heard. The results from the survey and interviews confirm the findings from the other two micro perspectives sections (6.5 and 6.6) to a great extent. Nevertheless it also shows some detailing information.

Process analysis and deployment of the approach

The participants from the line organization are moderately satisfied with the way of working. This moderate satisfaction stems from the equilibrium between positive and negative perceptions on the way of working. The participants on the one hand really feel involved in the process design and phrase a significant increase in their knowledge and also the development of new interactions with possible future colleagues. On the other hand the participants also express individual concerns on the speed, amount of work and the content that is discussed during the process.

The respondents and interviewees phrase the following aspects as the main contributions of the deployed way of working:

- Mutual understanding and acceptance by different organizational units
- Acceptance for the ES in general
- An indication on the expected organizational behaviour in the new situation
- Involved in the design process
- A rather good image of how new interactions and collaborations will look like in the new situation

This opinion is shared unanimously across the network and independent from the participants' background or the team it is assigned/invited to.

The participants in the line organization have great difficulties to extend the networking approach and organize further sessions within the line organization. The survey shows that respondents are intended to support networking (i.e. growing of the network), but most initiatives do not exceed informing of the direct working environment. This means passing on conceptual and generic information about the project, its progress and the possible impact. More ambitious settings, like initiating sessions or workshops in the line organization are not deployed. The respondents and interviewees phrase lack of time, competences and support from the PGS as main barriers to accomplish this assignment. Nevertheless a growth of the network is observable as the amount of informed people is continuously growing. The ambition to exceed the participation level of informing is not achieved, but again this confirms the results from sections 6.5 and 6.6. where both teams report no real energy is put in facilitating participating members from the line organization to extent their network.

Profundity and amount of the content as main concern

The content analysis confirms the critical assessment of design content in sections 6.5 and 6.6. Both the Purchasing team as well as the Materials management team do not incorporate systemic design and adhere to the BSF and PMF templates. This results in an emphasis on process design and system functionality, whereas the participants from the line organization frequently uttered their concern. This is confirmed in the interviews and the survey results. According to the participants all 4 teams spend very little time on:

- the impact on individual work situations,
- the reason behind the change
- necessary skills and competences in the new situation .
- Tasks, authorizations and responsibilities in the new working situation

A moderate amount of effort and time is spent on:

- The new organizational structure,
- New collaborations and interactions
- The current process logic and its problems
- Prospective timing of expected changes

A lot of time and effort is spent on:

- Process design and business logic
- Enterprise System functionality

The participants on the one hand praise the influence and care that is taken in the networking approach, but a significant amount of participants has difficulties with the content. The content is perceived:

- **Too complex**. Participants from the beginning have great difficulties in understanding the process designs. This improves significantly, but remains an issue as far as the participants are concerned.
- **Too extensive.** The combination of workshops (valued as very relevant), reading time, but especially the amount of material causes for a lot of complaints from the participants
- **Too little time available.** Participants state there is too little time to comprehend the content, transfer issues back to the teams or even pass on useful information further on in the line organization.

The above results are independent from the participants' background or the team it belongs to. The participants thus unanimously feel committed and involved in the several workshops or sessions formats of the different teams, but have great difficulties for validating the material afterwards via reading and reacting.

This is caused by two aspects:

1. **Uniform material**
   The teams from the development organization make no distinction between documentation aimed for configuring the ES and material specifically aimed on the network. Therefore a lot of the process designs or other material is complex and requires prerequisite knowledge. This can be solved by a simplification of the material for the network.
2. **Resources**
   The combination of extensive workshops with validating physical documents causes for time and resource conflicts in the line organization.

During the process the accessibility of the material improves due to the intranet based publication and communication, but the three main complaints remain.

Comparison between the Purchasing and Materials Management team.
The detailed results from sections 6.5 and 6.6, can be put in the perspective of micro perspective 3 to round off the concluding analysis in this section. There is no significant difference between both teams concerning the discussed content. The survey results show similar results for both the materials management as well as the purchasing team. This content analysis confirms the critical assessment of design content in sections 6.5 and 6.6.
However, the significant differences in way of working between the teams, described in sections 6.5 and 6.6,can also be observed in the interview and the survey results from the network participants. The respondents do state a difference in the way of working between the Purchasing and Materials management team. The following relevant statements are found in this micro perspective from the perspective of the line organization:

- The purchasing team receives a significantly better result in the number of different working formats during the sessions compared with the materials management team. 61% of the purchasing team agrees, whereas 41% of the Materials management team.
- There is no significant difference between both teams in the connection between the subsequent workshops or sessions. This can be explained by the coherent approaches of both teams. Each team uses a different approach, but in itself the sequence of workshops is perceived as coherent.
- The materials management team receives a more negative note on the duration of the workshops. The majority of the audience found their workshops too long (69%). This figure is 45% for the purchasing team.
- The respondents give the speed and number of process designs by the materials management team during the Rapid solution workshops a lower score. (This replicates the findings from 6.6).
- The survey respondents equally value the different approaches by both teams. The respondents do report different ways of working by the teams, but they perceive both ways as sufficient.

6.8 Concluding process analysis of the MINDEF project stage

In this section we return to the research operationalization of section 6.2 and deploy the process evaluation by addressing the following items:

1. Explicate and describe the deployment of ES*i*OD in the MINDEF case

This will be explained by the synthesized analysis of both the macro and micro perspectives from the previous sections.

2. The evaluation of working with ES*i*OD by the participants

This concerns the perceptions of the different participating groups on how well ES*i*OD facilitates the design and change process. To answer this question the findings from the different micro perspectives are compared and evaluated.

The combined findings depict a holistic process evaluation of the longitudinal case. This information is important as it will be used in the effectivity analysis of the next chapter 7. Relationships between the findings from chapter 7 and these process observations will possibly give answers after the cause and effect relationships in the entire case and on the micro level. This is addressed in chapter 8.

6.8.1 *Deployment of ESiOD in MINDEF*

In section 6.3 the process is described on a macro level. It is shown that the participants are confronted with a difficult start-up phase.

Section 6.4 explains some of these issues as the deployment differs from the ES*i*OD model in section 5.7. During the process the adoption of design and development improves, but especially the expectations of the military and bureaucratic personnel combined with the missing extensive documentation resulted in a difficult start-up phase. This was sometimes even accompanied by a blunt critical or ignorant perspective on integrating design and development.

Especially in the beginning stage the change team as one group had its influence by being visually absent. The team at time was busy setting up the necessary material and sessions. This effect worked through as the different teams gradually started to adopt their unique version on the integral approach.

This is not necessary a problem as ES*i*OD also encourages self-deployment. But the teams in this case forgot to exchange experiences and mix together. This is an explicit omission in how ES*i*OD was deployed.

There is a difference between the initial four-step plan of the PGS project management and how each individual team employs this plan. This situational-specific adoption of methods is recognized in several IS implementation projects (Aydin, 2006). Secondly there are differences between the MINDEF specific ES*i*OD as formulated in section 5.7, pp.224 and the initial four-step plan of PGS the project management.

1. The Purchasing team followed a four-step approach in which each step is accompanied by collaborative workshops. The amount of workshops increases per step towards the end of the process.
2. The Materials management team clearly changed its strategy after the summer holidays by adopting the RSW concept and increased output.

All teams have adopted a form of the MINDEF integral organizational change approach, and each more or less adopt different elements of this approach.
The adoption of clusters to flexibly organize tasks, work and resources accompanied by knowledge exchange and changing social interactions is not deployed in the PGS project. Project management clearly chooses to separate tasks and works with fixed teams. There are nevertheless a selected number of members per team who' travel through' two different teams. This is a low number (two per team). Team leaders and change consultants also meet each other regularly during the project outside their team framework. But the exchange of experiences between the several members is somewhat disappointing. Most of these meetings are about project progress and accomplishing milestones. Occasionally there is time and room for reflection, but there is not a collective atmosphere in which team leaders feel enthusiastic to learn from each other.
The knowledge and experience exchange between change consultants is also low. The team does not regularly meet, but individual change consultants in bilateral talks inform and exchange information and experiences. This does not result in a more homogeneous approach between the different teams. A lot of this knowledge exchange is project content related in how specific parts of the line organization feel about design proposals and how certain approaches work out or do not work out. This does result in individual improvements and change consultants seem to apply experiences from other teams in their own situation if appropriate. A more organized reflection for a larger audience in which such know-how is collected and used to adapt the 'entire' approach is lacking. This can be seen towards the end of the project in which teams more and more become individual groups confronting first integration management with the challenging task to integrate and harmonize the at times different proposals that do not match. But it also requires splits from the network to keep the overview, stay in touch with the different teams and also understand each other's different approach and content.

	Deployment
Micro perspective 1: Purchasing	Development-based. Challenges both team members as well as the network participants. Very early movement towards the network with at times conceptual content as well as workshop set-ups.
Micro perspective 2: Materials management	Design-based. Careful, serious and deliberate. Meticulous preparation, late movement towards the line organization
Micro perspective 3: Line organization	Socializing and networking successfully applied. Partly shifting cognitive schemata but overall knowledge increase of SAP logic and new process functionalities. Less attention given to organizational matters, profundity too low It assesses the adjustments and tuning between the sub teams as insufficient

Table 56 deployment of ESiOD from three micro perspectives

The two micro perspectives show some salient differences in the deployment of the integral approach. Both teams have incorporated collaborative sessions and workshops to give the line organization influence. The level of participation between Materials management and Purchasing differs. In the perspective of Passmore & Fagans (1992) the Materials management team chooses the informing and challenging level, whereas the Purchasing team chooses challenging to creation.

An important distinction stems from the deployment of the process owner role. In the purchasing team this role is deployed on its full objectives. This means the process owner succeeds in his multidisciplinary assignment to initiate a change process and realize a qualitative and accepted design (4.3.3, pp.162).

The deployment in the purchasing team is characterized by stimulating participants to create networks and really challenges the participants to reframe their existing schemata and way of working. The process owner nevertheless also makes mistakes and meddles with the design content. The team does not accept this and becomes dissatisfied with this dominating deployment of this role. This is repaired by coaching interventions byte external change consultant.

In the materials management team the process owner is more focused on the design content and its quality. The internal and external team leaders deploy the process owner role sometimes more as an expert. The team accepts this role deployment and follow the design directions suggested by team leaders and consultants. Network development is initiated, but late in the process.

The above analysis shows how the actions of the PGS team members and the network participants influence the different deployment of ES*i*OD. This deployment of ES*i*OD also depends upon the team's context and how the initial status of the approach, the actions of the project management team and change management team affect this deployment. The following side effects have their influence on the deployment and should be taken into account when evaluating the integral approach as a product (chapter 7)

Contextual influences

Lack of receptive and understandable material in the beginning
The MINDEF integral approach failed to create awareness, motivation and understanding for the way of thinking behind the approach. This is especially caused by a lack of available material and lack of extensive discussion on the way of thinking and working in the beginning stage. The contextual-specific design in chapter 5 suggests a gradual introduction of the different specific methods into the PGS to support the original functionalistic organization to the adoption of a multiparadigmatic approach. In reality the substantial material lacks in the beginning stage, whereas the participants are impressed by the importance of the very special design and development approach. This deployment is soon perceived by many participants in the PGS as *"Much ado about nothing"*

Acknowledgement of different adoption and application of the approach
The lack of extensive and supporting material and training causes discussion on the adoption of *the approach* from the very beginning.
In principle this discussion is beneficial as a mutual sharing process is initiated, but the lack of substantial knowledge of most participants results in many different visions and disputes. This leads to an inefficient knowledge exchange between the several teams during the sharing moments.

Influence of Project & integration Management
The project management team reacts by attempting to streamline the approach several times. This is done by first creating a group discussion that ends in a fierce dispute. This is followed by 'suggesting' *the* specific deployment by a coercing force. The latter also does not result in a successful outcome, but sometimes leads to an unfriendly working climate. Finally the adoption of a *wonder* method (RSW) is suggested that all teams should apply. Although this method works well to catch up the backlog of the materials management team, it does not contribute to integral organizational development.

Influence of the change management team
Change management team was not a coherent team, but a collection of professionals who met regularly, exchanged experiences, but were unable to significantly influence the change process and the employment of the MINDEF integral approach by the several teams. This can be explained by either the lack of team spirit and internally different perspectives on IOD. But it is also influenced by the lack of sponsorship from PGS project management and SPEER programme management.

Influence from the line organization
The Mandate discussion (6.3.1, pp.246) significantly disturbed the process. The development organization members perceived this as a kind of distrust of their intentions and competences. It took almost one month to stimulate team members, get over it and again start with their work in the original spirit. In hindsight this topic is heavily underestimated and would have required better understanding and agreements beforehand. The line organization and the development organization clearly had different views on this topic.

This analysis shows that exactly the two case-specific contextual guidelines, derived in section 5.6, pp. 220, are omitted in the MINDEF case.
The contextual influence on the course of the process is affected by the combination of the previously described phenomena:
First the insufficiently prepared members from the development organization causes an inefficient and sometimes failing open dialogue on sharing the different notions and meaning on integral organizational development. Secondly, the movement to get more grip on the process by suggesting to commit to “one” approach. Thirdly, the lack of critical mass from the change management team and fourthly the inappropriate sponsorship from Top management to intervene in the mandate issue and better support change management as a team and as a process.

6.8.2 *Evaluation of the approach*

From the three micro perspectives the following evaluation results can be combined

	Positive	Negative (improvement proposals)
Purchasing team	• Majority of the team members express a positive attitude towards the approach at the end of the project. • People feel they have learnt a lot and in some cases speak of personal development	• It takes some time to get used to the approach. Development approach was leading ("let the team members do the job") • Perceived as difficult and unclear approach by the team members (struggling, affective behaviour) • Role adoption for the network members should be clearer. A lot of time is invested in building bridges and getting to know each other. More energy should be put into helping these participants to get their messages across. This means helping them explain "our work" to the rest of the line organization.
Materials management team	• Moderately positive about the approach and its results of network development • Proud of and satisfied with the final results considering the work load and complexity of the topics	• The approach or "Design and development" should not be branded as something very special because it isn't. • It takes some time to get used to the approach. The team should have asked for more help of the other teams • Networking workshops are overvalued and do consume an enormous amount of time from both sides. This should be managed more efficiently • Position and expectations for the network members should be clearer. More energy should be put into giving the network members appropriate material that they can process in the prospected amount of time.

Table 57 comparative analysis of the evaluation of the approach by three participating groups

	Positive	Negative (improvement proposals)
Network	• Mutual understanding and acceptance by different organizational units • Acceptance for the ES in general • An indication on the expected organizational behaviour in the new situation • Involved in the design process • A rather good image of what new interactions and collaborations will look like in the new situation	• Too complex. Participants from the beginning have great difficulties to understand the process designs. • Too extensive, especially the amount of material causes a lot of complaints from the participants • Too little time available. Participants state that there is too little time to comprehend the content, transfer issues back to the teams or even pass on useful information further on in the line organization.

Table 57 (continued) comparative analysis of the evaluation of the approach by three participating groups

From the previous analysis of the different deployments of ES*i*OD by the teams and the results from Table 57 it can be concluded that the line organization has a lot of criticism on the deployed approach, but also sees the positive side of the approach. There is a balance in the positive and negative perceptions and the participants from the network generally show a positive attitude towards the way of working, but do see specific ways for improvement. The PGS teams in micro perspectives 1 and 2 are less unanimous in their perception. The purchasing team is also enthusiastic about the approach, but also self-critical and sees different ways of how to deploy a more efficient version of ES*i*OD. The Materials management is less positive about the approach as it does not recognise the approach as something special. It takes a pragmatic and functionalistic perspective and is also satisfied with the results, event though they had difficulties during the process and a considerable workload.

7. Product evaluation: Assessment of ES*i*OD

-- --When faced with a choice between changing and proving there's no need to change, most people get busy on the proof. --

John Kenneth Galbraith

7.1 Introduction

This chapter continues the empirical investigation of the MINDEF case. It focuses on the product evaluation explicating the effectivity of ES*i*OD. The chapter resembles the structure of chapter 6 and compiles the investigation in the following five sections. Section 7.2 explicates the in depth research approach -and methods are. The three micro perspectives, similar to chapter 6, are discussed in sections 7.3, 7.4 and 7.50 respectively. This again includes the purchasing team, the materials management team and the participants from the line organization. Section 7.6 closes chapter 7 and synthesizes the analysis of these three participating groups by an overall assessment of the outcomes of the deployment of ES*i*OD.

7.2 Research operationalization for Product evaluation

Product evaluation is investigated after Swanborn (1999, 2007) and Limburg (2002). Product evaluation is about the effectivity and the efficiency of the application of ES*i*OD. The latter is beyond the scope of this research. The deployment of ES*i*OD is a first attempt and there are no norms set to quantify efficiency for this particular deployment. We will reflect upon the developments in the entire process and compare it to existing ES implementation practices in section 7.6. This gives an insight on how ES*i*OD can be compared with existing approaches in the perspective of efficiency. Nevertheless efficiency will not be analysed quantitatively and the focus for this research especially is on the effectivity of ES*i*OD. Effectivity explicates if the approach realises its objectives and how this can be accredited to the approach itself.

The main objectives of ES*i*OD are the creation of a high quality design, facilitation of the organizational development process towards new social interactions and development of competences by its participants. In this research this is operationalized after the following two criteria:

1. The quality of the created design
2. The competence development of the participants

7.2.1 *Quality of the created designs*

The quality of Enterprise Systems can be subdivided in functional, information and technical quality (Govindraju, 2002). This model however represents the quality of the final information system and not all included criteria are relevant for the assessment of design quality in this study as the analysis is limited on the project stage up to the system configuration. Specific technical details, like security or system availability are specified in this configuration stage and are out of the scope of this study.

In this dissertation the focus is on the design artefacts created by the project teams where some of these specific technical aspects are either defined conceptually or even completely omitted. More generic criteria are required for the assessment of the information system related quality and these can be found in the extensively elaborated IS -and requirements engineering domain (Wieringa & Heerkens, 2006). In this field the design artefacts, design process and the quality of the information system are explicated.

An appropriate definition of design quality can be found in McCall (1977) and McKinney et al. (2002) that explicate generic quality aspects of design documentation by its completeness, correctness, consistency and the acceptance for the proposed design. This dissertation especially focuses on the facilitation of the change process and therefore the qualitative analysis of the designs requires a broader perspective over the above explicated IS related aspects. The socio technical design domain pleads to integrate the technological design with the social design and explicate technology, people and their interactions (Atkinson, 2000).

Design quality seen from that perspective includes quality of work, attributes of the people involved and acceptance towards the proposed design constructs (Mumford, 1995). The integration of technological and social items is extended towards the holistic or systemic notion on the organization (Boonstra et al. 1998). The systemic perspective resembles and in some situations extends the prior notion for completeness in the IS field. An important quality aspect phrased by the change scholars, besides completeness, is the support for the change -and learning process. Design artefacts should be presented to various audiences and different adapted versions of the integral design artefact facilitate the systemic change process (Senge, 2007). This criterion is also phrased under readability and accessibility (Eijnatten in Drenth et al. , 1998.) The perception of design quality seen from the perspective of the IS -and the organizational change domain shows overlap, but also distinctive notions that are complimentary. An appropriate definition of design quality that is relevant for this study requires the integration of the contributions from the socio technical domain as well as the IS domain. The integrated list of criteria to analyse design quality includes:

1. Systemic completeness (integral perspective upon the design. I.e. complete coverage of system requirements, but also integration with social and organizational aspects)
2. Correctness (Internal and external consistency amount of errors)
3. Support for the learning and change process (accessibility and comprehensibility for different readers)
4. Acceptance (support and acceptance for the design)

1. Systemic completeness

In chapter 3 the systemic notion on the organization is introduced (§3.2, pp.103). Systemic design succeeds in explicating the different aspects of the organization including the new ES it will embrace. Systemic design treats aspects equally, but moreover succeeds in explicating the interactions between these aspects. The criterion systemic completeness integrates the socio technical perspective with the functional information system completeness criterion. It explicates the use of the systemic perspective upon the design problem, the functional coverage of the design artefact as well as the match with the envisioned implementation objectives.

It explicates if the design artefacts represent the desired functionality of the designers and organizational members in a complete and consistent way that is also in line with the predefined implementation vision (Davenport, 1998 and Norris et al, 2000). The latter is an important quality aspect as ES implementations feature an extensive envisioning phase in which objectives are defined that set the business case. Design and development claims a specific amount of freedom to let go and see where a development process will lead to, but also is specific about setting explicit objectives to guide the participants in their design and development process.

2. Correctness and consistency

This criterion explicates the plain amount of errors that are present in the designs. It also is about the consistency of the design artefacts. Internal consistency is about the designs of the individual teams that participate in the project stage. Teams focus around specific themes or entire end to end business processes, e.g. the purchasing team and materials management team. Internal consistency is about how the contributions of the individuals in one team match to each other and construct a correct end to end business process. External consistency focuses on how the designs of different teams match each other and explicates integration between these designs.

3. Support for the change process (readability and accessibility)

The design artefact is not only aimed for the expert people that deploy the ES configuration, but should serve different audiences with different backgrounds. The design is a developing artefact and plays an important role in the change process. It should include the qualities to facilitate knowledge transfer, stimulate the design experience of participants, and be comprehensible for different audiences with different backgrounds. This can imply different versioning. Finally the design or its different versions should be accessible both in format as location.

4. Acceptance

This criterion is about how the combined participants in the design teams and the organizational members receive the design artefacts. It is about how the people recognize the benefits of the new situation explicated in the design (Davis and Olson, 1985; Deleone and McClean, 2003). The design should address their desires and the relevance for their working environment (Saracevic, 1975). These aspects are bundled under the notion of acceptance for the design (Venkatesh et al., 2003).

Research methods:
These four criteria are analysed via three different research methods during the 14-month case study; interviews, document inspection and a survey after acceptance.
Figure 81 shows the deployment of these methods. Pane A shows the assessment of acceptance for the design by the line organization. The results from an internal survey on acceptance, organized by SPEER around May 2005, are compared to the UTAUT acceptance items (Venkatesh et al., 2003) surveyed at t2 (December 2005). Secondly by interviews with different members from the line organization the perceptions of readability and accessibility of the designs is explicated

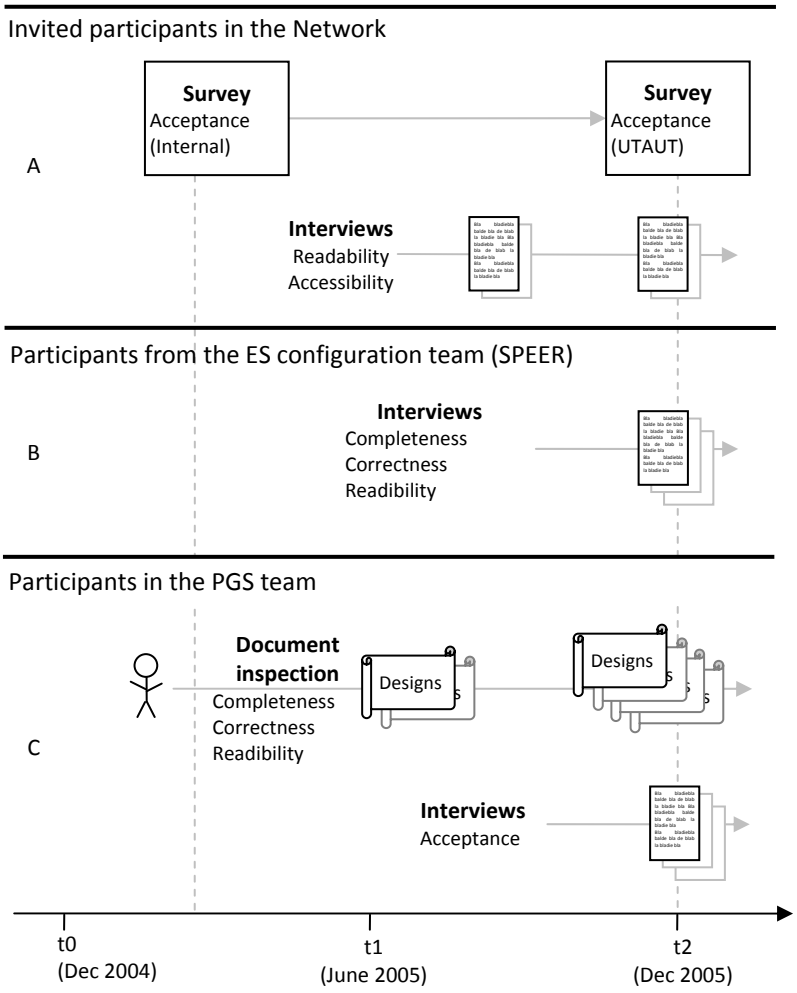


Figure 81 Research methods and population to analyse design quality

Pane B shows how the designs are analysed after correctness, readability and completeness. This is deployed via interviews with members from the Configuration team and SAP consultants. The expert opinions are collected around t2 as most designs are complete.
Pane C shows how the team members themselves reflect upon their creations. Acceptance is assessed by short interviews to assess if the team members are equally satisfied with the final design proposals. Secondly the correctness, readability and completeness of the designs is analysed by the researcher himself through document inspection.

7.2.2 *Effectivity of ESiOD: Competence increase*

Personal development and competence increase are explicated extensively in sections 3.2.3 and 3.2.4 (pp. 114- 117). The connection between personal development and competence increase, relevant in today's professional working environment is shown in Figure 33, pp. 120. ES*i*OD aims to achieve individual competence increase by extensive participation in different social settings and mutual sensemaking processes. In chapter 3 the process -and outcome properties of development in general and competence increase in particular are explicated. Schuiling (2001) derives a model from social -and clinical psychology and organizational science that assesses competence increase during the organizational change process. The notion of acting or the individual's behaviour is used to connect personal development with competence increase. Acting is defined as the person's actions from the perspective of the actor himself. The acting or behaviour can be discerned in three aspects: the activity, the story and the finding.
First there is the *activity* itself. A person acts or behaves in interaction with his or her environment. Behind each action there is a *story* or narrative in relationship with the person's intention. People have both the abilities and the needs to verbalize and justify their actions (Rogers, 1961). And finally there is the *finding* of the person in relation to its actions. People test if their actions help to realize their intentions, recognize themselves and behove emotionally. The three aspects in the perspective of andragogy can be named the technical, narrative and affective dimension (Nijk, 1978 Schiefele and Pekrun, 1996). Table 16, pp. 142 summarises this three layered model to assess the competence increase of the participating members. In this research the three dimensions are deployed as follows:

The technical dimension
The technical dimension describes *the person's abilities to realize intentions*. This dimension especially is about the knowledge, skills and arts to achieve something. To asses this dimension very specific settings can be validated with dedicated skills test. A more appropriate and for this research relevant applicable instrument can be found in the theory of self efficacy. The concept of self-efficacy lies at the centre Bandura's social cognitive theory (Bandura, 1986), which emphasizes the role of observational learning and social experience in personal -and consciousness development.

Self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave. Such beliefs produce these diverse effects through four major processes. They include cognitive, motivational, affective and selection processes (Bandura, 1986). Based on the social cognitive learning theory a standard and wide used psychometric self efficacy questionnaire has been developed to assess the self efficacy on various measures (Bandura, 2001).

Research method for the technical dimension

Based on Schuiling (2001) and Bandura (2001) self efficacy is investigated in this study by a specific questionnaire that uses 13 items. Table 58 shows the items and a summarized explanation for each item respectively. Items 1-7 are created by the researcher based upon change competences in general and specific competences in the perspective of performing and also facilitating the design -and development process. It includes for example the skills to craft qualitative designs (item: designing), but also facilitating collaborative design workshops and letting go of personal favoured expert opinions (item designing and developing). The items 8-12 replicate items of Schuiling (*) (2001) and Bandura (**) (2001).

There is a minor difference between the questions of the team members and the team leaders. Team leaders are expected to be able to create and understand designs, but this is not one of their main tasks. The design task is one of the main tasks of the team members and therefore the item *designing* is refrained from the team leaders and change consultants' questionnaire. This item is replaced by team management items from Bandura. The respondents are requested to complete the questionnaire on three different moments in the project stage. t0= December 2004; t1= June 2005; t2 = December 2005. This enables to assess the competence increase on the technical dimension. The recent self efficacy questionnaire deploys a 10 point Likert scale (Bandura, 2005).

The use of Likert-type scales is often discussed among researchers because it is, in a purely statistical sense, categorized as a nonparametric ordinal scale, but in behavioural research it is commonly treated as a parametric scale, similar to an interval scale. An ordinal scale does not indicate the exact difference between the points on the scale. When researching beliefs and attitude it is difficult to define the exact distances between the points. It can be presumed that the distance between, for example, points 1 and 2 describes a similar difference in the phenomenon under examination as the difference between points 6 and 7.

In particular, when distances between the points are proposed to be regular, the scale reminds one of an interval scale. In this research, which is related to respondents' attitude and beliefs, the Likert-type scale is treated as an interval scale.

The self efficacy questionnaire is distributed among the two micro perspectives in the PGS; the purchasing and materials management team. A total of 23 respondents have returned the questionnaire from the total population of 30. The differences in SE items are analysed by a paired T-test.

	Team members	*Team leaders & change consultants*	*Item Explanation*
1	Specifying competence	Specifying competence	Is the ability to discuss and specify necessary behaviour and competences in the future working situation
2	Networking	Networking	Is the ability to create new social networks
3	Explicating problems	Explicating problems	Is the ability to facilitate people in explicating current issues they perceive in the working situation as driver why to change
4	Janusian Thinking	Janusian Thinking	The ability to facilitate participants in taking extreme opposite perspectives in a discussion and reflect upon it
5	Process Vision development	Process Vision development	The ability to guide participants from concepts towards different versions of process visions. E.g. different ways to organize a part of a business process.
6	Designing	Team management**	Is the ability to craft qualitative good designs / the ability to effectively manage and facilitate the team
7	Designing and developing	Designing and developing	Is the ability to alternate between functionalistic and interpretative paradigms during the design process
8	Act assertively*	Act assertively*	The ability to stress one's distinctive features
9	Create space *	Create space *	The ability to act according to one's own desires and belief
10	Setting limitations*	Setting limitations *	The ability to be conscious on own capabilities and its limitations
11	Cooperate**	Cooperate**	Is the ability on how the individual thinks he can effectively work together in a group of people (individual perspective)
12	Collective SE **	Collective SE**	Is the ability of the team to be effective as a group of people (team perspective)
13	Emotional Intelligence	Emotional Intelligence	[13] Is the ability to put into perspective personal feelings and the experience to give emotions a place

Table 58 Overview of the investigated self efficacy items

The sample size is relatively low, but meet the necessary requirements. All dependent variables from the items have been checked on normal distribution properties by inspections of the normal distribution plots as well as quantitative using the Kolmogorov-Smirnoff test. Table 106, pp.493 in the appendix shows the reliability analysis using Cronbach alpha. All values are above 0.6. The actual results for the technical dimension are presented and explicated in the respective sections 7.3 and 7.4 for both micro perspectives.

[13] Emotional intelligence is included in the self efficacy survey, but also relates to the analysis of the affective dimension

The narrative dimension

The narrative dimension is about the stories behind the people's actions. It is about formulating, ordering, considering and choosing the intentions. It verbalizes the actions tenor. There are different concepts to explicate the narrative dimension.

Schuiling deploys the openness to experience concept (Rogers, 1961; McCrae, 1987). In Rogers' personal development theory openness to experience is defined as path towards consciousness development in which the individual gradually is able to listen to himself and reflect upon his thoughts, experiences and intentions. This concept can be deployed in bilateral interview settings or small groups where participants are stimulated to freely reflect upon mutual experiences (Motschnig-Pitrik & Mallich, 2004).

The kaleidoscopic openness to experience concept can be enhanced with a more cognitive and instrumental perspective called cognitive schemata or frames (Zajonc and Markus, 1982). The schemata concept stems from cognitive psychology and socio-cognition and is operationalized in the orders of change theory (Bartunek, 1983; La Bianca, 2000). It especially focuses on peoples thinking based on prior values, experiences and norms. Schemata incorporate specific attitudes (values) and cognitions (thoughts and knowledge). The shift in cognitive scheme indicates the consciousness development of involved participants upon a specified subject. This shift is one of the fundamental starting elements of widening the individual openness to experience and self reflect upon the professional position in the organization.

Both theories have their limitations, but in combination elegantly enhance each other. The openness of experience theory by Rogers via self reflection of different participants results in rich, but sometimes also less comparable research results. On the other hand the emphasis in the schemata theory is on the cognitive representation of peoples thinking in structures, stereotypes and or scripts. This can be deployed in more biased and comparable research results via mapping or comparing predefined structures. Surveys are an often used instrument in the latter situation. This is beneficial as extra investigation instrument to enhance the varied and rich interview results of the participants.

Research methods for the narrative dimension

Both above described concepts in the narrative dimension are used as research method during the project stage. This includes interviews and schemata elicitation

Interviews

Openness to experience requires a small scale and free format setting. During several interviews participants are questioned in an open setting and asked to reflect upon their actions sometimes accompanied with an example from observatory findings. The free format setting requires a structure in interview deployment and interview responses. This is operationalized as follows:

The interviewees are categorized after their role in the development organization. For each role a minimum of two participants per team is interviewed on at least two different moments throughout the design stage between t0 and t2. The interview is performed in the openness to experience setting as described by Rogers (1961).

This implies no formal structure, but a deliberate open attitude towards the respondent's experiences. The interview results are structured for the different roles in the respective project teams by classification and clustering (Miles & Huberman, 1994). The developments on this narrative dimension are first explicated by the changes in these clustered interview responses over time.

Schemata elicitation

The schemata elicitation is structured around a survey deployed twice at t1 and t2.
The used research instrument is pair wise comparison (Mohammed et al., 2000; Hodgkinson et al. 2004)). This method requests respondents to reflect upon statements that contain opposite items that are presented in an arbitrary mixed format. The items concern the participant's perspective upon their specific working situation, the change process and ES specific items. Pair wise comparison enables to inspect shifts in cognitive schemata as indication for the 2nd order change process.
The surveys are structured around two themes; the influences of integration (1) and the use of standards (best practices) (2). For the purchasing and management materials two specific sets of 12 statements are created by the researcher and two content matter experts. A replication of this study can be found in Schimmel (2007).
The respondents score on a 5 point Likert scale (totally disagree, disagree, neutral, agree, totally agree). The contrast between these statements is based upon the existing situation within MINDEF and the future vision specific for the respective teams (purchasing and materials management). The questionnaire is employed among the team members as well as the participants from the network before the first workshop at t1 and after the last workshop at t2.

The affective dimension

Change theorists in general have a strong cognitive orientation (e.g. Schein,1980; Argyris, 1990, 1993). However, many scholars have stressed that organizational behaviour and change are strongly influenced by emotions and social relationships (Bartunek, 1993; Gersick, 1991; Lazarus, 1991; Frijda, 1996; Huy, 1999). Emotion is inseparable from the cognitive process, playing a central role in perception, decision and behaviour (Damasio, 1994, Fiske & Taylor, 1991). This is definitely the case when the individual's well-being is at stake (Lazarus, 1991) or people take part in a difficult change process (Bartunek, 1991). In change processes people ask themselves whether the new situation is a threat or a benefit to their personal well-being. If change recipients evaluate the potential consequences as harmful, they are likely to be non receptive to change, but if they see it as a challenge they will be better attuned (Huy, 1999). Emotional receptivity influences the concrete actions taken by a person in the direction of change.
The affective dimension in competence development concerns *the abilities to shelter ones actions* and is about loving its acting and behaviour. This dimension explicitly is not about the daily alternating moods or emotions (Schuiling, 2001). It is about the fundamental state of mind perceived by a person during the change process. Schuiling compares this dimension with movements in the score of music.

The affective dimension is not about swiftly changing melody lines or the harmonics or dynamics in the score, it more resembles the tonic in a piece of music being it minor or major.
The affective dimension explicates how people perceive the change process, but it also includes the development of how people reflect upon their emotions and give meaning to these feelings. Emotional intelligence is a bridging concept between give meaning to emotions and understanding the affective dimension.

Research methods for the affective dimension
The used instruments for the affective dimension are a questionnaire on t0 t1 and t2 and the combination of participant observation accompanied with short interviews. Expressions of emotions (fierce, flat, angry, happy, inspired, negative, ..) are recorded during the different sessions and workshops throughout the design stage. If possible the observations are checked and accompanied with short interviews with the members of the development organization on their respective feelings with respect to the project and the change process. In the self efficacy questionnaire emotional intelligence is investigated (Table 58, pp.329) and secondly the mood perceptions of the participants during the project stage are questioned using a graphical mood model developed by Schuiling (2001). Figure 82 shows the applied model, whereas Table 59 shows the accompanying affective representations. Participants are questioned to categories their perception on the change process by selecting the graph that best matches their evaluation. This is deployed twice at t1 and t2.

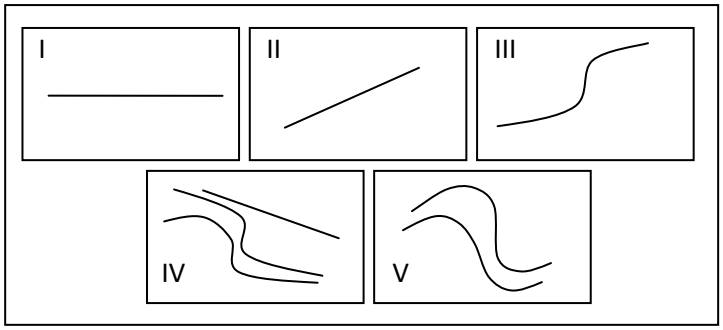


Figure 82 Mood score model (Schuiling, 2001)

I	Indifferent
II	Steady Growth
III	Accelerated growth
IV	Downward
V	Recovery of balance

Table 59 Affective perceptions upon the change process by the participants

Competence increase
Competence increase during a change process not only means the improvement in one of the three dimensions respectively, but moreover an increase in a person's consistency between these three dimensions. Organizational members experience personal development if they act based upon skills, ambitions and experiences, while their actions are in accordance with their emotional findings and intentions (Nijk, 1976; Schuiling, 2001; Huitt, W. 2006).

Deployment of research methods
In §6.2.2 (pp. 241) the distinction is explained between initial PGS and the network as collection of invited participating members from the line organization. The initial PGS members are mostly full time deployed in the design and development process. Therefore they are expected to experience a significant competence increase including the incorporation of new matching behaviour.
The invited participants in the network in a lower extent are employed in the change process. They are expected to show knowledge increase and experience reframing of cognitive schemata. The latter represents the incorporation of a new understanding and valuation relevant to the new information system, working situation and organizational setting.
This distinction is continued in the product evaluation. Competence increase for the purchasing -and the materials management team is analysed with the complete competence increase model in three dimensions. This is explicated in micro perspectives 1 and 2 in sections 7.3 and 7.4. In short this encompasses surveying, participant observation and interviewing.
The network participants (micro perspective 3 in section 7.5) are assessed limitedly using cognitive schemata elicitation as measure for reframing cognitive schemata.
Figure 83 and Table 60 show the different research methods deployed in product evaluation.

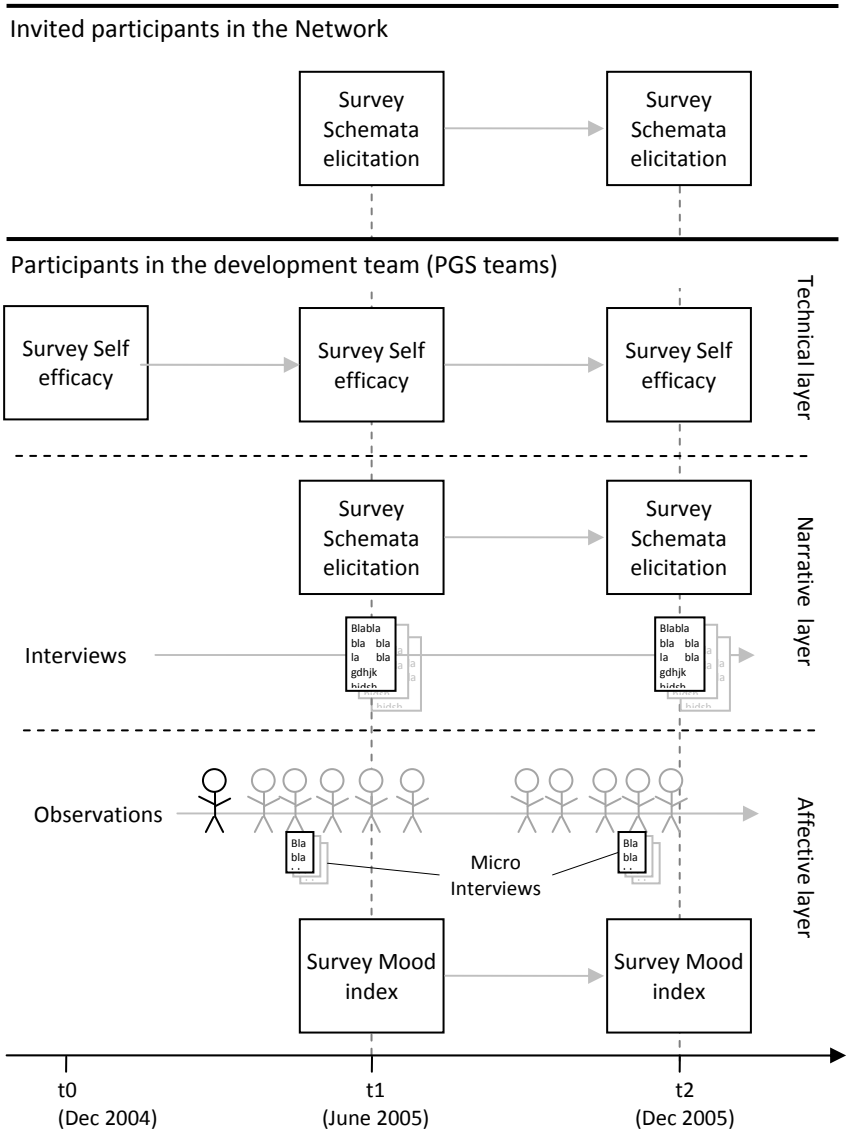


Figure 83 Research methods and population of assessment on competence increase

Research Topic	Research population	Research methods	Explanation of deployment	Items	Timing
Technical layer	1. Purchasing team 2. Materials management team	Survey	Self efficacy questionnaire in twelve items employed at	12 SE items based on items of Schuiling (3) and Bandura (4)	t0, t1 and t2
Narrative layer	1. Purchasing team 2. Materials management team	Interviews and observations	Semi structured interviews	interviewees reflecting on intentions, experiences, and actions	Repeatedly after t0, t1 and t2
	1. Purchasing team 2. Materials management team 3. Network participants from both teams	Cognitive schemata	Pair wise comparison of statements reflecting old versus new thinking (Mohammed et al. 2000)	Purchasing team 12 specific purchasing statements Materials management team 12 specific statements	Twice at t1 and t2
Affective layer	1. Purchasing team 2. Materials management team	Observations and interviews	Observation on affective charged behaviour	Explication of influence of the change process on mood and feeling of participants	From t0 to t2
		Mood index	Assessment of mood via 5 different mood indices after Schuiling 2001)	Imperturbable, continual growth, accelerated growth, declining, balance recovery	At t1 and t2
		Survey	Self efficacy of Emotional intelligence		t0, t1 and t2

Table 60 Product evaluation (evaluation of the effectivity of the IOD approach (competence development)

7.3 Micro Perspective 1: outcomes of the Purchasing team

In this section the outcomes of the purchasing team are analysed. First the teams' design quality is assessed, followed by the competence development of the team.

7.3.1 *Content analysis: Design results*

The results of the teams are assessed from interviews with experts during the use and employment of the designs. The interviews are held in separate moments in time during the configuration and testing stage in the year 2006. Secondly the designs are inspected by the researcher. The design content is analysed after:

1. Systemic Completeness
2. Correctness & Consistency
3. Support for the learning -and change process
4. Acceptance

1. Systemic completeness

The results of the Purchasing team can be characterized as lean and mean designs.
From the beginning onwards the entire team opted for a simple and understandable redesign of the purchasing process that would fit the different purchasing streams in the MINDEF organization. This is realized by the following main design elements

- Standard purchasing scenario;
- Blanket ordering;
- Foreign military Sales (FMS);
- Internal purchasing services
- One single supplier's database
- Catalogue buying
- Simplified adoption of preliminary financial supervision (VFT)

The purchasing team also did not realize some specific ambitious objectives:

- Two way match
- Supplier relationship management
- Cancelling of VFT

The purchasing team realized the designs in:

- 2 Business Scenario files
- 15 Process master files

The purchasing specific content is mainly focused on process descriptions that fit into the template and explicates process steps, activities, process logic, required information -and systems and administration & control. This is a rather IS based perspective upon the process design and lacks the systemic view. In chapter 6 it is argued the offered design templates lack to support a systemic perspective (Table 37, pp. 272).

The purchasing team on the one hand thus is not facilitated to create a systemic view upon the organizational change problem. On the other hand, the team also does not excel in deploying the offered items in the BSF and PMF templates. Figure 84 for example shows an exemplary description of impact on the organization by the Purchasing team. It includes the exemplary and instructing text of the template (italic) and is only extended with the comment impact on the organization is **medium**. No extra comments are added by the team. The designs of the purchasing team reflect ordinary process and information designs. Typical softer aspects like specifying competence are not explicated in the PMF's and BSF's. A systemic perspective in the sense of explicating relationships between information system, organizational structure, skills, people also are omitted.

Impact on the organization

Describe the expected impact of the new process on the organization. This is explicated by MINDEF personnel based upon their understanding and knowledge for the existing and the new process. Describe in terms of high, medium, low and if relevant elucidate.

The expected impact on the organization is medium

Figure 84 Topic "impact on the organization" as excerpt from a BSF from the Purchasing team

2. Correctness & Consistency

An inspection by the researcher and consultants from the configuration facility shows no to only minor flaws in the internal consistency of the designs.

The external consistency on the other hand causes for more remarks. It appears touch points between the design of the purchasing team and other business processes from for example the financial and controlling team and materials management team are characterized by two issues: In a small number these touch points show minor errors. This means teams have deliberately discussed the touch point, but the connection between the two processes is wrongly defined by the purchasing team. In a slightly bigger number these touch points are defined incomplete. In this case specific elements that explicate e.g. logic, the transfer of information or activities between the touching process designs from the respective teams are lacking. One influence on these latter phenomena is the different deployment of the template structures PMF and BSF. One external consultant expresses*:*

"There is a great difference in the level of detail in the Business scenario files between the separate teams. This is a clear perspective issue. Some teams choose the BSF as concept process map to structure the detailed PMF's whereas other teams make BSF's already rather in depth process charts in which PMF's play a single part. This should have been harmonized in an earlier stage."

This is a property that can be seen throughout all team results, but the Purchasing team is not the worst example. Their designs are transparent and understandable, but sometimes lack the specific detailed information on master data and also important sometimes a lack of interfacing with other process master files is still present.

3. Support of the learn -and change process

The designs and also the design process of the purchasing team can be described as participative, simple and the results as lean and mean. The purchasing team on purpose continuously favours accessible and understandable designs both for the different members of the team as well as the network members. This facilitates the knowledge exchange and mutual understanding significantly. But this approach also has its reverse side. It results in clear und readable process designs that sometimes lack in depth specifications. These latter specifications are necessary for system configuration but also organizational issues that are important for the training, development and reorganization process during or prior to the migration stage. The latter aspect is also criticized by the network members from the line organization. These participants in general are positive about the way of working and design outcomes from the purchasing team, but criticize the lack of specific details. One respondent from the line organization states:

"The basic line of reasoning can be recognized, but it is also about the nasty details. A lot of such details are not yet explicated. It is like the team has sketched the outlines of the business processes, without daring to explicate specific choices in detailed questions or problems."

This issue causes for some rework during the beginning of 2006 after which the designs are delivered with mutual satisfaction from the configuration team and the line organization.

4. Acceptance

Acceptance in this section is assessed from the perspective of the team itself. The participants from the line organization that are related to the purchasing process are positive on most design decisions, but this research outcome will be explicated in depth in the respective micro perspective 3, section 7.5. The purchasing team is coherent in its vision and design objectives. From different interviews with the team members it is shown that there is unanimous support for the several designs. This unanimous opinion also is present in the somewhat disappointment about the achievements. The disappointment stems from 2 sources: First the purchasing team feels it could have created more advanced designs. It is aware that the team has a significant head start in knowledge over the line organization, and therefore ambitions or specific items are a bridge too far.

Secondly the team also feels held back by the project management team and decision makers from the network as specific topics like SRM could have started with already. But it is decided to leave these options to a later stage in the project.

7.3.2 *Structural developments in the team*

During the 12 months the purchasing team does not experience significant structural changes. It slightly changes in its team composition. After the summer break one extra SAP consultant is added to the team. Two team members leave (one civilian and one from the air force). This is compensated with the addition of one military member from the air force in September 2005. There is no initiative at the team level to rearrange roles or functions of team members during this period. There is also no initiative at the project level to exchange members from different teams or reorganize the teams.

The first line network of the purchasing team approximately consists of 80 people that actually take part in the several workshops. During the 12 months there is no formal change in the organizational structure of these participants or their organizational units. The formation of the centrally Defence Material Organization (DMO) is initiated just prior to the start of the project, but this and the purchasing workshops mutually influence relationships and collaborations between the participants. The participants in the network report improved understanding and collaboration between the different force units and also the increase of social networks that are not present before.

7.3.3 *Competence development by the team members*

This section will in detail describe the competence development of the team members using the three different measures as explicated in section 7.2.; the technical, narrative and affective dimension. The outcomes of these three dimensions first will be presented separately after which the combination is discussed as final analysis for the competence development of the entire team.

1. The technical dimension

The technical dimension is assessed by the self efficacy questionnaire at t0, t1 and t2. Figure 85 shows the averages of the 13 Self efficacy items on t0, t1 and t2.

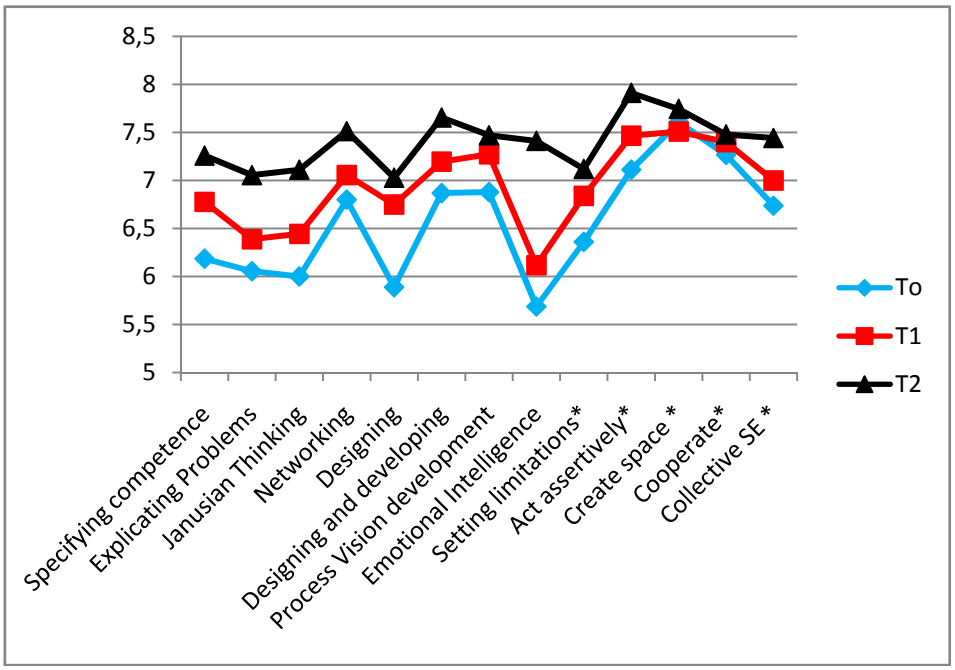


Figure 85 Self efficacy on 13 items during 2005 (t0=December 2004, t1=June 2005, t2=December 2005)

	t0	n=9	t1	n=10	t2	n=10
	Avg.	σ	Avg.	σ	Avg.	σ
Specifying competence	6,19	1,92	6,78	1,78	7,26	1,51
Explicating Problems	6,06	2,41	6,39	2,40	7,06	1,76
Janusian Thinking	6,00	1,81	6,44	1,92	7,11	1,28
Networking	6,80	1,84	7,06	1,59	7,51	1,17
Designing	5,89	2,01	6,75	1,86	7,03	1,58
Designing and developing	6,87	1,90	7,20	1,58	7,66	1,05
Process Vision development	6,88	1,60	7,27	1,38	7,47	1,26
Emotional Intelligence	5,69	2,52	6,12	2,06	7,41	1,50
Setting limitations*	6,36	2,04	6,84	1,65	7,12	1,33
Act assertively*	7,11	1,72	7,47	1,36	7,91	0,97
Create space *	7,61	1,81	7,51	1,88	7,75	1,37
Cooperate*	7,27	1,78	7,40	1,66	7,48	1,53
Collective SE *	6,74	1,57	7,00	1,83	7,44	1,43

Table 61 outcomes of Self efficacy on t0,t1 and t2

By a paired T-test (Appendix pp. 494, Table 107 and Table 108) the items are compared to inspect significant changes over time. Table 62 shows the significant changes in the self-efficacy items throughout the project stage (from t0-t1 and from t1 to t2). It shows the Purchasing team reports a substantial increase in self efficacy during both periods. The detailed analysis shows the following results:

- The team perceives a stronger development in the first half of the year (t0-t1) than the second half (t1-t2).
- There is no item in which the team responds a decrease.
- The SE item 'create space' is reported indifferently during the twelve months. The results on this item can be explained by the stress and workload of the project.
- The team reports a continuous increase in their social networking capabilities. This confirms our observations that the purchasing team excelled in networking throughout the entire project.
- The data on the item *Designing* clearly shows that the Purchasing team during the first 6 months of the project increased their competence on this activity. In the last 6 months of the project the team does not report a significant increase on this item. This is logical considering the learning curve of the activity takes place in the beginning of the project and the activity does not change drastically later on.
- The Purchasing team members report an increase in their competence *to cooperate*. During the second half of the year this falls back. This is in line with our observations in which the members choose a more individual development path. The assessment of the team effectiveness (*collective self efficacy* with standard items from Bandura, 1994) show the opposite. In the first half of the year the members do not assess an increase in their team effectivity. In the second half of the year , though more individualised, the team runs on automatic pilot and the members perceive this as an increase. perceive increase of the item that increase in the last 6 months of the project.

An explanation of the discrepancy between both outcomes may be the individual perspective on collaboration in the item *to cooperate,* whereas the item *team self efficacy* investigates the team efficacy in its entirety scoping wider than pure cooperation alone. Team self efficacy is the ability of the entire team to fulfil its ambitions and does include cooperation, but also measures social characteristics like team honour, trust and being a role model for other teams.
The increase of team self efficacy after the summer pause is explainable as the team clearly succeeded to more work harmoniously together and emotional disruptions between the team members less disturbed the team process. See also the relating process observation in §6.5.2 (pp.278).

t0-t1			t1-t2		
Decrease	*Indifferent*	*Increase*	*Decrease*	*Indifferent*	*Increase*
	EI				EI
		Specifying competence		Specifying competence	
		Setting Limitations		Setting limitations	
		Janusian Thinking			Janusian Thinking
		Act assertively			Act assertively
		Explicating problems			Explicating problems
		Networking			Networking
		Designing		Designing	
		Designing & Developing			Designing & Developing
		Process vision development		Process vision development	
	Create Space			Create Space	
		Cooperate		Cooperate	
	Collective SE				Collective SE
0	3	10	0	6	7

Table 62 Overview of SE items and their changes throughout the project stage for the purchasing team

2. The narrative dimension

The narrative level is about how the personal experiences of the team members impact their work and motivations. This level is analysed via:

- Openness to experience interviews (accompanied with observations) (2-1)
- the assessment of the shared schemata on t1 (May 2005) and t2 (December 2005). (2-2)

2-1 "Openness to experience" results from Interviews

During the project stage nine Purchasing team members are interviewed in an open interview setting in which the interviewees reflect upon their experiences, motivations and their actions. The interviews are unstructured to sometimes semi structured and request the participant to reflect upon the essential experiences during the project and also their personal intentions. The interviews were from variable length depending upon the relevant or new contributions from time to time by the respondents. Three time windows can be distinguished that match the period around the self efficacy measurements.

Around t0

A start that is reported by most respondents as easy going , but perceived mostly enthusiastic with a lot of room for gaining knowledge and learning new skills.

> *New way of working is interesting, but difficult and challenging. I really need to put much energy in releasing old habits.*

> *To me this is just a new job. It is the logical next thing in my career. I try to gain new knowledge and insights, but I will not do this forever.*

Around t1

There is a distinction in the group of interviewees between enthusiasm and more tempered reactions. Approximately 50 % of the interviewees feels motivated and is trying to perform their actions based on reflection of their personal experiences. The other half is 'just' reporting mixed experiences (both positive and negative) without the explicit reference of their reflections and actions.

> *This is really nothing new, except that we call it "Design and Development". But it still comes down to the same old power games within MINDEF. Yet it is still interesting to see how all involved struggle to break this habit by this large participation efforts*

This group of respondents is in most occasions is not able to refer their actions to a specific driver or intention. The main actions by the respondents are categorized as typically networking, deploying workshops and designing.

I actually have been doing information system design and testing but my experiences up to now are new and interesting. I try to get as much out of this approach and way of working. I receive a lot of freedom and sometimes even feel left alone, but this encourages me to make the best out of it

Around t2

At the end of the project stage, 6 respondents still are motivated and intend to continue. Five of them do have a repetitive perception of their experiences over the year. For two other respondents it is time to start something different.
There is a positive image on personal development as interviewees report to have learnt personally (3), about the MINDEF organization (3) and considerable new skills (6). The image of the projects achievements is less positive as 5 interviewees feel more could have been accomplished by the entire PGS project. During the last months of the project the respondents put a lot of time in self employment and personal development

I continuously gain more and more interest in the change issues. This is definitely one topic that I will continue with.

This is rather different than my work before. In the beginning I thought it to be very interesting, whereas after 6 months the magic new impression vanished a bit

The narrative development is explicated for the entire team by classification and clustering of the interview results (Miles & Huberman, 1994). Table 63 shows the characteristic clusters for the essential motivations, experiences, and actions during three time windows. The items are created after clustering and counting the individual statements in the respective interviews. In some cases similar statements are made by different singular respondents so that the sum of counted statements is larger than the total of different respondents. This shows congruency in the statements between the respondents. Summarized the three stages can be characterized as (including exemplary statements from interviewees)

	t0 (Jan 2005- Mar 2005)		*t1 (May-July 2005)*		*t2 (Nov 2005-Jan 2006)*	
	Characteristic	**N**	**Characteristic**	**n**	**Characteristic**	**n**
Motivations	Ready for a new start	1	See where we can go. We all need to put energy and effort to get the train rolling	3	This tends to be much of the same	5
	Enthusiastic to play an important role in the change process	5	Still enthusiastic, but wiser. It will not go as swift as expected.	4	Ready for something new	2
	Expectant / We will see	3	This is a rather difficult way to implement a new system	2	Definitely will continue in the project	6
Experiences	Learning a lot of new things	7	Having both difficulties but also pleasant results	5	Bit disappointed overall. Not on the own team itself. But overall More could have been achieved	5
	Extending prior experiences	1	learning some new things about our actions and their impact	1	Have learnt a lot on the MINDEF organization	3
			Notice our typical weak points	3	learnt considerable new skills	6
			Developing? Maybe. We are not sure	3	learnt a lot about myself	3
Actions	Application of new skills	4	Building Bridges between network participants	5	Self employment/ Self development	6
	Making new friends and relationships	2	"Work shopping"/ Organizing sessions	6	Preparing for the next thing, but outside this project	2
	Beginning a bit slow	4	Designing	4	Continuing but keep on improving	2
	Gaining knowledge	7				

Table 63 Clustered and counted statements by the Purchasing respondents around t0, t1 and t2

2-2 Pair wise comparison of cognitive schemata

Table 64 and Table 65 show the results of the pair wise comparison at both t1 and t2 for the purchasing team. A paired difference T-test between the matched pairs show that the purchasing team members tend to adopt the new schemata at t1 (April 2005).

The Purchasing team respondents value four new schemata significantly higher over the old schemata at t1.The first and fourth statements that are both related to pricing show no significant difference (Appendix, pp. 498, Table 111 and Table 112). There is no significant difference between t1 and t2. Paired difference analysis for old and new schemata are the same on t1 and t2. The results give a good indication that the purchasing team members incorporate the new thinking on the purchasing process, but pricing is still a sensitive item.

Item (Integration) ***Questions (3)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
Our purchasing philosophy should be based upon integral cost pricing.		3,8	0,8		4,0	0,7
Mutual benefits can be achieved by a good cooperation between supplier and client		4,2	0,7		4,4	0,6
The benefits of a joint purchasing process can be realized in various organizational structures and settings, but require a tight collaboration between purchaser, planner and financial controller.		4,1	0,7		4,2	0,7
Totals		**4,03**	**0,73**		**4,20**	**0,67**
Valid n	11			9		
α	0,69			0,71		

Item (Standards/Best practices) ***Questions (3)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
The use of graduated discounts in framework contracts can lead to comparable price conditions of blanket order contracts		3,3	1,0		3,4	0,7
Process integration can improve both legitimacy and efficiency of the purchasing process.		3,9	0,8		4,0	0,7
Effective purchasing requires one dedicated master data of supplier information		4,1	1,0		4,2	0,9
Totals		**3,77**	**0,93**		**3,87**	**0,77**
Valid n	11			9		
α	0,74			0,69		

Table 64 Results Purchasing team at t1 and t2 on new schemata propositions

Item (Integration) ***Questions (3)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
The leading principle in our purchasing organization is too attain the lowest price.		3,3	0,9		3,6	0,8
If customer and supplier initiate a negotiation process it will result in a "zero sum game" (One wins the other losses and vice versa).		2,1	0,8		2,2	0,8
A central and independent organized purchasing function leads to the best creation of 'buying power'.		3,1	1,2		2,6	0,9
Totals		**2,83**	**0,97**		**2,80**	**0,83**
Valid n	11			9		
α	0,70			0,74		

Item (Standards/Best practices) ***Questions (3)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
Blanket ordering offers more opportunities for pricing negotiation than framework contracting		2,7	1,0		2,8	1,0
A legitimate way of working requires a 100% control of all invoice lines.		2,7	1,0		2,5	1,0
Effective purchasing requires the ability for the autonomous creation and management of vendor data.		2,8	1,1		3,4	1,0
Totals		**2,73**	**1,03**		**2,90**	**1,00**
Valid n	11			9		
α	0,67			0,63		

Table 65 Results Purchasing team at t1 and t2 on old schemata propositions

Analysis of the narrative dimension

The narrative dimension explicates people's experiences, their personal reflection upon these experiences and how they put these into actions. In this specific research it is combined with the investigation if these experiences have a significant impact upon the respondents thinking (cognitive schemata) around their specific design topic.
The interview analysis shows that the experiences by the respondents in many occasions are perceived similarly. This can be explicated by the teams' characteristic of doing many things as a group. The respondents go through the same things (discussions, meetings, workshops, etc.). The reflection on the personal experiences on the other hand differs for the individuals. It depends upon the situation in personal life (age) and prior (work) experiences. Some respondents phrase their experiences result

in knowing more about the organization they are working for. Others report a similar knowledge increase, but also indicate personal growth and self learning experiences by trying out doing things differently than before. The unanimous knowledge increase and different way of thinking on the purchasing process is confirmed by the results in the schemata elicitation survey.

3. The affective dimension

This layer is assessed by the emotional intelligence item in the self efficacy questionnaire, observations during the process and the respondents affective perception of the entire change process assessed on t1 and t2 with the personal growth curve of Schuiling (2001 Also partly results from the interviews, deployed for the narrative dimension, are used as affective experiences in some interviews are addressed that illustrate or enhance process observations.

The team members have difficulties with the emphasis towards the development approach initiated by the change consultant and team leaders. During the first 6 months this occasionally caused emotional eruptions by single team members and conflicts in the team. Three team members in interviews express difficulties and state this explicitly influences their enjoyment in work. The other interviewees truly report the difficulties during the start up phase, but partly ascribe this to the messy beginning within the entire PGS and also as just a new and different way of working they are not used to. There are three interviewees that perceive this start up process as challenging and interesting.

The team is especially challenged in exciting stages like workshop preparation and performing the workshop. In the beginning number of these workshops the typical valley of tears can be recognized. This means respondents go through a period of difficulty and sometimes intense emotions but this finally results in satisfaction and personal growth afterwards. The change consultant reserves extensive time to reflect on sessions and let emotions express or cool down. The team takes moderate time for informal gatherings and there are also several humorous moments when the group increased to work collectively. The item emotional intelligence (see technical layer) shows a significant increase after the summer break. The purchasing team from that moment on is less tensed before and during the workshops and succeeds in a self confident employment without being blasé.

Table 66 shows the results from the growth curve questionnaire (Figure 82, pp.332). The majority of the respondents report a growth and there are no reports on declining perceptions.

		t0-t1	t1-t2
I	Imperturbable	2	1
II	Continual growth	2	
III	Accelerated growth	4	7
IV	Declining		
V	Balance recovery	1	1

Table 66 results affective layer from the Purchasing team

4. Competence development as combined notion of the technical, narrative and affective dimensions

On the technical level (the abilities and capabilities of the team members) there is a significant increase of several items during the entire 12 months. This set is accompanied with various items that alternately show an increase or are indifferent. The number of indifferent items is larger for the second period t1-t2 and this can be recognized in the findings from the narrative and affective dimension.
The narrative level shows individual differences on the motivation (conation and willing) and the openness to experience (actions and refection upon actions). Two groups can be characterized within the purchasing team of which the first is the significant larger one.
This group clearly shows affinity with the change process, the related content. In a substantial amount of sessions these group members really try out different behaviour during workshops or in the team itself. There is a congruency between their motivation and effort in reflection upon their actions. A second significant smaller group states a rather indifferent or sometimes even nonchalant attitude. This latter phenomena increases after t1 towards t2 and replicates the lesser Self efficacy increase during that period. This can be explained by the less motivation and perception of less challenging assignments.

The cognitive schemata is assessed on the team level and shows a significant change between t0 and t1 for the entire team. This change resides but does not change significantly towards t2. The knowledge increase and incorporation of new cognitions and attitudes is already successful between t0 and t1.
The affective layer shows eruptive emotions and experiences in the first half of the process. This is especially caused by the team members that in the beginning lack knowledge and conation, whereas the team management and change consultant forced them into this way of working with a ‘soft hand’. By this deployment most team members try out “new” things and after a while start experiencing beneficial results in the workshops. This results in more comfortable perceptions after the summer pause. The larger part of the team reports a positive perception of the change process in its entire perspective.

Competence development is the convergence of technical, narrative and affective layer. Based upon these results the majority of the Purchasing team members meet these criteria in the second half of the process. In the beginning of the process most team members shows difficulties with the content, but especially with the alternating design and development way of working. Being confronted to organize and facilitate most workshops and sessions by themselves was not trained as the SAP and design skills.

This sometimes in the beginning caused for uncomfortable situations and perceptions by the respondents. First after a couple of such experiences most Purchasing respondents felt more and more at ease in this setting and were able to realize their ambitions also based upon their newly learned skills and knowledge.
Still this doesn't count for the entire Purchasing team as single respondents still perceive the design and development method as annoying and sometimes ineffective. They nevertheless report an increase in their skills, but have a less positive feeling on the experienced process.

7.3.4 *Conclusions*

The prior results can be put into the perspective of the process evaluation of chapter 6. In 6.5 the deployment of ES*i*OD by the purchasing team is explicated.
It is argued that the team, influenced by the team leaders and change consultant, but also by the team's composition, favours an emphasis for the development approach.
This means a loosely coupled organization of the team, a mostly interpretative perspective upon the process and in most cases also the intention for a multi paradigmatic perspective upon the design content. The latter gradually changed during the process from a mere functionalistic perspective towards the alternation between interpretative and functionalistic perspective.
This way of working can be recognized in the outcomes. The design quality in some occasions is inconsistent or incomplete. This is improved with rework after t2. The use of the design artefacts to facilitate the change process is reasonable and improves during the project, especially around t1. This is reflected by the use of the design artefacts in the different workshops and the improvements in accessibility towards the line organization.
The way of working shows its benefits in the development of the team itself. There are singular team members that do not report a significant progress and perceive the project as just another project. But the majority of the team members reports an increase in skills and knowledge, but especially a congruency between how they feel, act and reflect using this knowledge.

7.4 Micro perspective 2: The materials management team

7.4.1 *Design quality*

Again from the interviews with consultants and experts from the configuration team in the configuration factory and the assessment of the first prototype the following evaluations considering the design quality come up:

1. Systemic Completeness
2. Correctness & Consistency
3. Support for the learning -and change process
4. Acceptance

1. Systemic completeness

The Materials management from the start on strives to standardise and integrate the different ways of provisioning, transportation, and materials handling of four different forces. This is a complicated and extensive assignment and originally organized via three sub teams. The team creates extensive design documentation with a focus on the process logic that includes the following main design elements:

- materials management & handling,
- storage and warehousing
- shipping and planning of transportation
- planning and supply chain management
- Master data

The materials management team structure the design in 47 Business Scenario Files
57 Process Master Files. This represents an extensive amount of design documentation and also the deployed distinction between BSF's and PMF's differ from the purchasing team. The impact of this design structure will be explicated further on.
The designs focus on event driven process chains and again are scarcely accompanied with organizational or even behavioural aspects. Figure 86 shows an example of how impact on the organization is explicated in a Materials management PMF.

.....
Impact on the organization
- Implementation and realization of standard warehousing structures -and numbering has a large impact on the organization.

Personnel aspects
-
.....

Figure 86. An example of the explication of organizational affairs in a PMF

It includes the exemplary and instructing text of the template and is extended with the comment on impact on the organization. In this case this is large and no extra comments are added by the team, although the template offers space for additional information on personnel
The materials management design content is mainly focused on process descriptions that fit into the template and explicates the logic, process steps, activities, required information, relating systems and the necessary administration and control. This incorporates the same IS based perspective upon the process design as the purchasing team and lacks the systemic view. Considering the systemic completeness there are not many differences between the management materials or purchasing team designs. Both deploy the offered design templates that lack to support a systemic perspective (Table 37, pp. 272). A systemic perspective in the sense of explicating relationships between information system, organizational structure, skills, people also are omitted.

2. Correctness & Consistency

An inspection by the researcher and consultants from the configuration facility shows an extensive amount of flaws in the internal consistency of the designs. The designs to some extent are better detailed than other teams (e.g. Purchasing), but at the expense of mistakes. The amount of mistakes and rework after the first prototype is extensive (status beginning of 2006). The Materials management process designs are number two in the rework and redesign list (runner up after the financial team). This is merely caused by the combination of the extensive design assignment and the deployed complex SCOR structure (§6.6.2, pp. 292).
The external consistency is confronted with comparable issues to the purchasing team. Touch points between the design of the materials management team and other business processes of the purchasing team are characterized by two issues: In a small number these touch points show minor errors. This means teams have deliberately discussed the touch point, but the connection between the two processes is wrongly defined by the materials management team.
In a slightly bigger number these touch points are defined incomplete. In this case the connection between process designs is incomplete and parts are missing for a complete coverage of the process logic or information transfer between both designs. One influence on these phenomena is the different deployment of the template structures PMF and BSF. One external consultant expresses*:*

"The extensiveness of the design documentation complicates readability and it takes a deliberate amount of time to get into the process designs even for experienced readers. This is caused by the deployment of the SCOR model, but also due to the comprehensiveness of the teams' scope.

3. Support for the change and learning process

As stated the design of the materials management team is structured in an extensive and equal structured amount of :
47 Business Scenario Files
57 Process Master Files.

This is significantly more than the Purchasing team and also the design structure differs significantly. The purchasing team makes a clear distinction between the two. It chooses to create a low amount of business scenario files with a larger number of detailed related process master files. The Materials management team also perceives the PMF's as a detailing derivative of the BSF, but from the start take a more detailed scoping on the business scenario files. This results in the more complex overview and the large amount of single process designs. It marks the hard work of creating an extensive amount of single detailed process designs

The designs and also the design process of the materials management team can be described as complex, extensive and especially based on an expert approach in which participants are well informed and sometimes consulted.
The Materials management team chooses a rather inaccessible framework to structure their designs. Some detailed aspects do not fit the SCOR model well due to the difference between the MINDEF organization and a generic commercial organization.
The amount of process files is overwhelming (pp.298) and it is difficult to keep overview.
The network participants have great difficulties in understanding the designs, but also one third of the Materials management team itself acknowledges that the SCOR model is inappropriate to service the design process. A quarter of the Materials management team still has difficulties to employ the model during the RSW sessions in October and November 2005.

The materials management team is confronted with a backlog and works hard to attain the deadline of December in 2005. This is not fully accomplished, but due contractual disagreements with implementation partners the team receives more time and finishes its work in the first months of 2006. During this phased no official collaborative sessions are deployed, but the results are shared with a selected set of participants from the line organization via the web based content system.

4. Acceptance

Acceptance in this section is mainly assessed from the perspective of the team itself. The participants from the line organization that are related to the materials management are moderately positive on most design decisions, but this research outcome will be explicated in depth in the respective micro perspective 3 (section 7.5).
The involved participants from the line organization have mixed feelings on the design artefacts. There is a strong acceptance for the content and the way in which solutions are elaborated. The participants utter a great amount of trust in the expertise of the materials management team. On the other hand this trust also is sometimes sourced by just good faith as several participants complain about the bad accessibility and complexity of the designs.

The materials management team is characterised as a very coherent and professional team. Although the team is composed along three sub teams there is unanimous support for the design products and different expertises are well informed on each other's solutions and design decisions
This unanimous opinion also is present in the satisfaction on the achievements. This is slightly different from the statements of the purchasing team (§7.3.1, pp. 336). This is an interesting result as the purchasing team shows significant development and is satisfied on this performance of their competence increase. They nevertheless also feel 'more could have been accomplished' with the creation of the designs. The materials management team on the other hand is satisfied with its accomplishment as halfway the project they are confronted with a major backlog and after the summer break work hard to catch up.

7.4.2 *Competence development by the team members*

This section will in detail describe the competence development of the team members using the three different measures as explicated in section 7.2; the technical, narrative and affective dimension. The outcomes of these three dimensions first will be presented separately after which the combination is discussed as final analysis for the competence development of the entire team.

1. The technical dimension

The technical dimension is assessed by the self efficacy questionnaire at t0, t1 and t2. Figure 85 shows the averages of the 13 Self efficacy items on t0, t1 and t2.

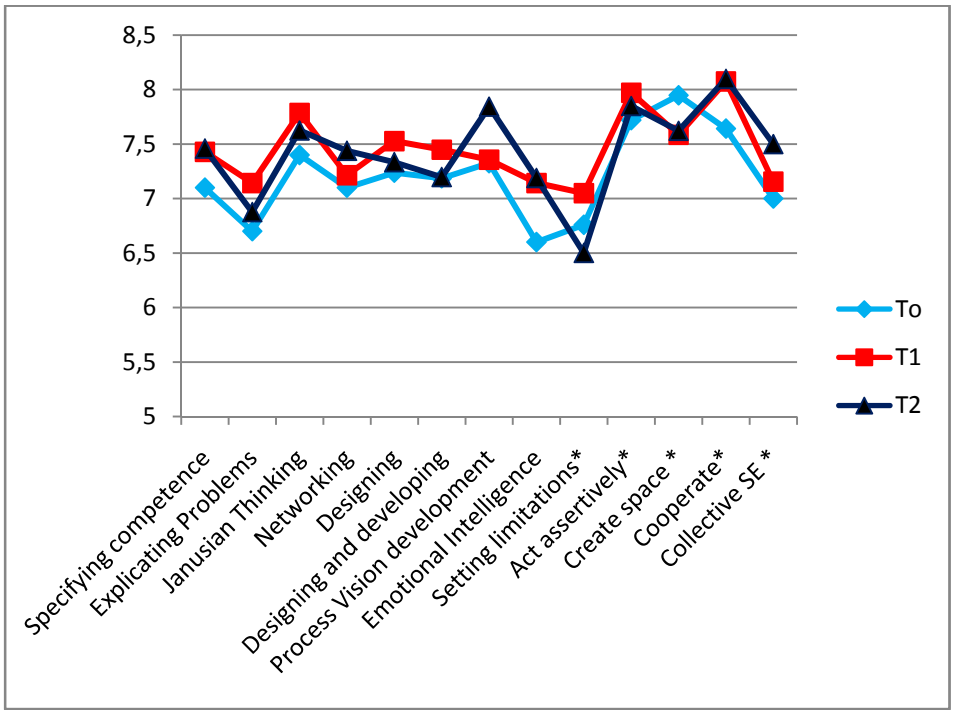


Figure 87 self efficacy items for materials management team at t0, t1 and t2

	t0	n=9	t1	n=10	t2	n=10
	Avg.	σ	Avg.	σ	Avg.	σ
Specifying competence	7,10	1,71	7,43	1,12	7,46	1,59
Explicating Problems	6,70	1,17	7,14	1,03	6,88	1,15
Janusian Thinking	7,40	1,47	7,79	0,89	7,63	1,20
Networking	7,10	1,35	7,21	1,23	7,44	1,16
Designing	7,24	1,88	7,53	1,21	7,33	1,40
Designing and developing	7,19	1,33	7,45	1,21	7,20	1,44
Process Vision development	7,33	1,10	7,36	0,87	7,84	0,77
Emotional Intelligence	6,20	1,99	7,14	1,35	7,19	1,97
Setting limitations*	6,76	2,06	7,05	1,96	6,50	1,69
Act assertively*	7,72	1,39	7,97	1,48	7,85	0,98
Create space *	7,95	1,48	7,59	1,53	7,62	1,50
Cooperate*	7,64	1,42	8,08	1,21	8,10	1,00
Collective SE *	7,00	1,46	7,16	1,13	7,50	1,45

Table 67 outcomes of Self efficacy on t0,t1 and t2

By a paired T-test the items are compared to inspect significant changes over time (Appendix , pp. 496, Table 109 and Table 110). The results (Table 68) of the Self efficacy questionnaire show a different pattern compared to the purchasing team. The number of indifferent items is extensive and stable. The materials management team scores indifferent on all 13 items on t1. This continues on t2 with a minor difference. The item process vision development statistically scores a significant increase towards t2. This may be explained by the better facilitation of the team by the RSW sessions. Still the team compared to the purchasing team shows almost no real increase in this self efficacy assessment.
These results match the observations and interview results. The team members in general improve their technical design skills and SAP related knowledge, but the specific items elicited by the SE questionnaire are not phrased or deployed extensively by the team members.

t0-t1			**t1-t2**		
Decrease	*Indifferent*	*Increase*	*Decrease*	*Indifferent*	*Increase*
	EI			EI	
	Specifying competence			Specifying competence	
	Setting Limitations			Setting limitations	
	Janusian Thinking			Janusian Thinking	
	Act assertively			Act assertively	
	Explicating problems			Explicating problems	
	Networking			Networking	
	Designing			Designing	
	Designing & Developing			Designing & Developing	
	Process vision development				Process vision development
	Create Space			Create Space	
	Cooperate			Cooperate	
	Collective SE			Collective SE	
0	13	0	0	12	1

Table 68 Overview of SE items and their changes throughout the project stage of the materials management team

2. The narrative dimension

The narrative level is about how the personal experiences of the team members impact their work and motivations. This level is analysed via interviews, observations and the assessment of the shared schemata on t1 (June 2005) and t2 (November 2005). During the project stage ten materials management team members are interviewed in an open interview setting in which the interviewees reflect upon their experiences, motivations and their actions.

2-1 "Openness to experience" results from Interviews

10 Materials management team members are questioned repeatedly on their motivations, experiences and actions during the project. The semi structured interviews were from variable length dependent upon the relevant or new contributions from time to time by the respondents. Three time windows can be distinguished that match the period around the self efficacy measurements.

Around t0

The team is confronted with a gradual instalment an after a few months is at its full strength. The members are motivated and inspired. They approach the project pragmatically and professionally. The respondents have some difficulties with the slow pace of the start-up stage.

It could have started a bit swifter as far as I'm concerned. A lot of the time in the beginning was taken for training, meetings and setting up the project. It would have appealed me to get started more early.

Around t1

Towards April and May 2005 the team gradually gets under pressure due to the progress and workload. Other teams are already deploying extensive external workshops, whereas the management materials team still is focused inside.

A lot of effort is put in digging into deep on the specific design problems as they are formulated by the team. Some interviewees oversee the workload and require a different organization of the work.

This team needs more men to accomplish the extensive task

In their perspective both the internal organization should be changed, but also the internal resources are criticized. This reflection especially is based on the structure of the team (e.g. the transfer of the three sub teams). But the reflection upon the way of working is lacking by most interviewees. The change consultant would like to adopt a more varied approach, but the substantial amount of team members is confident in the current approach and also does not want to discuss its effectivity. This confident, but also unwavering attitude marks the team characteristics of the material management team.

An often heard frustration is the knowledge incompatibility with the network. The team members feel competent, but have difficulties to deliberately take the time and pace to go over design issues and explicate the line of reasoning behind it.

We better could have created finished designs and presented them to the network. At the end that would have worked out more efficiently.

The backlog becomes critical just before the summer break and the proposition of the RSW concept is accepted by the combination of the sense of urgency, the pushing of project management and finally the experiencing of the RSW concept itself in July 2005. It is decided that the management materials team will pilot this way of working accompanied with extensive support. This is welcomed by the team.

Around t2
After the summer break the team feels inspired again and embraces the RSW concept. The team feels confident that this way of working will help them out and both improve progress as well as the understanding from the line organization.

It is tiresome to explain basic SAP or process insights over and over again. I cannot generalize because there are also very good examples, but sometimes the network just stalls the process quite considerably. The RSW sessions improved that aspect. But when we started we actually were already too late to catch up.
At the end of the project stage (December 2005) the team members are satisfied, but also tired with the extensive content and uniform and monotonous RSW workshop format. It characterizes the team composition that a substantial part wants to continue this assignment after a well deserved break. There is only a small number of interviewees that desire another project or position within the project or back to the line organization.

It wasn't easy, we certainly have made a lot of mistakes, but at the end we have accomplished our task. We can be proud about that

The narrative development is explicated for the entire team by classification and clustering of the interview results (Miles & Huberman, 1994). Table 69 shows the results. The items are clustered around individual statements. Sometimes similar statements are made by singular respondents so that the sum is larger than the total of different respondents.

	t0 (Jan 2005- Mar 2005)		*t1 (May-July 2005)*		*t2 (Nov 2005-Jan 2006)*	
	Characteristic	**N**	**Characteristic**	**N**	**Characteristic**	**N**
Motivations	Interested to improve new systems and processes	3	Be persistent. Keep on going	3	We accomplished a lot. Feel proud	5
	Learning new things	5	This is harder than we thought	4	Try to switch within the project	2
			We need to improve our planning and collaboration	2	Continue what I'm doing	5
Experiences	Slow project kick off	7	Difficult Complicated	3	Still working on things that started approximately a year ago	3
	Searching for an appropriate way of working and planning	2	Laborious Intense	5	Strenuous workshops	3
			Project runs like Syrup (viscous)	2	New workshop format is good	6
Actions			Plan extensively	2	Finishing designs	6
	Set up of the team	2	Change sub team structure	6	Changing teams	2
	Start up SAP experience	4	Change workshop formats	5	External design sessions	4
	Initiate contacts with social networks	1	Internal design sessions	2		

Table 69 Clustered and counted statements by the Materials management respondents around t0, t1 and t2

2-2 Pair wise comparison of cognitive schemata

The Schemata elicitation is comparable to the setup in micro perspective 1 of the purchasing team. Nevertheless the opposed phrased statements are specifically constructed for the materials management domain. The survey contains 14 propositions, based upon the pair wise comparison test of cognitive schemata (Mohammed, 2000; Hodgkinson, 2004) is employed at t1 (beginning of June 2005) and t2 (beginning of December 2005). The contrast between each of these statements is based upon the existing situation within MINDEF and the future vision specific for the logistic and materials management process. The questionnaire is employed among both the team members as well as the participants from the network before the first workshop at t1 and after the last workshop at t2. The results from the participants in the network will be explicated in micro perspective 3 (§7.50, pp. 366)

Table 70 and Table 71 show the results for the old and new schemata at both t1 and t2 for the materials management team. A paired T-test shows there is a significant difference between five old and new schemata propositions on t1 (Appendix, pp. 499, Table 113 and Table 114). Only the first proposition shows no significant difference between “old and new” scheme. Interviews with the team members indicate the first old scheme proposition properly is highly valued because of existing frustrations in the current practice and its often informal way of working. Nevertheless, at t1 the Materials management respondents almost value all new schemata significantly higher over the old schemata. There are no significant differences between the responses on t2 and t1. The differences between old and new schemata reside after t1. This is comparable to the purchasing team.

Item (Integration) ***Questions (4)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
The supply process can function properly if all players in the process recognise the greater cause of the entire process chain and are prepared to critically reflect on current ways of working and role patterns.		4,4	0,5		4,6	0,5
A substantial improvement of the MINDEF logistics requires the implementation of an ES accompanied with personnel that recognizes its possibilities. This mutual condition will improve thinking in process chains and optimally utilizing the benefits.		4,3	0,7		4,6	0,5
One substantial boundary condition for the MINDEF joint logistic deployment is a central based administration of master data on articles and materials.		3,5	0,7		3,9	0,7
The optimal logistic support of joint operations is only possible if business processes and information are integrated amongst the different force elements		4,5	0,5		4,5	0,5
Totals		**4,18**	**0,6**		**4,4**	**0,58**
Valid n	12			8		
α	0,81			0,69		

Item (Standards/Best practices) ***Questions (3)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
The actual settlement of logistic services between the operational forces and the service units will lead to more efficiency, because it increase the cost awareness of the operational forces.		3,8	0,8		3,2	0,6
Standardising logistic processes will lead to a performance increase in both peace time and operations		3,9	0,9		3,8	0,9
The addition of Defence specific functionalities will make the ES applicable for the entire MINDEF organization		4,0	0,9		4,0	0,9
Totals		**3,91**	**0,92**		**3,6**	**0,83**
Valid n	12			8		
α	0,75			0,71		

Table 70 Results Materials management team at t1 and t2 on new schemata propositions

Item (Integration) ***Questions (4)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
The supply process is effective if all participants stick to their procedures instead of neglecting these and continuously appeal to the informal system.		4,5	0,5		4,3	0,5
An improved end efficient logistic supply chain can be realised by the mere introduction of an ES		2,4	1,2		2,8	0,9
Central management and administration of article and material master data delays the deployment of the logistic process.		2,4	0,8		2,3	0,9
The logistic support for joint operations is guaranteed as long as the force specific logistics resides and works..		1,5	0,5		2,1	1,0
Totals		**2,71**	**0,76**		**2,88**	**0,83**
Valid n	12			8		
α	0,83			0,81		

Item (Standards/Best practices) ***Questions (3)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
Settlement of logistic services -and products between operational forces and the service unit causes a substantial administrative workload and results in a low amount of benefits.		2,1	0,9		2,4	0,5
Standardising the logistic processes over the specific force units affects its performance negatively.		1,7	1,0		2,0	0,9
ES systems are designed for civil and commercial purposes. Our logistic processes are substantially different, so the operational deployment of an ES is not feasible for MINDEF.		2,6	0,9		2,0	1,1
Totals		**2,11**	**0,9**		**2,10**	**0,83**
Valid n	12			8		
α	0,82			0,77		

Table 71 Results Materials management team at t1 and t2 on old schemata propositions

3. The affective dimension

This layer is assessed by the emotional intelligence item in the self efficacy questionnaire, observations during the process and the respondents' affective perception of the entire change process assessed on t1 and t2 with the personal growth curve. Partly the results from the interviews, deployed for the narrative dimension, are used as affective experiences in some interviews are addressed that illustrate or enhance process observations.

The materials management team, different from the purchasing team, is confronted with less emotional eruptions in the beginning of the project. The team includes a lot of the same personalities and the external change consultant characterizes the team as very efficient project workers. A direct comparison with the purchasing team also displays a significant different leadership context. In the purchasing team the combination of team leaders and change consultant makes the team members self responsible for process and outcomes. In the beginning the purchasing team has its difficulties with this interpretative approach (§6.5.2, pp.278). The persistent behaviour from the team leaders can also be perceived as a directive approach to enforce the team members this interpretative way of working. In the materials management team the team leaders also take a directive approach, but have a different vision than the change consultant.

The team leaders have an unanimous functionalistic perspective upon the aspired way of working and the change consultant can only comply and gradually bring up alternative workshop formats or ways of working. From the start there is a 'no nonsense' culture and a formal project plan that the team adheres to. This causes for a formal approach in which also disagreements appear during the process, but the emotional disruptions and tensions are less compared to the purchasing team. This is mainly caused by the fact that this approach stays close to the existing perspectives of the team members, whereas the purchasing team members are continuously challenged to adopt another frame of reference. After the first 6 months the stable situation for the management material team changes due to the backlog and process problems. After the collaborative LSI in July 2005 the team nevertheless catches up swiftly, supports the RSW concept and jointly decides to go for it.

	t0-t1	*t1-t2*
Imperturbable	3	2
Continual growth	1	0
Accelerated growth	4	6
Declining	0	0
Balance recovery	1	0

Table 72 Results from the affective layer Materials management

The item emotional intelligence (see technical layer) shows a significant increase after the summer break. Table 66 shows the results from the growth curve questionnaire (Figure 82, pp.332). The majority of the respondents reports growth and feels satisfied with the outcomes and accompanied way of working. There is a small group that feels indifferent along the project and there are no reports on declining perceptions.

4. Competence development as combined notion of the technical, narrative and affective dimensions

On the technical level (the abilities and capabilities of the team members) the team reports indifferences on most items, some progress in a minor number of items and on two items decay. This latter effect can be explained by the increased work pressure and stress. These results can be confirmed by observations as the team from the start is a confident team composed around experts and designers.
This effect is repeated in the narrative level as most respondents state they feel motivated, committed and satisfied, but in accomplishing a lot of the same work, without taking time to reflect and doing things significantly different than before.
The cognitive schemata are assessed on the team level and show a significant change between t0 and t1 for the entire team. This change resides but does not change significantly towards t2. The incorporation of new cognitions and attitudes in the perspective of new business processes and integration is completed between t0 and t1.
The affective layer shows mostly satisfaction, whereas approximately one fourth of the team is feeling indifferent about the project.

Competence development especially is the convergence of technical, narrative and affective layer.
Based upon these results the materials management team especially shows it incorporates an extensive set of skills, the observations shows they also extend these skills and knowledge, although the self efficacy test shows their perception is indifferent. The team realizes an extensive amount of work, but fails to reflect and really try out ways of working that are different than before. The openness to reflection and new experiences is lower compared to the purchasing team. The materials management team does not aspire to do so, but is also not challenged by the team leaders.
The team leaders acknowledge the change process, but their perspective is especially on creating qualitative designs that are understood and accepted by the line organization. This matches the original perspective from the project documentation around t0, as described in section 6.4.1 (pp. 253). From that perspective this attitude can be explained, but other project members, especially the purchasing team shows a different approach is also possible. In comparison the purchasing team clearly is more directed towards the alternation between acting and reflecting where the materials management team continuously focuses on getting the job done.

7.4.3 ***Conclusions***

The prior results can be put into the perspective of the process evaluation of chapter 6. In 6.6 the deployment of ES*i*OD by the materials management team is explicated.

The team clearly opts for a functionalistic and pragmatic deployment of their assignment. The change consultant proposes different ways of working, but different from the purchasing team, the team leaders persist their own approach.

The team is composed around typical content matter experts that quickly incorporate the knowledge and requirements for process modelling and defining SAP. Development in the perspective of this team especially is involving participants from the line organization to inform and create acceptance. This way of working can be recognized in the outcomes.

The design is extensive and clearly breathes the intention to be complete in the technical sense, but unfortunately this does not match systemic completeness. The extensiveness of the materials -and supply topic compared with the perfectionistic approach causes for a backlog.

The throughput in design proposals increases substantially after t1, by the use of the RSW concept, but this goes accompanied with the final designs including some substantial issues or inconsistencies. This is improved with rework after t2. The use of the design artefacts to facilitate the change process in the beginning is mediocre. This improves after t1 and the RSW concept standardizes the material and improves accessibility. On the other hand the complexity and amount of material increases. The uniformity accompanied with the RSW concept implies limitations in freedom and does not optimally facilitate the change -and learning process.

The deployed way of working shows its benefits in acceptance and respect from the participants of the line organization. There is broad acceptance for the expertise of the team and the rigorous preparations. This is also dependent upon the match between the existing favourite way of working within MINDEF and the adopted approach by the materials management team.

The way of working also shows its effect in the outcomes of competence development of the team itself. The team unanimously reports an indifferent perspective upon their competence increases. There is a significant increase in design skills, based on observations. The team itself reports almost no increase in self efficacy. The narrative dimension confirms the pragmatic composition of the team in being motivated, steadfast and adopting a no nonsense approach. The team is satisfied with their throughput and design quality and most team members want to continue.

7.5 Micro perspective 3: Participants from the line organization

As explained in section 7.2 the assessment of design quality and organizational development differs for micro perspective 3. The line organization participates in the design and change process, but their involvement during the case study is lower and therefore different outcomes are expected. Design quality therefore is assed merely on acceptance and organizational development upon cognitive schemata change and network development.

7.5.1 *Design quality*

Acceptance

Acceptance is analysed via the comparison of two different surveys. The first survey is deployed by the change management team around march 2005. During the series of first road shows the support for the ES implementation is assessed. A total of 223 respondents the line organization complete the survey. The survey is deployed after the road shows. At that moment the respondents already are knowledgeable about the concept of the ES, the ambitions of the SPEER program and the generic impacts on the MINDEF organization (see also Table 75).

- 52% expresses its trust and motivation for the forthcoming project and supports the arrival of SAP
- 48 % expresses its demurs on the feasibility of the project and mentions past exemplary implementation experiences within the defence organization as reason.

Table 73 Acceptance for the Enterprise system around at the end of March 2005

Table 73 shows there is an approximate 50/50 dissension in the members from the line organization. One half supports the implementation versus another half utter their concern or disapproval.

In December 2005 the acceptance for the SAP system is assessed with acceptance item questions from the UTAUT and TAM model (Venkatesch, 2003). Table 74 shows the deployed questions and results. From the results the following can be concluded:

- Acceptance for the future plans and the arrival of the ERP system in general has risen to approximately 75 %.
- Participants have the tendency to expect the work to be more interesting (29% expects so, 17 % does not, 54 % is neutral)
- Participants are divided on productivity expectations (28% does expect a significant rise, 33% does not and 41% is neutral).

- Participants are also divided on the available knowledge and insights. 41 % of the participants requires more in depth knowledge to fully support the arrival of the ES. 41 % is satisfied with the available information.
- Most respondents see the greater cause for the entire MINDEF even if their individual situation will not improve (62% agrees, 8 % disagrees)

	Totally agree	**agree**	**neutral**	**Disagree**	**Totally disagree**
It's a good idea to start using the ERP system	19%	54%	20%	6%	1%
The ERP system will be beneficial for our daily tasks	17%	42%	30%	9%	2%
By the use of ERP our productivity will increase	6%	22%	41%	22%	11%
The ERP system will make work more interesting	9%	20%	54%	15%	2%
we support the plans SPEER currently is communicating	6%	37%	41%	15%	0
we think presently too many things are unclear to support the arrival of the ERP system	19%	22%	19%	39%	2%
we do not support the arrival of the ERP system	0	4%	15%	33%	48%
if our individual situation does not improve we still see advantages of the arrival of the ERP system for the entire MINDEF organization	17%	57%	15%	7%	1%

Table 74 Results on Acceptance for the ERP system (UTAUT model Dec 2005)

The comparison of both results, though not questioned repeatedly with the same survey instrument give a good indication that the acceptance for the Enterprise system has increased significantly.

Support for the change and learning process (Accessibility and readability)
The availability of the design information is again assessed by the comparison of two different survey results deployed on March 2005 and December 2005
After the road shows the 223 respondents are questioned on the information transfer, and its quality. At that time this does not yet incorporate specific design proposals, but it already includes the information channel as the project teams deploy during the entire project stage. This is via email and a web based intranet channel.

Table 75 shows the results for the items on accessibility.

90 % of the visitors states they are informed on the SPEER project.
The intranet site plays a significant role in the information transfer (60% receives information via this channel). The information quality is valued as poor an unintuitive.
33 % of the visitors receives the information via the front offices (paper documents and email).
Almost 60 % of the visitors require additional information on their individual role in the project.

Table 75 Accessibility and information supply at the end of March 2005

The information quality has improved significantly during the project, but the accessibility is decreased. The latter effect is caused by the extensiveness of the project documentation and the presentation of the material

54% of the participants values the work of the front office as information transfer unit.

7.5.2 *Organizational development*

Organizational development, different from the two prior micro perspectives, is assed via social interactions and the change in cognitive schemata of the participants in the line organization.

Social interactions

Based on the outcomes of the networking survey, deployed around t2 (December 2005) 31% of the participants actively help to create a bigger network by several initiatives.

The way of working used by the participants in the network is focused around small meetings (up to 10 participants), extensive email traffic and communication by telephone. The medium and larger workshop format for lager groups from 15-100 participants is not popular to extend the network in the line organization. This large scale session format is popular within PGS, but the members from the network respond different reasons why this extensive workshop format is not deployed to extend the network. The interviewees respond lack of preparation time and inexperience with these formats, but especially the need for more informal knowledge exchange as the main reasons for not selecting this type of meeting.

50% of the respondents report to be able to create an extensive social network and transfer the information towards these organizational members in the line organization, whereas 30 % does not feel confident enough to transfer this information.

The process of networking, comparable to the oil macula, proceeds slowly but deliberately during the period March towards October 2005. Observations in the different workshops and the networking survey shows there is a continuing mixing -and socializing process of individuals and groups. The participants stem from different backgrounds that before the project were not in touch with each other. The assimilation is both between participants from different force units (e.g. between navy, army and/or air force), but also within one of these force units.
Several different functions are represented, though the higher ranks are less in number.

Schemata elicitation of the line organization

The knowledge increase and understanding for the new designs is assessed by the same pair wise comparisons explicated in sections 7.3 and 7.4 for the purchasing and materials management team respectively. In this section the results from the participants of both teams are analysed separately and also compared.

I Participants from the purchasing team

On t1 and t2 a total of 64 and 47 respondents participate in the pair wise comparison. Table 76 shows the composition of these respondents.

	t1	t2
Organizational background		
Navy	10	3
Air Force	3	7
Army	17	10
MP	1	2
CDC	8	5
DMO	14	11
Role in the network		
Expert	35	25
Advisor	13	9
Decision maker	5	4
Purchasing team itself	11	9
Totals	**64**	**47**

Table 76 Background and roles of respondents in purchasing schemata test at t1 and t2

Item (Integration) Questions (3)	t1	Avg. t1	σ t1	t2	Avg. t2	σ t2
Our purchasing philosophy should be based upon integral cost pricing.		3,7	0,9		4,0	0,9
Mutual benefits can be achieved by a good cooperation between supplier and client		4,0	0,9		4,3	0,8
The benefits of a joint purchasing process can be realized in various organizational structures and settings, but require a tight collaboration between purchaser, planner and financial controller.		4,1	0,8		4,1	0,8
Totals		3,93	0,87		4,13	0,83
Valid n	53			38		
α	0,69			0,71		

Item (Standards/Best practices) Questions (3)	t1	Avg. t1	σ t1	t2	Avg. t2	σ t2
The use of graduated discounts in framework contracts can lead to comparable price conditions of blanket order contracts		3,3	1,0		3,4	0,8
Process integration can improve both legitimacy and efficiency of the purchasing process.		3,8	1,0		3,8	0,9
Effective purchasing requires one dedicated master data of supplier information		4,1	1,0		4,0	1,0
Totals		3,73	1,00		3,73	0,90
Valid n	53			38		
α	0,74			0,69		

Table 77 Results from networking participants from the purchasing team at t1 and t2 on new schemata propositions

Item (Integration) ***Questions (3)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
The leading principle in our purchasing organization is too attain the lowest price.		3,4	1,0		3,6	0,9
If customer and supplier initiate a negotiation process it will result in a "zero sum game" (One wins the other losses and vice versa)		2,2	0,9		2,2	0,9
A central and independent organized purchasing function leads to the best creation of 'buying power'..		3,0	1,2		2,7	1,0
Totals		**2,87**	**1,03**		**2,81**	**0,92**
Valid n	53			38		
α	0,70			0,74		

Item (Standards/Best practices) ***Questions (3)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
Blanket ordering offers more opportunities for pricing negotiation than framework contracting		2,7	1,0		2,8	1,1
A legitimate way of working requires a 100% control of all invoice lines.		2,5	1,0		2,4	1,1
Effective purchasing requires the ability for the autonomous creation and management of vendor data.		2,7	1,1		2,6	1,2
Totals		**2,66**	**1,02**		**2,61**	**1,13**
Valid n	53			38		
α	0,67			0,63		

Table 78 Results network participants from the purchasing team at t1 and t2 on old schemata propositions

The members in the network of the purchasing team show the same responses on the pair wise comparison as the purchasing team itself (Appendix, pp 500, Table 115 and Table 116. Again the respondents do not value the "old and new" price related statements differently (items 1 and 4).

II The materials management team

On t1 and t2 a total of 90 and 52 respondents participate in the pair wise comparison. Table 79 shows the composition of these respondents

	t1	t2
Organizational background		
Navy	20	9
Air Force	15	6
Army	25	10
MP	4	4
Administration (CDC)	3	5
Administration (DMO)	11	10
Role in the network		
Expert	55	30
Advisor	20	11
Decision maker	3	3
Materials management team itself	12	8
Totals	**90**	**52**

Table 79 Background and roles of respondents in materials management schemata test at t1 and t2

The members in the network of the materials management team show the same responses on the pair wise comparison as the materials management team itself (Appendix, pp.503, Table 117 and Table 118). Again only the first proposition is equally valued between old and new schemata.

Item (Integration) ***Questions (4)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
The supply process can function properly if all players in the process recognise the greater cause of the entire process chain and are prepared to critically reflect on current ways of working and role patterns.		4,3	0,6		4,4	0,9
A substantial improvement of the MINDEF logistics requires the implementation of an ES accompanied with personnel that recognizes its possibilities. This mutual condition will improve thinking in process chains and optimally utilizing the benefits.		4,1	0,8		4,5	0,7
One substantial boundary condition for the MINDEF joint logistic deployment is a central based administration of master data on articles and materials.		3,5	1,0		3,7	0,9
The optimal logistic support of joint operations is only possible if business processes and information are integrated amongst the different force elements		4,0	0,9		4,1	0,9
Totals		**3,98**	**0,83**		**4,18**	**0,85**
Valid n	75			43		
α	0,61			0,73		

Item (Standards/Best practices) ***Questions (3)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
The actual settlement of logistic services between the operational forces and the service units will lead to more efficiency, because it increase the cost awareness of the operational forces.		3,9	1,0		3,4	1,0
Standardising logistic processes will lead to a performance increase in both peace time and operations		3,7	0,8		3,6	0,7
The addition of Defence specific functionalities will make the ES applicable for the entire MINDEF organization		3,9	0,9		3,8	1,0
Totals		**3,83**	**0,9**		**3,6**	**0,9**
Valid n	75			43		
α	0,68			0,67		

Table 80 Results Materials management network at t1 and t2 on new schemata propositions

Item (Integration) ***Questions (4)***	***t1***	***Avg. t1***	***σ t1***	***t2***	***Avg. t2***	***σ t2***
The supply process is effective if all participants stick to their procedures instead of neglecting these and continuously appeal to the informal system.		4,3	0,9		4,0	0,9
An improved end efficient logistic supply chain can be realised by the mere introduction of an ES		2,5	1,0		2,6	1,0
Central management and administration of article and material master data delays the deployment of the logistic process.		2,4	1,0		2,3	1,1
The logistic support for joint operations is guaranteed as long as the force specific logistics resides and works..		1,9	1,2		2,0	0,9
Totals		**2,78**	**1,03**		**2,73**	**0,98**
Valid n	75			43		
α	0,63			0,7		

Item (Standards/Best practices) ***Questions (3)***						
Settlement of logistic services -and products between operational forces and the service unit causes a substantial administrative workload and results in a low amount of benefits.		2,5	1,2		2,8	1,0
Standardising the logistic processes over the specific force units affects its performance negatively.		2,0	0,9		2,1	0,9
ES systems are designed for civil and commercial purposes. Our logistic processes are substantially different, so the operational deployment of an ES is not feasible for MINDEF.		2,7	0,9		2,2	1,1
Totals		**2,4**	**1,02**		**2,37**	**1,01**
Valid n	75			43		
α	0,71			0,69		

Table 81 Results Materials management network at t1 and t2 on old schemata propositions

Analysis
The network participants from both teams show the incorporation of the new schemata already around t1. There is no significant increase or decrease towards t2. This shows that the understanding for the new situation and its implications is comprehended by the participants and both teams have succeeded in this ambition.
It also replicates the findings from the individual teams itself.
The statements used in the pair wise comparison are uniquely formulated per team. A direct comparison between schema elicitations therefore does not make sense.

7.5.3 *Conclusions*

In chapter 6 the deployment of ES*i*OD is explicated and it is shown that two teams opt to differently deploy this approach substantially. Nevertheless there are some generic similarities that shows its influence in the perception of these outcomes by, the participants from the line organization, micro perspective 3.

Design quality in general is valued by the members from the line organization. This is independent from visiting the purchasing or management materials team.
The acceptance and support for the design proposals has increased substantially from 50 % in April 2005 towards approximately 75 % in December 2005.
The members from the line organization value the improved availability of the designs. On the other hand the respondents criticize the substantially increased information density and the decrease of their comprehensibility of the designs.

The schemata elicitation shows the conceptual notions behind integration of the nodes in the purchasing and logistics chains are understood and incorporated by the members from the line organization at t1 before the summer break. This understanding does not change significantly over the second half of the project

7.6 Conclusions and comparison of results

This chapter closes with a concluding section on the comparative analysis of the product evaluation between the separate micro perspectives. It also investigates the interaction between design and development as the two main research notions for this study.

7.6.1 *Summarizing product evaluation*

In the prior sections the two main product evaluation items design quality and organizational development are explicated in three micro perspectives. The summarized outcomes show the following results:
The bare design output between both teams is similar except for the extensiveness and complexity. This is mainly caused by the enforcing templates BSF and PMF.
The use of these templates on the one hand is understandable as it encourages uniformity that is of great importance in a suchlike integration project as SPEER. On the other hand the teams are not invited or challenged to extent the main items with their findings from workshops and enhance these templates.

The purchasing team clearly shows a competence increase, adoption of new behaviour and ways of working. The MM team on the other hand shows an improvement in skills and knowledge, reframing cognitive schemata considering the design content but no adoption of different behaviour.

Both the teams show integration between individuals that stem from various departments and force units of the entire prior organization. The socializing process in and to a somewhat lower extent also between the teams is successful.

The participants of the line organization show a very fruitful result of the networking initiatives by both teams and the participants themselves that continue this networking approach. A total network of approximately 500 individuals in various parts of the MINDEF organization is created, new social relationships are and friendships are made.
The line organization shows a significant increase on the acceptance for the ERP system on a generic level. On a more minute level there still are a lot of detailed questions and unsolved issues open according to various statements of respondents in the line organization. But a lot of the insecurities and lack of knowledge is taken away throughout the 12 months period.

	Purchasing	Management Materials	Perception of the line organization
Systemic completeness	Lean and mean designs. Based on the predefined process design templates Emphasizing process logic. Lack typical organizational and social items like impact, expected behaviour and explication of necessary competences	Extensive and complex design output. Stick to the predefined process design templates. Lack typical organizational and social items like impact, expected behaviour and explication of necessary competences	Participants from both teams (Purch. And MM) value the designs and state integrated process logic and information needs are the main focus of the design content
Acceptance	Team itself unanimously supports its own designs. Satisfaction on the other hand is moderate	Team itself unanimously supports its own designs. Team itself is satisfied with the throughput and outcomes	The line organization shows an increase in acceptance for the newly designed system. Nevertheless there are also a lot of critical individual remarks on the lack of specifying critical details that often encompass or touch upon social and behavioural issues.
Quality (consistency & errors)	Minor amount of mistakes in consistency	Relative many minor to moderate errors in internal consistency	n.a
Facilitate the change & learning process	Design outcomes as such are not the significant contributor to this item. The formats and documents used during the sessions on the other hand are. It is a pity that the last step of detailing and explicating these observations and outcomes in the formal designs is omitted (See systemic completeness)	Team uses the design documentation as single format communication means. Discursions during the workshops therefore especially are about decisions in the design content and lesser about explicating existing problems or reasons behind the redesigns	The line organization is satisfied with the way of working by both teams

Table 82 Comparison of the product evaluation of three micro perspectives

	Purchasing	Management Materials	Perception of the Network
Technical dimension	The team shows an increase on a significant set of self efficacy items throughout the 12 months investigation period. The increase is continuous	The team shows no changes in most of the self efficacy items throughout the 12 months period. The team is confronted with a high work load and this is recognized in a decrease in the two respective items create space and setting limitations.	This is not assessed via the self efficacy survey. Nevertheless the network survey and observations show an increase in knowledge and mutual understanding for integration of processes, the functioning of the ES in general and the impact on the MINDEF organization.
Narrative dimension	First 6 months the interviewees respond a motivated, inspiring situation in which there is a lot of room to experiment and learn new things. This period also is characterized by vehement discussions on how to deploy the integral MINDEF approach. Towards the summer break the team's vision coalesces and the respondents report balance and satisfaction with their results. During the second 6 month period this tendency decreases and individual team members focus on their own personal development path, sometimes outside the teams objectives or even the project. This is influenced by the project mgt. team that restrains starting up new initiatives. Cognitive schemata show an unanimous reframing already on t1 (may 2005). This is maintained throughout the project.	A substantial amount of time is consumed by discussing how to deploy the MINDEF integral approach in adjustment to the complex design content. The focus in this team more is on structuring and understanding this content instead of how the approach can contribute to learning and competence development of the network participants. The team respondents state they appeal to a "no nonsense approach" and aim on the creation of qualitative good designs that are understood and accepted by the network. The respondents are stable and solid in their motives and rationales throughout the entire case study. This is also not altered by the deployment of the RSW method after t1, The Cognitive schemata show an unanimous reframing already on t1 (may 2005). This is maintained throughout the project.	The specific cognitive schemata for both the purchasing as well as the logistic supply experts from the line organization show the adoption of new cognitive schemata on t1. These schemata reside as there is no significant change towards t2

Table 83 Comparison of the product evaluation of three micro perspectives

	Purchasing	Management Materials	Perception of the Network
Affective dimension	The team members report a difficult phase between April and July in which the team leaders and change management consultant indirectly enforce an interpretative way of working. A substantial number of the team members in the beginning feels uncomfortable with this approach. The successful deployment of the workshops helps the members to regain some balance and at t2 the team members report a positive feeling and	This team also is confronted with difficulties considering timing and workload, but it doesn't show that much. The team is deliberate and persistent. Many members report feeling indifferent at t1. This changes towards the end of the project (t2) as the team members feel proud with their accomplishment and look back satisfied.	N.a
Competence increase	The three levels combined show a congruency towards the end of the 12 months period. The team at first improves skills and knowledge, is forced in a self doing mode, causing for affective disruptions, but recovers shows congruency between the three dimensions. In the last part of the 12 month period there is a tendency noticeable in which the feeling of satisfaction ebb away due to the failing new inspiring incentives and a somewhat disintegration of the group	The team shows an increase in very specific skills, but in general the increase in self efficacy on most items is indifferent. There is no collective increase in the three dimensions. The team persisted in the already existing capacities of the individuals. It shows a homogeneous and united team composition, but no real competence development.	The participants in the network show an increased understanding for the different force units. This leads to an increase in mutual trust and new social interactions. The competence increase is especially visible by the increase of specific knowledge on Systems, processes and the MINDEF organization. Partly new skills are developed in the design context.

Table 83 Comparison of the product evaluation of three micro perspectives

7.6.2 *Interaction between design and development*

In chapter 3 a specific process model (Figure 34, pp. 121) is derived that explicates integral organizational development in the PER context. In the section the interaction between design and development as process, but also as outcomes are discussed. The philosophy behind integral organizational design is the explicit integration and interaction of these two concepts. This interaction shows its own specific dynamics in both micro perspectives.

In micro perspective 1, the purchasing team, forms a loosely coupled group that adopts an interpretative emphasized perspective upon the change process and the design content. This emphasized perspective shows its influence in the design outcomes as well as the development outcomes. The design artefacts are lean and mean, include a little too less detail, but show a good readability for the network participants. Only after criticism from the configuration team these designs are detailed up to the required level. From the perspective of an alternating balance in integration between design and development the purchasing team fails to explicate the tangible design findings from their diverse workshops into the design documentation. A lot of the gained information by that approach is lost or implicitly stored in the minds of the purchasing team members. The used way of working of the purchasing team shows an explicit order in the interaction that is mainly is from development towards the design. An important influence on this phenomenon is the role deployment of the process owners accompanied with the coaching style from the change consultant.

In micro perspective 2, the materials management team, it is the other way around. This team deliberately chooses not to strive for an interpretative ambition and perceives development especially as “way of working” towards acceptance and increase of understanding by the line organization. (See also §6.4.1 pp.254). The team deploys a functionalistic perspective and creates complex, extensive designs that incorporate a high level of detail, especially on the technological and functional side. The same unidirectional dynamics, as described in micro perspective 1, also is observed in the materials management case. This team during the process gets entangled, so to speak, in the complexity of their design and the used approach. The problems that accompany this functionalistic deployment are met with the urge to persevere, manage the process with tighter planning schedules and accomplish the task in time with the initiated quality level. This causes a substantial backlog for the team and also in this micro perspective an external intervention is necessary. Again the deployed approach is influenced by the role deployment of the process owners in the team.

The observations in both micro perspectives show that there is one dominant perspective that gradually influences the other and this resides over time. It apparently is difficult for the teams themselves to adopt a balanced alternation between interpretative and functionalistic perspectives.
This alternating movement between both perspectives especially is difficult to achieve when we reflect the observations in the perspective of IOD theorists. Scholars in this domain state the interaction between design and development ideally is situational specific (Boonstra et al. 1998; Koopman & Pool, 1995). Participants in most situations induce a single paradigm emphasized approach and lack the necessary change capabilities to alternate. By introducing interventions that match this specific situation the participants gradually are facilitated to adopt a more meandering approach. This can be deployed in both directions. Functionalistic dominated teams can be facilitated in releasing their paradigm with role play, coaching or creativity sessions. Interpretative oriented teams can be facilitated with quality circles, cause mapping or work -and process design. (Rothwell et al. 1995).

In both micro perspectives an external intervention outside the scope of the team was necessary to compensate these movements. In the case of the purchasing team this was deployed by a quality control of the designs. This was executed by the ES configuration team and integration management team. It helped the purchasing team to finalize the designs at an appropriate quality level, but at a rather late moment in the process. This timing does not substantially help the team to adopt a more alternating approach. The materials management team was facilitated by the deployment of the RSW concept: a specific collaborative design LSI. This had its effects and the teams' deployment changed gradually, but not towards a substantial alternating approach. The RSW in the beginning of its introduction (around t1) was deployed by external experts. Driven by cost saving reasons and argued as a 'train the trainer' philosophy the team members themselves soon were asked to organize these RSW sessions. This did not result in the necessary paradigm swing, but "streamlined" the design sessions in efficiency and throughput. Their deployment still continued rather functionalistic, but it helped the team to regain some balance, get involved more participants from the network and finish the designs in time.

Concluding,
In both situations the final result is not ideal compared to the multiparadigmatic ambition and increase of change capabilities. The deployed emphasis on one perspective shows the omissions on the other. In other words: focusing on development gives incomplete systemic designs and vice versa. In both cases an intervention outside the scope of the team was necessary to resolve this issue and regain the necessary balance. One external intervention was deployed rather late in the process and the other without the lack of enough external expertise and support. The change consultants and process owners from both teams were not able to recognize these phenomena and its effects, during the process itself. This confirms the lack of reflection within the entire PGS team. A recurring reflection between teams possibly at a higher abstraction level sooner can explicate these phenomena.

7.6.3 *Efficiency*

In the beginning of this chapter, it is stated that this research does not focus to assess the efficiency of the integral approach. The main reason is this way of working has not yet been deployed, standards thus are lacking and a direct comparison with ERP implementation data is only valid to a limited extent. Nevertheless, this section attempts to explicate how to put the experiences from this project in the perspective of 'classic' ERP implementations.

Chapter 1 presents extensive research on ES implementations, critical success factors and ex post evaluation of implementations.

This field publishes typical indicators on duration, resources and budget. ES implementations take one to three years in duration and a cost ranging from $0.4 million to $300 million (Koch 2002). Others state these figures depend upon organization, and implementation scope. Large-scale implementations can take up to 10 years and cover expenses up to 1 Billion dollar (Ferratt et al. 2006).

Such large bandwidths complicate matters for a direct comparison. Especially when the fashionable trend is to speed up projects (Shields, 2001), but these projects are nothing more than repetitive implementation efforts often resulting in cyclical reimplementation affairs (Akkermans & Helden, 2002). At the end the bottom line of such projects will also show significant larger budgets and durations than the singular projects.

The SPEER programme can be characterised as a large-scale initiative with an extensive implementation scope. The planned program budget originally is about 250 mil. Euro and the duration is scheduled from 2004-2010.

In the one-year case study an approximate 200 FTE are working in the programme. Another 450 are partly involved via networks and participation. This is extensive, but does not differ significantly from the figures in the prior phrased literature indicating figures of historical investigated implementations.

The progress in the 12 months is reasonable and after 14 months, the designs are up to the required quality level. This goes accompanied with a substantial amount of involvement and commitment from the standing organization.

A first careful conclusion, based upon the investigated period of 14 months, shows the program is certainly not lean and mean, but also shows no significant excessive spending of budget, time or human resources.

Further research is definitely necessary to investigate the entire implementation program after Go live.

Part D.
Redesign and reflection

8. Redesign of ES*i*OD

-- Follow effective action with quiet reflection. From the quiet reflection will come even more effective action.--

Peter Drucker (1909–2005)

8.1 Introduction

In chapters 6 and 7 the deployed integral approach is evaluated from two different perspectives. Chapter 8 presents a combined analysis and reflection in order to define the specifications for the redesign of ES*i*OD.

This reflection has two main inputs. First, in section 8.2 the outcomes of two reflection initiatives by the project organization itself are presented. Section 8.3 then independently considers the outcomes of chapters 6 and 7. In this section the project's course is evaluated and possible cause and effect relationships are explicated from the perspective of the researcher himself. The combination of both analysis results from sections 8.2 and 8.3 shapes the redesign requirements. Section 8.4 finally presents the improved ES*i*OD.

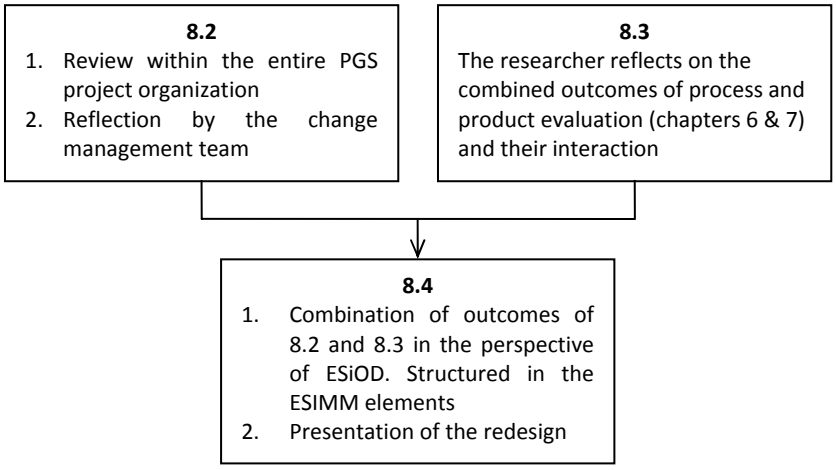


Figure 88 Reflections on the case findings and redesign

8.2 Reflections with the MINDEF organization

In the period between December 2005 and March 2006 two separate evaluation initiatives are realized within the SPEER project.

1. First, in December 2005 the project management team of PGS initiates an evaluation workshop. The objective is to look back on the used approach and way of working in the previous 12 months.
2. Secondly, the change management team initiates a series of reflective sessions on the application of the integral approach including an in-depth analysis of how change management functioned during the previous12 months. This evaluation takes three workshops during the period between December 2005 and march 2006.

8.2.1 *Reflections with the PGS*

This first evaluation is an initiative of the PGS project and integration management team. Prior to the actual one-day workshop the different teams in the PGS project are requested to prepare and reflect on their deployment of the approach, their outputs and performances. During the collaborative workshop an approximate number of 40 participants of different teams present and share their experiences. After a group discussion the benefits of the approach, the possible quick wins and aspects for improvement are defined and if relevant scheduled for further discussion in subgroups. The teams present their evaluations in different formats (Top ten; Do's and don'ts, etc.). Table 84 shows the essential outcomes.

	Project and integration management	**Weapon systems management**	**Materials management**	**Finance and controlling**	**Purchasing**
To be improved	Difficult to get all people on board and in line	Time consuming approach	Need for more organized adjustments between teams	Integration management more repetitive	We could have achieved more Organization of workload
				Knowledge exchange between teams should be improved	Exchange of people and experiences in PGS
Good results	Network development is ok. But we put a lot of effort into it	Qualitative design work	RSW is an accelerating concept that helped us a lot in gaining efficiency	Network building in the line organization	We succeeded in creating substantial acceptance and network development

Table 84 main outcomes of the reflection session within PGS

To the majority of the PGS members it is unclear why the teams are organized as they were. "*SAP is integrated, why aren't we also organized like that?"*
Three teams propose a different division of work in for example end-to-end process with mixed teams. In the current setup the teams are organized according to classical business functions (SAP modules).

8.2.2 ***Reflections with the Change Management team***

The change management team, apart from the PGS project team evaluation, initiates a second more in-depth evaluation during three separate sessions between December 2005 and March 2006. The deployment of the IOD approach and its effects are assessed with specific attention given to the organizational change aspects. The group is composed of 12 people and includes almost all internal and external change consultants who work in the different teams (like the purchasing and materials management), a few members from two different design teams and the leaders of the change management team. The researcher also fully participates in this evaluation and is part of this group.
The way of working in this group is as follows:

A. During the first session process, outcomes and the deployment of the IOD approach are evaluated.
   Through item elicitation and group discussion (using brown paper and post-it notes), each group member gives an overview of the important issues, events and phenomena. Through clustering and classification the group has a converging dialogue on the most important issues and outcomes in perspective of the project's course in the previous year. At the end of this session the group specifies six significant issues for further investigation.
B. In January and February three smaller randomly mixed groups, in intermediary sessions, each elaborate on two items and prepare a more detailed documentation of causes, effects and possible measures for each of the two items.
C. In March 2006 a final session is organized in which the detailed findings of these groups are shared, discussed, possibly improved and finally appointed as the group's evaluation outcome. This outcome also contains concrete action points for respective members of the change management team to carry out in the future course of the project.

The final results from the third session (C) include the six original aspects, though specified in detail and applied to the case-specific context (items 1 & 2) and the respective elements in the approach itself (items 3 to 6). Figure 89 shows the results

Reflective observation	Relationship with ES*i*OD
1. Top management support is absent especially for change management as process, but also for the change management team itself	Case-specific context issues
2. The collaboration with and within the change management team can be improved	
3. All four process design teams did not succeed in explicating the impact on the organization;	Systemic design
4. The designs often lack in-depth details (beneficial project results are not explicated and detailed choices are sometimes postponed)	
5. The collaboration with the line organization can be improved	Network development
6. During the entire project there is not enough focus on the change process itself, the daily work of the significant participants in the teams is dominated by the business process design.	Competence development

Figure 89 Main findings from the CM reflection initiative

An in-depth analysis of the first two items will be given in this section. To prevent unnecessary repetition an-in depth explanation of items 3 to 6 will be given in §8.3. In that section the researcher takes a reflective perspective on the ES*i*OD approach itself. Items 3 to 6 fit and enhance this analysis. Items 1 and 2 explicate contextual issues that affect the process and its outcomes:

1. The lack of top management support for the change management process and the change management team itself

Summarized description:
Top and higher management are clearly absent from many collaborative workshops. Somewhat understandably this may be due to the fact that they have other obligations, but the their influence is limited to delaying the process by either frustrating design decisions, not making any decisions or by disturbing power play from

the line organizations perspective. The indecisiveness especially influences the progress of the change process. Top management does not intervene in resolving conflicts, power and political issues and lastly fails to show exemplary behaviour of how to deploy design and development. The reflection group explicates the following causes and possible measures:

Causes

- Too late involvement of active top management and sponsorship
  - Change management and project teams were not able to explain the organizational impact to the top. The relevance for the top is not clarified.
  - SPEER program is perceived as just another program next to all other programs.
- Top management focuses on short term whereas SPEER has long term ambitions
  - Focus of top management is on savings and personnel cuts, whereas the original ambition included substantial process and organizational improvements
  - Top does not make explicit choices (this behaviour is copied and can be recognized in the behaviour of the design teams, which postpones explicit design decisions are)

Possible measures

- Earlier involvement of the top.
  - Top and higher management play a pioneering role and should be more aware of their position
  - Better and earlier communication of the organizational impact of the SPEER program
- Give top management the chance to participate by speaking each other's language and letting them adapt way of working to their style
  - Work more incrementally. Show earlier results in simple, accessible format and language
  - Organize stakeholder management bureaucratically, but combine this with greater use of informal networks

2. The collaboration with and within the change management team can be improved

Summarized description:

The change management team is characterized by a gathering of individual professionals who do not succeed in building a team spirit during the process. On the one hand this is a deliberate decision, because the change consultants do not want to appear as a team or block to the outside world, but want to operate freely during the process. By doing so various stakeholders with different backgrounds can be advised and coached during the process. *"Keeping our independent position is vital"*.

Nevertheless the team members also admit that a strong individuality is present and knowledge and experiences are not shared sufficiently during the project. Though this freedom still is perceived as valuable the team also states that the negative impact of this way of working affects the team's credibility and adroitness. Not acting as a team in many cases causes the resolute members of the MINDEF organization to doubt the teams' expertise and choose their safe and habitual approaches instead of trying the ways of working proposed by the change consultants. The reflection group defines the following causes and possible measures:

Causes:

- Relatively new approach in a difficult domain with a bureaucratic organization with low change competences.
- Professionals who are used to working individually and based on their expertise
- Number of consultants is low even though they have numerous tasks in different teams and settings. This soon results in a sort of consulting rat race and less time for inward reflection
- In some situations the project is a playground for change experts to try things out on

Possible measures

- Be aware of androgynous perspective. To the outside there is the need to operate as individuals serving various stakeholders, but on the inside an improved sharing and team building culture need to be achieved
- Be realistic about the combined phenomena of capabilities of the organization and the ambitions of the change project and planned change process.
- It is a planned change process and in a lot of instances a merely interpretative approach will fail. Planning parts of the development process is possible as long as time and room are created for it.
- A more deliberate attitude from the change consultants, accompanied by the need to study and inform oneself of the design content to match the material experts and help them when necessary.

8.2.3 *Conclusions*

The previous section explains a list of findings from the perspective of the members of the PGS project organization and the change management team in particular. The outcomes are very useful since they give extra insights from the various players during the entire case study.

During the assessment of the change management team clearly a critical perspective is taken on its objective to merely find problems. During these sessions relatively little attention is paid to the positive contributions during the project. In the perspective of the researcher this is a somewhat coloured perception and can be explained. The change management team is closely related to the integral approach and to a great extent feels responsible for the negative results and achievements in the development and change process. This does not make the issues less important, but considered from an independent perspective the change consultants have limited capacity to influence this large-scale process, and some important issues are not or only minor within their sphere of influence such as top management involvement.

The evaluation organized by the project management team takes a balanced perspective and requests participants to reflect on good experiences and possible improvements. The perceptions of the PGS members in the first section are more neutral and balanced and can also nicely be combined with the specific findings of the change management team.

One significant observation is hidden behind all the stated issues and illustrates the development of the participants at the end of this stage. The setting and timing during the reflection process enable the participants to really reflect as the sessions especially focus on this objective and the timing is a natural moment for reflection. After 14 months the PGS project comes to an end and slowly the preparatory activities for the second design stage are initiated.

This moment captures the PGS team members adopting a truly reflective mode that lacks during the entire projects' course in 2005. In comparison with the intermediary session in July 2005 (the first large-scale reflective session by PGS) one substantial element is added; a more calm state of mind. This necessary element for competence development is explicitly placed in ES*i*OD, but the teams mostly fail its deployment during the active course of the project. This observation is confirmed by Schimmel (pp; 295, 2007) who states that the situation at the end of PGS 1 induces the necessary learning and reflection for the development organization. In that perspective it can be concluded that, though very, very late in the process, now all the teams do try to reflect as a means to competence development.

8.3 Foundations for redesign; reflections on plan, process and product evaluation

In this section the researcher himself takes a reflective perspective and looks for new insights and enhancements of the insights from section 8.2. He reflects on the results in chapters 5, 6 and 7 and the relationships between them.
The main objective of chapter 8 is to specify the redesign of the integral approach, ES*i*OD. We therefore look for the interaction between the context-specific approach (Chapter 5), the deployed process (Chapter 6) and the results (Chapter 7). For clarification purposes chapters 5, 6 and 7 each describe these aspects, but in real life there is continuous interaction between the approach, the deployed process by its users and the results (compare Figure 26, pp.104).
Section 4.6 explains how an approach or methodology is embraced by its users (Aydin, 2006; Hirschheim& Klein, 1995). During the process the contextual conditions, the approach itself and its users will all influence each other (Figure 55, pp. 195); The approach, during the process, will be partly deployed, ignored and altered by adding experiences from the users. In this way participants will learn and change. This interplay makes it more difficult to directly point out *the* redesign specifications of the ES*i*OD approach from the individual analysis outcomes in the MINDEF case. Nevertheless the design specifications can be derived by an in-depth investigation into cause and effect relationships in these three interplaying aspects. This is realized by a four-step approach:

A. A comparative analysis of the deployed process (results from chapter 6) and how it differs from the context-specific design of ES*i*OD(5.6 and 5.7). This is connected to the outcomes in the MINDEF case (results from chapter 7);
B. A cluster analysis of the elements that are valued and selected for improvement by the several participating groups in the process. (i.e. the PGS teams, the change management team, participants from the network and the researcher himself); (This is based on the results from sections 8.2, 6.7.3 and 6.8.2)
C. The combined analysis results of steps A and B are further investigated by an in-depth reflection of the cause and effect relationships between the deployment of the approach, the course of the process and finally the results that can plausibly be assigned to the interaction of process and approach. This is realized by cause mapping and a root cause analysis that make it possible to determine the case-specific MINDEF context.
D. In the last step the redesign specifications are derived that define redesign adaptations to the generic format of ES*i*OD, the MINDEF case-specific adaptations or recommendations and finally necessary boundary conditions.

The retrospective analysis is based on two elements of the ESIMM model: framework and the accompanying methods and instruments. ES*i*OD, introduced in chapter 4, divides framework into three assignments each including its methods and instruments. Each assignment is analysed individually in the subsequent three sections.

8.3.1 ***Network development***

A Analysis of the expected way of working compared with the actual deployment and its results

In the perspective of the entire PGS project this assignment has been deployed in the same way by the different groups of the development organization. A substantial number of the participants comprehends the intentions behind the assignment. This includes the deployment of the assignment, its objectives and the relevance and also the respective use of the tools and instruments. Table 85 gives a comparative overview of the deployment compared with the expected deployment of the three methods that accompany network development. It can be concluded that the development organization as conditional instrument and type of project organization is deployed and this works out well in the beginning of the project. Nevertheless the lacking interaction with the other assignment, competence development, causes the development organization to return to a functionally organized project team during the project. This is also influenced by the deployment of roles. This instrument is used at the beginning of the project, but the role deployment is influential (§6.5.3, pp. 283; §6.6.3, pp. 298) whereas role development in many cases fails (§7.6.20, pp. 380)

The generic format of LSIs is widely deployed, but its benefits and possibilities are not optimally utilized in a substantial number of cases. The LSIs, though deployed differently by the different PGS teams, in each team are deployed in a very uniform and static format. This is also due to the absence of interactive elements such as simulation and gaming defined in the third assignment, competence development. The outcomes of the deployed assignment are the creation of an extensive network of various participants from the line organization, a substantial knowledge increase and the socialization between the different “blood types” in the MINDEF organization including its accompanying increase in mutual understanding and trust.

	Application	Significant discrepancies from expected deployment
Development organization	○ Installing the Development organization in the project. ○ Development organization in the first6 months exceeds classical project team.	○ Development organization does not meet all objectives as it only partly succeeds in initiating development of the members from PGS and their participants in the network. ○ After the summer break the development organization, especially PGS, reverts to a project team that depicts the culture and behaviour of the MINDEF organization in miniature
Roles and Rules	○ Moderate application and definition of Roles and rules at the beginning of the project. ○ Process owner role is moderately successful with focus on network development. The role is assessed as being difficult due to existing competences, the lack of dedicated role-based coaching and sometimes misunderstanding of the role concept.	○ Staffing problems and lack of a focused initial training programme affect role deployment and development ○ Sustaining sponsor role is unsuccessful as top management involvement and support gradually decreases during the project. ○ Deployment of rules fails especially due to the combination with failing role deployment of process owners and sustaining sponsors. Power from the line organization disrupts continuation of the development process and the quality of the designs.
LSI	○ Extensive application of the generic LSI concept in different settings with an extensive number of participants. • Purchasing team uses self developed collaborative workshop design that alternates between large scale plenary sessions and smaller scale dialogues • Materials management team adopts the RSW format	○ The adopted participation level from the line organization is limited (from conforming up to contributing (Passmore & Fagans, 1992). Members in *the Network* often participate in a consuming mode. This is also caused by the repetitive and uniform deployment of the LSI concept by the different teams within PGS.

Table 85 Deployment of tools and instruments in MINDEF

B. Cluster analysis on reflections and specifications for redesign

The network development assignment is assessed as positive by the change management team reflection initiative (8.2.2). It values the extensive involvement of the line organization, a successful socialization process between different force units and the substantially improved mutual trust after 12 months. Nevertheless this group evaluation also sees specific issues that need to be improved. During the collaborative workshops the network participants remain rather passive, whereas they should be stimulated to collectively design, decide and actively experience these sessions.

Deployment of the cluster analysis

An overview is created that defines the valued elements in ES*i*OD and the elements that require improvements. This is realized by a cluster analysis of the reflections from the various participants in the process including their line of reasoning. Clusters are derived by classification and deduction of these statements.

Table 86 and Table 87 present the cluster analysis results that each include four columns. From left to right these represent:

Cluster:	The aggregating label that describes the collective reflections that belong together according to the cluster analysis
Type:	The category that explicates the typical characteristic of the clustered reflections (outcome, deployment of the approach or a necessary boundary condition)
Statement	The actual reflection as a collective statement of the observations from the various respondents
Source	The population that reflects (participants in the network, the researcher himself, the PGS or the Change management team

Valued elements in ES*i*OD

Table 86 shows the valued elements seen from the different participants. The analysis shows that there is a mutual agreement between the different participants and that especially outcomes are valued. The latter points to the result-driven attitude of the participants

Cluster	Type	Statement	Source
Efficiency and effectivity of LSI	Deployment	Efficient use of large-scale sessions	Network
	Deployment	Effective use of large-scale population	PGS
	Deployment	The number of people involved	Change Mgt. team
Knowledge exchange and socialization	Outcome	Successful realization of spreading of knowledge and information Increase in acceptance	Network
	Outcome	Socialization Substantial number of people with understanding and knowledge of the project	PGS
	Outcome	Increased mutual understanding and trust (the latter after a substantial period)	Change Mgt. team

Table 86 Valued elements of network development

Elements or aspects that can be improved

Table 87 shows the improvable elements of network development seen from the different participants. The analysis of the findings shows five substantial improvement outcomes:

A. role deployment in the development organization
B. repetitive restructuring of the development organization
C. interaction of network development with design activities
D. agreement between the line -and development organization
E. enduring top management support and involvement

Cluster	Type	Statement	Source
A Role deployment in the development organization	Deployment	The defined Roles in the Network (Expert, Advisor, Decision maker) and their distinctive properties are perceived as unclear and should be better explicated. Spreading knowledge within the line requires extra resources and facilitation by the development organization.	Network
	Boundary condition	The facilitation of "deeper" network development in the line organization (the Network) should be done both in resources as well as in knowledge.	PGS
	Deployment	A tighter Interaction with the competence development assignment is required: Roles are defined and installed, but in the majority of cases the staffed members lack the specific competences from the start. This requires a deliberate coaching on role development. ES*i*OD should make participants more aware of the necessary link between the role instrument as organizing item (network development) as well as dynamic development aspect (competence development)	Reflection by the researcher
	Deployment	Explain expectations to role owners Improve and increase coaching for process owners	Change Mgt. team
B Repetitive restructuring PGS	Deployment	Network development *within* PGS is neglected. The process teams emphasize outward networking, but "forget" to do so inwardly.	Reflection by the Researcher
	Deployment	More exchange of people and structures within PGS Organize teams around processes not SAP modules	PGS
	Deployment	Organize teams according to objectives Improve internal collaboration and knowledge sharing	Change Mgt. team

Table 87 Clustered analysis of improvements for network development

Cluster	Type	Statement	Source
C Interaction with design activities	Deployment	A tighter interaction with the systemic design assignment is required. The teams adopt a 'classic' design workshop approach during the LSIs, focusing on mere process and information system design.	Reflection by the researcher
	Deployment	Better adjustment of project documentation for the audiences including fewer urges to create extensive documentation.	Change Mgt. team
D Agreement making accompanied with rules and involvement of decision makers	Deployment	Line organization, configuration facility and process teams in an early stage make their expectations and responsibilities explicit to one another	Change Mgt. team
	Deployment / Boundary condition	Top management fails to show the appropriate behaviour and actions. This affects the deployment of network development	Reflection by the researcher
E Top management support *and* involvement	Boundary condition	Achieve real and sustaining sponsors from the beginning. (This replicates finding 1 from section 8.2.2).	Change Mgt. team
	Deployment	Incremental decision making (involve decision makers in an early stage)	PGS

Table 87 (continued) Clustered analysis of improvements for network development

C Root cause analysis

The clustered improvement results are derived from different perspectives of the participants in the case study. To derive redesign specifications the issues need to be divided into elements that depend on the MINDEF case context and that can be deduced to actual redesign principles that relate to the foundations of ES*i*OD.

This is done by a root cause analysis of the deployment of network development throughout the entire case study. Figure 90 shows the cause map (Weber & Manning, 2001) for the cause and effect relationships in deployment, process and results of network development. The map is based on the retrospective analysis of chapters 5, 6 and 7 combined with the in-depth results of item 5 of the CM group reflection, introduced in §8.2.2 (Figure 89, 388).

It starts with the main outcomes from the bottom going upwards via several entangling substantial issues to the root causes at the top. It can be seen that on the left side organizational-specific contextual issues are displayed, whereas on the right and in the middle the issues in the deployed network development are presented. The improvement issues, derived in the previous clustering analysis (Step B) are also represented by the following labels:

A	Lack of role deployment in the development organization
B	Too little repetitive restructuring of PGS
C	Too little interaction with design activities
D	Problems due to the agreement making between line and development organization
E	The lack of enduring top management support and involvement

The accompanying narrative that is depicted in the cause map goes as follows:
The assignment results in a substantial increase of knowledge, acceptance and socialization in the line organization, but in-depth discussions and decisions on critical and sensitive organizational aspects are avoided. This is caused by the fact that the responsibilities for design decisions are transferred to the line organization and not to the development organization. PGS requires interventions from top management, but this is omitted (label E) and there is a shift in the responsibilities for the discussed items. This especially concerns labels C and D. Consequently teams do not dare to express sensitive issues and play safe. The lack of interaction with the competence development assignment together with the explicit focus on creating large-scale acceptance results in moderate attention being given to role adoption in PGS (label B), This aspect together with the efficient uniform LSI approach causes a lack of elaborate support for the participants from the line organization in their roles (label A).

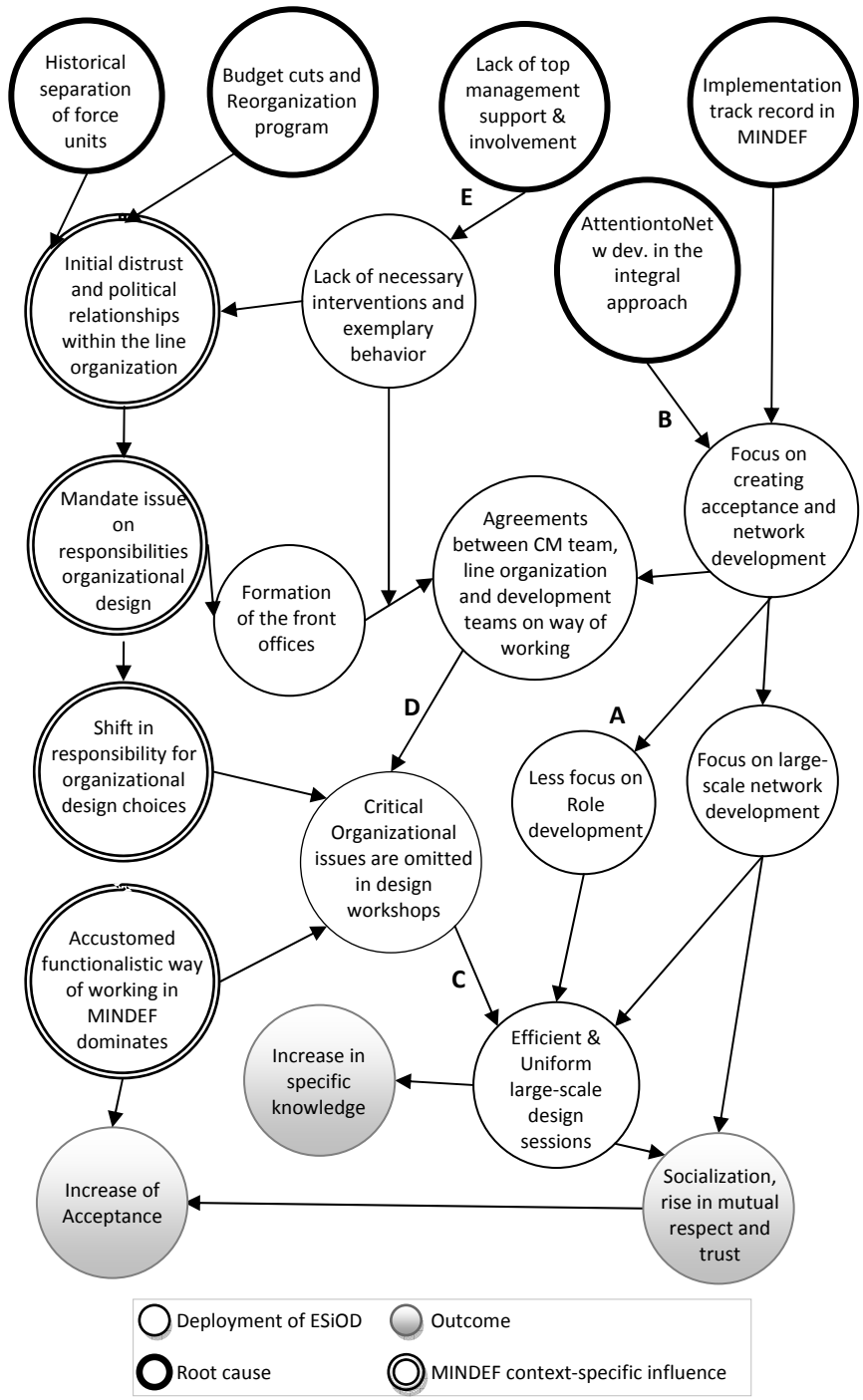


Figure 90 Cause Map on the deployment of network development

From the beginning the network development assignment receives a lot of attention compared with the other two assignments. This is caused by two related phenomena:

1. The assignment implicitly receives extensive attention of most of the internal organizational members. This is mainly caused by the historical track record of IT implementations within the case organization and their acceptance.
2. The assignment is also explained understandably and concisely in the source material from the beginning of the project. Already during the beginning stages of the project there is a kind of unanimous agreement on how to deploy this assignment.

D Explication and subdivision of design specifications

The previous analysis explicates valued elements and areas for improvement.

The cause-effect analysis shows how the case context and the followed approach interact with each other, the result in the course of the process and its final results.

To phrase the redesign specifications a distinction has to be made between the original ES*i*OD design (§4.6, pp. 192) and the case-specific situation (§5.7, pp.224). A comparative analysis of the original items in ES*i*OD with the improvement items in the perspective of the case-specific context separates the generic redesign specifications from the case-specific improvements. Table 88 shows the results of this assessment.

The redesign specifications of the generic format of ES*i*OD are explicated in the left column. In some cases the redesign measures or adaptations in the accompanying element in ES*i*OD, is not applicable (N.a.).

The MINDEF case-specific adaptations or recommendations are presented in the middle column. Finally, the right column explains necessary boundary conditions for a successful deployment of the approach. Table 88 shows that there are two adaptations positioned between the three assignments.

The first adaptation is positioned between systemic design and network development. The LSI concept is deployed as generic large-scale instrument and this distracts the attention away from the small scale intentions of the collaborative design workshop. This is elaborated in ES*i*OD (4.3.3, pp. 162 and, 4.4.3 pp. 172), but the explicit combination of these two methods should be formulated more clearly. The same holds for the second adaptation that touches on the assignments network development and competence development. Roles are defined in network development as an organizing element (4.3.3, pp. 162) and §5.7.1, pp. 231).

The enduring deployment and especially link with the role development in the competence development assignment are underexposed. This intended combination should be formulated more clearly. Both topics are included as redesign specification to make improvements and a clearer explication of the way of working in ES*i*OD. The adaptations are specified to the MINDEF case by putting them into the perspective of the case-specific context.

Item	redesign or adaptation of ESiOD	Case specific adaptation or recommendation	Boundary condition
Interaction with systemic design	Improve efficiency of network development by adjusting project and design documentation for the respective audiences	Adapt BSF and PMF documentation	Different design templates for configuration team and participants in the Network
	Adaptation of LSI: better fit the objectives of the collaborative design WS (systemic design assignment)	Training on different workshop formats for different objectives	
Integration of Role deployment and role development	Roles are defined in ES*i*OD (4.3.3, pp. 162) and (§5.7.1, pp. 231). Interaction with role development in the competence development assignment requires more explicit description and explanation	○ Reinitiate dialogue on role deployment at the start of the second design stage ○ Improve match with coaching and competence development	○ Facilitation of role deployment in the Network (Training & resources) ○ Enduring Involvement and support of top and higher management (transition council and sustaining sponsor roles)
Restructuring development organization	N.a.: Is defined in ES*i*OD (§4.2.1, pp. 155) and context dependent design (5.7.1, pp. 225; Figure 67, pp. 228	Organize PGS dynamically	

Table 88 Redesign requirements for network development and improvements for MINDEF

8.3.2 ***Systemic design***

A Analysis of the expected way of working compared with the actual deployment and its results

In the perspective of the entire PGS project this assignment is deployed in the same way by the various teams. The deployment by the purchasing team shows slight differences, but in most cases all teams adopt the same approach. Table 89 shows the deployment of the three tools that accompany systemic design.

The followed approach substantially differs from the intentions and meaning behind systemic design in ES*i*OD. Systemic design essentially is the integration of both designing technological artefacts and explicating the relating social with behavioural implications for the organization and its members. This is only realized in a handful of occasions, mostly by the purchasing team. In these cases the workshop setting is fruitful and the related competence development significant, but unfortunately in all the observed cases the relevant insights and results are not explicated in the design artefacts.

	Application	**Significant discrepancies from expected deployment**
Collaborative Design WS	○ The to and fro between process vision development and problem analysis has been achieved moderately during the several workshops. ○ Uniform workshop format	○ Process visions lack a connection to explicit project ambitions and benefits, but also the explication of existing issues or problems is often refrained from. ○ Designs are not explicated systemically. ○ Organizational affairs are downplayed
Diverse modelling method	○ Gradual adoption of one specific modelling method. ○ Classical EPC-based process documentation.	○ Social and soft aspects that come up in dialogues and discussions are not recognised as important and not recorded in the design artefacts ○ The used Mavim tool does not support rich modelling concept.
Systemic template	○ The used design templates are standard ES templates with an emphasis on EPC-based business process design.	○ Relationships with other more social-and organizational-based aspects are neglected or defined scarcely within the used templates.

Table 89Deployment of tools in systemic design in MINDEF

B. Cluster analysis on Reflections and specifications for redesign

An overview explicates the valued elements in ES*i*OD and the elements that require improvement. This is realized by a cluster analysis of the reflections from the various participants, including their line of reasoning.

Valued elements in ES*i*OD

Table 90 shows the elements that were valued. Especially the interaction with network development is valued. This includes the large-scale setting, the invitation of participants from different backgrounds and the use of the uniform workshop format.

Cluster	Type	Statement	Source
Uniform format of design workshop	Deployment	Uniform workshop format	Network
	Deployment	Efficient design workshops in a large-scale setting (Integration with network development)	Network & PGS
	Deployment	The amount of people involved	Change Mgt. team
Uniform design format	Outcome	Applicable process and information system designs	PGS

Table 90 Valued elements of systemic design

Elements or aspects that can be improved

The majority of the participants state that the reasons for the unsuccessful deployment of this assignment are not mainly related to the line of reasoning and the objectives in ES*i*OD itself, but that it especially depends on the situational context of the MINDEF organization and influential decisions during the project, such as the use of modelling methods. Three clusters of improvement items can be discerned:

A. Persistent deployment of systemic design
B. Varied and integrative deployment of the collaborative design WS
C. Pay attention to method deployment and change process

The results from Table 91 and Table 90 show the contribution of the reflective sessions around and after t2. The Network and PGS at first sight value the uniformity of the design workshops (Table 90). However it is argued that this uniformity contributes to the poor integration of the systemic design assignment with competence development (Table 91). The understanding of this phenomenon during the reflection stage significantly increases the comprehension of the essential line of reasoning behind the assignment. It convinces the participants from the Network and PGS to try another deployment in the future situation. This confirms the initial lack of experience (both of external as well as internal participants) combined with the moderate preparation and schooling on this assignment.

Cluster	Type	Statement	Source
A Directive approach to persistent deployment of the assignment	Deployment	ES*i*OD suggests different and rich modelling methods, but leaves room for the practitioners. A more directive approach is required that better prescribes the use of such methods	Reflection by the Researcher
	Boundary condition	This requires training of internal, but also external participants. 'Classical' methods mostly used by system designers or SAP consultants do not suffice.	
	Boundary condition	Systemic design requires mature and elaborate training material and appropriate tooling from the start.	PGS
	Deployment	Change management team members should take a more persistent attitude during sessions • Start each workshop with the 4 program ambitions of SPEER as guiding objective • Reminding participants of the importance of the open and honest dialogue on detailed issues and also on making the accompanying decisions.	Change Mgt. team
B Focus way of controlling on progress in content *and* process	Deployment	Extension of way of controlling the process instead of the content. This implies more inquiry and control of project management on how workshops are carried out including the results and objectives.	Reflection by the researcher
	Deployment	A more directive approach by project management, steering team and possibly top management as way of controlling how external parties behave and deploy methods or tools	Change Mgt. team

Table 91 Elements or aspects from systemic design that can be improved

Cluster	Type	Statement	Source
C More varied approach in deploying LSI and collaborative design WS	Deployment	Varied deployment of the LSI concept. Systemic design is about the collective creation of design artefacts, but also about the open dialogue on organizational issues and impact. This requires an alternating approach in which different workshop formats are available and deployed by the teams.	Reflection by the researcher
	Boundary condition	Exemplary behaviour and more involvement of top management. The mutual distrust between line organization and development organization on explicating organizational design decisions should be negotiated by top management involvement	PGS
	Deployment	PGS adopts the generic LSI format as design workshop, but the essential integration between large-scale network development and collaborative systemic design is refrained from. This requires different WS formats with support from • Top management: Acknowledging the importance of the item by exemplary behaviour of the project management team and steering board. • Openly complimenting employees who do explicate impact on the organization instead of sanctioning them	Change Mgt. team

Table 91 (continued) Elements or aspects from systemic design that can be improved

C Root cause analysis

Figure 92explainsthe cause and effect relationships in deployment, process, and results of systemic design. The map is based on the retrospective analysis of chapters 5, 6 and 7 combined with in-depth findings 3 and 4 of the CM group reflection sessions, introduced in §8.2.2 (Figure 89, 388). Parts of the context-specific issues from the network development assignment (Figure 90) can be recognized at the bottom left (critical issues are omitted, mandate issue, etc..).

The issues for improvement, derived in the previous cluster analysis (Step B) are also represented by the following labels:

A. Lacking persistence in the deployment of systemic design
B. Uniform deployment of the collaborative design WS
C. Lack of attention give to change process

The accompanying narrative that explicates the cause map goes as follows:

The outcomes represent 'classical' information system and process designs. This differs substantially from the intended results of this assignment. This is caused by different issues. The context-specific influence of the line organization again plays a substantial role. At first there are disagreements on topics and way of working during the design workshops. Due to the mandate issue the network receives the decisive power over design decisions on organizational impact. The network also influences the way of working which emphasises process design and associated SAP functionalities without defining organizational impact and business benefits (Label B).

For this assignment this disrupting effect is also strengthened by insufficient fulfilment of boundary conditions causing the unsuccessful outcome. First there is a lack of control and coaching by team leaders, project management and change consultants. Due to the insufficient knowledge most participants do not see the added value of explicating "organizational impact" and deploy classical process and information system design. Some participants are excellent (technical) experts or designers; they adopt their behaviour and excel in their present design skills. This even holds for external business and SAP consultants also showing a lack of knowledge on explicating organizational impact.

The training and introductory material is also not able to explicate the essential objectives and reasons behind systemic design. The material is less explicit and less mature compared with the network development assignment. Also a substantially smaller number of participants really has knowledge on systemic design and its objectives at the beginning of the project. This effect is strengthened by using an inappropriate way of modelling for the explication and appointment of systemic designs. The MAVIM design tool shows strong limitations and the design templates BSF and PMF offer significantly low options for explicating organizational aspects.

There is no visible exemplary behaviour of top management to stimulate a dialogue on organizational impact or the necessity of making choices. Role deployment of the sustaining sponsor fails in that perspective. Finally the change management consultants do not persist (Label A) in sticking to the original objectives of the approach and do not use available formats such as process quality workshop. See also the detailed explication and observations in Figure 91.

Reflection on the Process quality workshop

This workshop is situated in the four-step approach and is meant as a method to tie together organizational and information system aspects during a design workshop (Figure 72, pp. 270). The workshop format is not used by the different teams in the project. This causes some discussion during the evaluation sessions. To some extent the change team leaders are surprised that the format is not used. The change consultants do admit to having a kind of 'aha Erlebnis', again recognising its presentation in the beginning stages of the project. They also state that the importance of this format is never really discussed in the succeeding stages during the entire project.
The researcher in the observations never sees this workshop format explicitly mentioned or used and the change consultants unanimously confirm this. The workshop instructions are relatively scarce. They are found after searching several project documentation directories. This observation illustrates the availability and the immature state of some of the methods and materials. It also shows the mutual knowledge gaps between consultants and their individual approaches.

Figure 91 Reflection on the Process quality workshop

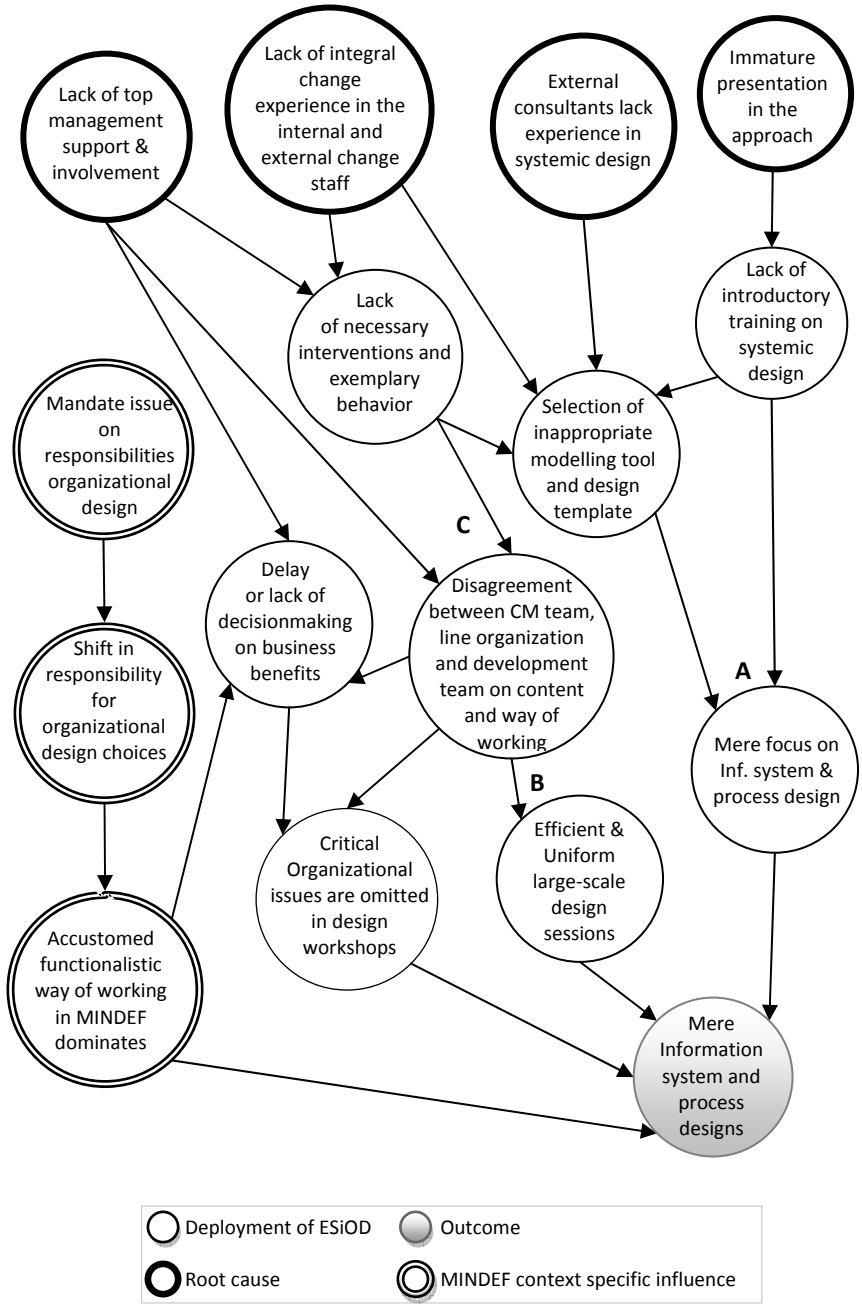


Figure 92 Cause map on the deployment of systemic design

D Explication and subdivision of design specifications

Based on the previous three steps the design specifications are divided into specifications for ES*i*OD, case-specific recommendations for MINDEF and boundary conditions. Table 92 shows the same adaptation of ES*i*OD considering the integral deployment of LSI and the collaborative design workshop (4.3.3, pp. 162 and 4.4.3, pp. 172). The systemic design assignment clearly fails in the MINDEF case and the main causes are context-specific. The fundamentals behind the assignment therefore lie in ES*i*OD, but its described way of working is improved. The case-specific adaptations are explicated in the middle column. One specification of ES*i*OD concerns the adaptation of way of controlling process and content. This concerns the reflective action as explicated in section 4.6, pp. 192. This section explains the reflective action as a measure to assess the specific context and adjust the situational deployment of instruments and way of working. In the MINDEF case this is scarcely deployed.

The failure in this case study shows that way of controlling was not deployed as method for mutual reflection. A more prominent position of reflective action is required within ES*i*OD, especially by making participants aware that a recurring deployment of reflection is necessary as well as helping them with this connecting method between design and development.

Item	Adaptations or redesign of ES*i*OD	Case-specific adaptation or recommendation	Boundary condition
Deployment of Systemic design	N.a. Systemic design is extensively elaborated on in §4.4 (pp.171)	Directive approach and self-assured acting of the CM consultants. CM consultants also dig into design content	Appropriate design tooling and templates Prepared external consultants
Integration of LSI and collaborative design WS	LSI: better fit with the objectives of the collaborative design WS (systemic design assignment)	Training on different workshop formats for different objectives	
Reflection as adapted way of participative controlling and learning	Reflection is explicated outside the elements of ES*i*OD (4.6, pp. 192) The limited deployment and results in the MINDEF case show the explicit emphasis for the mutual reflection activity is necessary	Extension of participative monitoring and way of controlling of the change process and not merely design content objectives	Involvement and support of top Management Create better connection between change management team and project management team

Table 92 Redesign requirements for systemic design and improvements for MINDEF

8.3.3 ***Competence development***

A Analysis of the expected way of working compared with the actual deployment and its results

The third assignment, competence development, is characterized by a diverse deployment by the different teams. The focus in this dissertation is on two micro perspectives: the materials management and the purchasing team. Interviews, observations and survey results show that both teams deploy competence development in their own way, but this only contains partial elements from the prescribed ES*i*OD approach. Table 93 shows the deployment of methods and instruments.

	Application	**Significant differences with expected deployment**
Gaming	○ Role play is cautiously tried out in different workshops (MM and purchasing team), but without a good preparation of the teams and without the deliberate connections to explicating behaviour or competences in the new situation	○ Gaming and simulation in general are limitedly deployed since process designs are not really "played through". Process designs are gone through in brown paper sessions without experiencing its impact. Participants are not unfrozen or positioned in specific roles by experimental learning.
SFA	○ Surveys are moderately carried out by the change management team, but without the feedback loop	○ During the project only applied by the researcher. Moderate successful results as the feedback part is only discussed with a minor amount of PGS
Janusian WS	○ No application	○ During the project only applied by the researcher with successful results and evaluation by the participants
Coaching	○ Deployed in the project by the change consultants ○ Especially the external change consultants pay attention to coaching the team members and team leaders.	○ MINDEF internal change agents clearly have shortcomings, but this may be due to less experience with coaching than the external change consultants

Table 93Deployment of tools during competence development in MINDEF

In chapter 3 the constructivist approach to competence is introduced (Stoof et al. 2002; Figure 32, pp.119). ES*i*OD includes this approach and suggests a mutual dialogue on the meaning of competence. In the MINDEF case two different approaches to competence can be distinguished.

The materials management team opts for a functionalistic deployment with an emphasis on knowledge increase and learning new skills. These aspects also represent the team members' competence increase. Interviews with the change consultants show that this deployment can also be recognised in the other two teams. These include weapon systems management and finance & controlling, neither of which are subjected to detailed investigations in this dissertation.

The purchasing team chooses a more interpretative approach without making this explicit to the team members and also without explicating the outcomes in the designs (see also the section on systemic design §6.5.2, pp. 278). This approach is fruitful after a difficult start-up period. Towards the end this approach reverts to individual development initiatives mostly focused on the interests and ambitions of the individual team members. Nevertheless, the outcomes of the purchasing team show significantly different outcomes on competence increase than the materials management team.

B. Cluster analysis on reflections and specifications for redesign

A cluster analysis of the reflections by the various participants/respondents creates an overview that explicates the valued elements in ES*i*OD and the elements that require improvements. The latter includes the line of reasoning by the respondents.

Valued elements

Table 94 shows the valued statements. The valued items focus on knowledge increase and skills. Behaviour and social interactions are not included. Again, mostly the outcomes are valued including one process related statement (collective learning).

Cluster	Type	Statement	Source
Knowledge increase	Outcome	Gained insights on MINDEF, SAP and processes	Network
	Outcome	Gained insights and knowledge on SAP, implementation process	PGS
	Outcome	Gained insights on the deployment and effects of the integral approach	Change Mgt. team
Collective learning	Deployment	Learning together	Network & PGS

Table 94 Valued elements of competence development

Elements or aspects that can be improved

The various respondents specify several elements for improvement. These can be divided into five coherent clusters. Table 95 shows the clustered items in arbitrary order:

A. Initiate a dialogue on integral organizational design and development
B. Integration with systemic design
C. Directive approach to persistent deployment of the assignment
D. Reflection as adapted way of participative controlling and learning
E. Focus on enduring role deployment and development

Cluster	Type	Statement	Source
A Initiate a dialogue on integral organizational design and development	Deployment	Early in the process a discussion on the essentials of integrating design with competence development are necessary. Especially the mutual sense making process on one another's meanings can lead to one shared notion or at least understanding and knowledge exchange	Reflection by the researcher
	Deployment	Earlier sessions on the approach and its meaning to create commitment and mutual understanding for the approach and its objectives and benefits	Change Mgt. team
	Deployment	The experiences on the different deployments of this assignment should be shared	PGS
B Integration with systemic design	Deployment	Explication of competences is an important contributor to competence development. The approach should emphasize the link between systemic design and explicating competences in the designs. Integration of role play, Survey Feedback Analysis and simulation & gaming into the design WS	Reflection by the researcher
	Deployment	Increase mutual learning and experience sharing during the design sessions	PGS & The Network

Table 95 Elements or aspects of competence development that can be improved

Cluster	Type	Statement	Source
C Directive approach to persistent deployment of the assignment	Deployment	A non receptive organization requires a very persistent and in some cases planned development approach	Reflection by the researcher
	Boundary condition	This implies clear and mature tooling, a persistent team and appropriate training	Reflection by the researcher
	Deployment	More Planned development Deliberate appearance and acting of the change management team in agreement with project management and SAP consultants	Change Mgt. team
	Boundary condition	Deliberate combination of assessment of project team members with dedicated training and coaching on their role in the project	Change Mgt. team
D Reflection as adapted way of participative controlling and learning	Deployment	The ES*i*OD approach deliberately leaves room for interpretation and self-deployment especially in this assignment. This 'freedom' should be accompanied by mutual reflection	Reflection by the Researcher
	Deployment	Project, change and team management should deliberately reflect and share experiences on the deployed change process, the applied methods and their results with each other.	Change Mgt. team
	Boundary condition	Start with a realistic ambition level for the change process that matches the change capacities of the line organization	Change Mgt. team
E Focus on enduring role deployment and development	Deployment	The Role instrument is mainly used as 'organizing' instrument as explicated in network development. This disregards the power of the instrument as facilitation of competence development.	Reflection by the researcher
	Deployment/ Boundary condition	Top management should show exemplary behaviour and be involved in the change process in good but especially in difficult times	Change Mgt. team

Table 95 (Continued) Elements or aspects of competence development that can be improved

The same learning effect (pp. 404, Table 90 and Table 91) that appears in the cluster analysis of systemic design returns in this analysis of competence development. The members from the development organization value the element of collective learning (Table 94). During the different reflecting sessions, these participants find out that there are real possibilities to improve their deployed way of working. This effect can be compared to the initial perception on the uniform design workshop in Table 90 (pp. 404). Both observations confirm the success of the real adoption of reflection during the sessions as described in §8.2, pp. 392.
It is again confirmed that label D is one of the elements needing improvement: Reflection as adapted way of participative controlling and learning. In the MINDEF case this goes wrong and the lack of mutual exchange of experiences influences the partial failure of broad deployment of competence development. This is further elaborated on in the next root cause analysis.

C. Root cause analysis

Figure 101 explicates the cause and effect relationships in deployment, process and results of network development. The map is based on the retrospective analysis of chapters 5, 6 and 7 combined with in-depth finding 6 of the CM group reflection sessions, introduced in §8.2.2 (Figure 89, 388). Parts of the relating cause-effect relationships from the network development assignment (Figure 90) and systemic design (Figure 92) can be recognized. The improvement issues, derived in the previous cluster analysis (Step B) are also represented by the following labels:

A. Lack of a dialogue on the meaning of integral organizational design and development
B. Lack of integration with systemic design and collaborative design workshop
C. No persistent attitude in the deployment of the assignment by the change management team and process owners
D. Lack of internal reflection on the change process
E. Lack of attention given to role deployment and development for members of the development organization and top management.

The accompanying narrative that explicates the cause map goes as follows:
The MINDEF organization itself is non-receptive and often takes a rather firm or directive point of view on the adapted way of working of competence development. The degree of persistent external and internal change expertise is low (Label C). The team spirit that the change management lacks is a side aspect that certainly reinforces this latter aspect. Nevertheless individual change consultants in the beginning individually tried to introduce different ways of working based on their own expertise. These consultants are in a difficult position.
They are perceived as "*those with the understanding of the soft items"* but this understanding is not always taken seriously by the participating members in the network as well as by the PGS team leaders or members.

The lack of exemplary behaviour from the sponsors in the top and higher management also does not support the change staff. The involved members from top management do not succeed in their role of sustaining sponsor or the transition council (4.3.3, pp. 162) (Label E). These phenomena have their effect on the mutual sense making process in the development organization. Examplary are the attempts of the change consultants (both internal and external) who try to support and stimulate the teams in their way of working. Workshop formats are proposed or even organized, but rather quickly during the project most teams revert to a standardized "work shopping approach" in which there is less room for self-deployment or competence development of the PGS members (Label B).
The time and possibilities for reflection and mutual exchange during the project becomes limited as teams focus more and more on their own business (Label D). This is strengthened by the perceived time pressure to finish designs and the lack of one uniform training and introductory material to the essentials of competence development. Compared with the other assignments this one is filled with extensive, but various material, which is the result of the various contributions from the consultants in the change management team. It actually represents a kaleidoscopic box of all individual best experiences and due to the lacking team spirit in the change management team each PGS team deploys its own approach.

The integral approach in the beginning of the project is presented as something special. The meaning behind development and the objectives of the assignment nevertheless remain conceptual and abstract. This leads to various images of competence development in the minds of the different participants even in the change management team. Because of the lack of a mutual sense making process on this meaning of competence development, the various teams and the different ambitions of the change consultants (Label A) drift apart.
The outcomes of this assignment are limited in the perspective of the competence notion that is included in ES*i*OD. Most PGS members and participants in the Network show improved skills and an increase in knowledge. This is exactly the much criticized functionalistic perspective on competence stated in §3.2.4, pp. 119 by Stoof et al. (2002) and McClelland, (1973). It is an improvement, but more could have been achieved, for example by placing more emphasis on explicating behaviour and personal development.

Using the same analysis as described in §8.3.1 (pp. 402) the specifications for improvement are analysed .Table 96 shows the results.

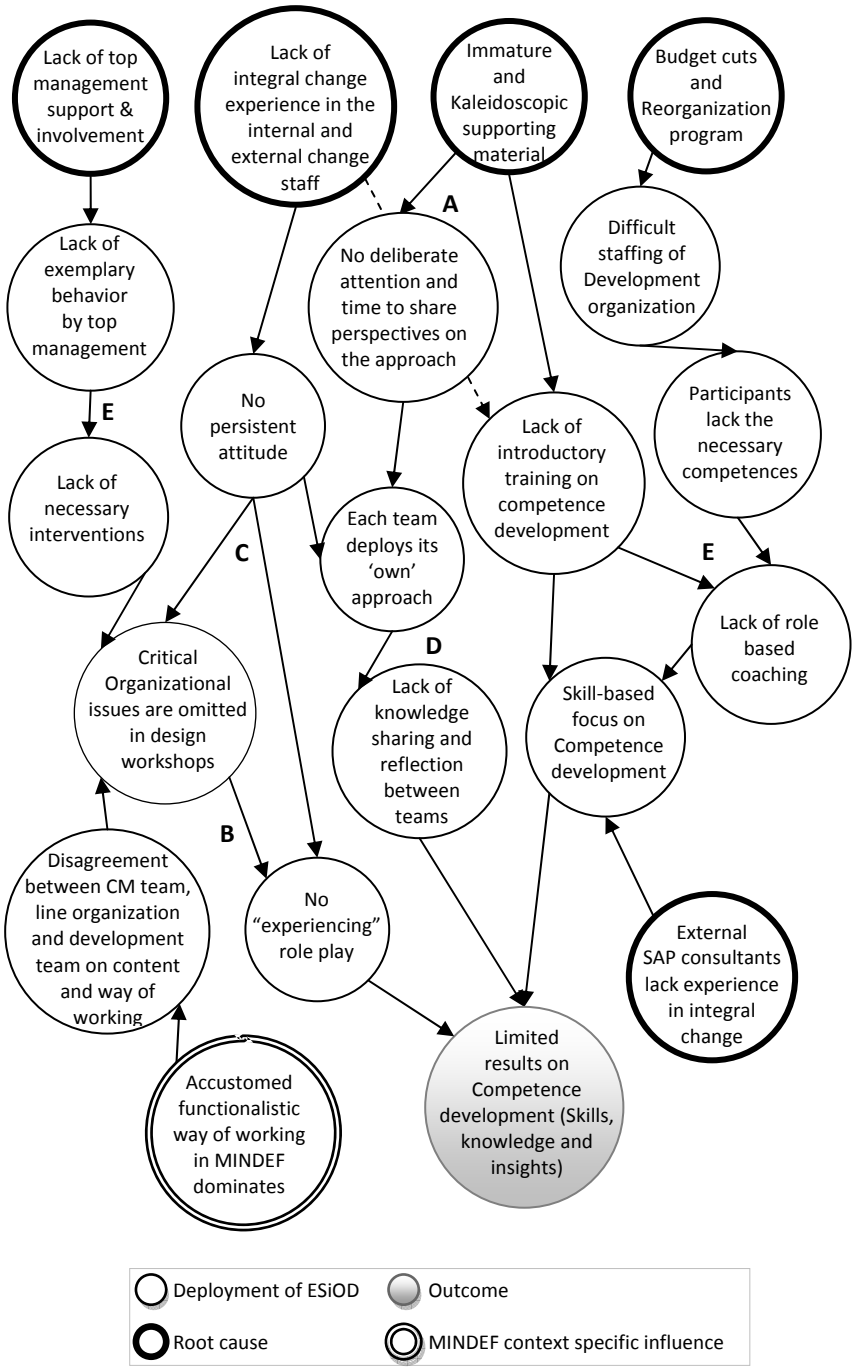


Figure 93 Cause map on the deployment of competence development

Item	Conceptual redesign of ES*i*OD	Case-specific adaptation or recommendation	Boundary condition
Integration of role deployment and development	Connect the role as 'organizing' instrument in network development with role development to facilitate competence development.	Improve role-based coaching	Acceptance and awareness of top Management
Initiate a dialogue on integral organizational design and development	N.a. The preparation and introduction of deploying ES*i*OD is elaborated on in §4.6.1, pp. 193; §5.6.1, pp. 220 and §5.7.2, pp. 229	Initiate a dialogue on integral design and development and its meaning early in the second design stage	Appropriate and consistent training and introductory documentation
Integration with systemic design	Better fit the objectives of the systemic design assignment: Explication of competences / Enhance collaborative design WS with simulation and game play	Training on different workshop formats for different objectives	Appropriate templates and modelling methods
Reflection as Adapted way of participative controlling	Emphasize the mutual reflection activity as participative way of controlling with focus on both the change process and the content	Extension of Way of controlling to include process and not only design objectives	Involvement and support of top Management Create connection between change mgt. team and project mgt. team
Directive approach to persistent deployment of the assignment	N.a. Competence development is elaborated on in §4.5(p. 181)	Directive approach and self assured acting of the CM consultants. CM consultants also dig into design content	Assessment of project team members accompanied by dedicated training and coaching on their role in the project

Table 96 Redesign requirements for competence development and improvements for MINDEF

8.3.4 *Concluding analysis and interaction between the assignments*

In sections 8.3.1, 8.3.2 and 8.3.3 three separate tables are derived (each time in step D) that explicate the requirements or adaptations for the redesign of ES*i*OD and recommendations for improvements in the MINDEF case-specific deployment. A comparative analysis of the three tables shows that there are two distinct types of design requirements.

A. Elements that address an improvement in ES*i*OD independent of the case-specific deployment. This category especially includes integral elements that appear in two or three of the analysis outcomes. These specifications require taking a more integral perspective on two or three of the assignments in ES*i*OD and their respective methods & instruments.
B. Elements that address a case -n the fundamentals of ES*i*OD, but the case-specific deployment fails due to for example the lack of external expertise, inappropriate use of tooling or simply disregard for the objective and deployment of the assignment(s).

A. Integral specifications or adaptations

It is an important observation that this first category of redesign requirements fits in between two or three assignments of ES*i*OD. Apparently the original setup of ES*i*OD groups the methods into one assignment and this causes an insufficient accommodation of the integral notion behind IOD ("designing and developing", §3.2.5, pp.122). The comparative analysis shows that there are three integral requirements that return in two or three of the respective analysis tables. These integral elements are:

1. Reflection on the deployed process and its outcomes as an improved and deliberate way of participative learning and controlling
2. Stronger integration of diverse instruments into the systemic design assignment.
3. Integration of the role instrument with network and competence development

1. Reflection on the deployed process as an improved and deliberate way of participative monitoring and controlling s

This redesign requirement is not explicitly incorporated into ES*i*OD as method or unique assignment. It is described under the generic context-specific explanation behind deploying ES*i*OD in section 4.6, pp. 192. This section argues that the deployment of ES*i*OD should be included in the planning and control cycle in which "way of controlling" should focus on progress of the realized outcomes, but also on the deployed interventions. The foundations behind this way of working and controlling are participative planning and controlling, described in section 3.3.2, pp.128.

Nevertheless, the deployment in the MINDEF case situation shows that a more deliberate attention should be paid to planning and controlling of both content ("what is realized") as well as process ("How is it realized"). Especially the empirical results in the competence development assignment show that the more implicit or "softer" the topics the more it is necessary to explicate process and outcomes. This does not imply that a functionalistic deployment of planning and control on competence development is required, but the explicit need to mutually share these topics with each other. Project professionals and designers have a natural tendency to focus on the content. They continuously ask the question: "what is accomplished?". The adoption of a deliberate moment of reflection attempts to expand this focus on the project's content and start up an exchange process in the group of participating members with the answers to the following questions:

- How did you do it?
- What was the result?
- What did you learn from it?

The redesign of ES*i*OD, based on this requirement will therefore *not* be realized by a dramatic change in the ES*i*OD philosophy of context specificity and participative planning. The movement between action and reflection is exactly the meandering mechanism that can substantially contribute to a mutual sense making of how the approach works.

2. Stronger integration of development into the systemic design assignment.

This second redesign requirement focuses on the systemic design assignment. The ambition of the integration around the systemic design assignment aims at performing the design activity while:

1) Large-scale interventions support network development and facilitate the extensive involvement of participants from the line organization.

2) Playful elements are incorporated such as role play, role development and experimental learning.

This marks exactly the integration of organizational development with repeated design activities. First, the social structure changes by the extensive participation process in a networking setup. Secondly, the competences of groups and individuals develop during experimental learning and mutual dialogue on the future situation. Intentionally this integration is described in ES*i*OD, but the deployment in the MINDEF case context shows it is necessary adjust and sharpen this objective. Too often the methods are deployed independently and the analysis shows that a clearer integration between these specific methods is necessary.

3. Integration of the role instrument with network development and competence development

This third redesign requirement concerns the connecting function of the Role method. This instrument in the original ES*i*OD is presented as an 'organizing' instrument in network development. It gives members of the development organization a different structure than their prior position in the line organization. This enables these members to be released from their current working environment and behaviour. Nevertheless, the deployment in the MINDEF case shows that the power of the instrument as facilitation of competence development is deployed rather implicitly and the members of the development organization perceive Roles more as an organizing instrument than a method that also facilitates development.

B. Case-specific adaptations or recommendations

The secondary category includes redesign adaptations that originate from the case specific deployment. In this case the analysis in the previous three sections shows that the issues are already covered in the fundamentals of ES*i*OD, but that the case-specific deployment fails due to lack of external expertise, inappropriate tooling or simply disregarding the objective and deployment. It includes the following recommendations

1. Initiate a dialogue on integral organizational design and development
2. Repetitive restructuring of the development organization
3. Employment of Systemic design
4. Directive approach to persistent deployment of the assignments

1. Initiate a dialogue on integral organizational design and development

This requires the members of PGS and the network to initiate a number of specific sessions in which the shared meaning and understanding of this theme is exchanged. This is feasible, as the PGS team members have shown an increase in their insights and understanding of the meaning behind integral organizational development during the reflection sessions. Secondly, because t2 marks a formal ending of the first design stage and a similar stage is planned to follow shortly. The majority of the PGS members indicated that they would continue this project and this provides a good opportunity for a series of such sessions, which would ultimately deploy the created insights and competence development at the end of this first design stage.

2. Repetitive restructuring of the development organization

This requires a more dynamic organization of PGS. This would improve knowledge exchange and different social interactions within PGS and prevent specific adjustment issues from appearing at the end of the project timeline. This again is feasible as the current members of PGS to a large degree are organized in self-steering teams or sub teams. The involved people thus are used to this way of working and the accompanied responsibilities. Only the more dynamic restructuring is lacking and should be made part of the self-steering team's assignment.

3. Employment of Systemic design
4. Directive approach to persistent deployment of the assignments

These third and fourth recommendations are combined, as they require similar measures. This requires a renegotiation on way of working between MINDEF and the external implementation partners. A more directive approach and self-assured acting are required from the external consultants. This should be combined with the appropriate staffing of a balanced mix of experienced and lesser-experienced consultants. The MINDEF organization on the other hand needs to commit to the principles of ES*i*OD and look for the dialogue instead of the discussion on the way of working and design content. This latter requirement is strongly related to the first recommendation on initiating the dialogue and also requires exemplary behaviour from higher and top management.

Based on this comparative analysis Table 97displays the final redesign requirements and adaptations based on the three original assignments of ES*i*OD. It explicates both generic as well as MINDEF case-specific requirements (A and B). Column C presents the boundary conditions that are derived from the specified conditions in the respective analysis results in Table 88, Table 92 and Table 96.

The results in the previous three sections show that:

- the participants from PGS and the Network especially focus on improvement of the network assignment. The perceptions of valued items focus on outcomes and not on elements that support the process.
- The systemic design and competence development assignments are especially discussed by the change management team, the researcher himself and to a lesser degree the PGS members. This can be explained by a different adoption of these assignments compared with the intentions. At the end of the case study it is shown that a substantial number of the participants (including change consultants) begin to understand the essentials behind this way of thinking.

	A	B	C
	Redesign requirements for the foundations of ES*i*OD	**MINDEF case-specific adaptations and Redesign requirements**	**Boundary conditional adaptations**
			Generic and MINDEF
Network development	Adaptation of the role instrument: Integration of role initiation, role deployment and role development. Support by coaching, role play and dedicated SFA	• Assessment of PGS members accompanied by dedicated training and coaching on their role in the project • Different dynamic structure of PGS • Facilitation of role deployment in the line organization	• Assessment and staffing of participants • Focus on early role development of top management by coaching and leadership development • Elaborate resources for role deployment and coaching
Systemic design	Stronger integration of Collaborative design WS and gaming with the systemic design assignment	Adaptation of the RSW concept to a more situational-specific large-scale workshop accompanied by two sets of different BSF and PMF templates for different audiences	• Elaborate training and introductory material that explicate the different deployments of the generic workshop • Appropriate modelling methods • Prepared external consultants • Different design templates for configuration team
Competence development	Reflection as an improved and deliberate way of monitoring and controlling on the deployed process and the results	• Initiate a dialogue on integral organizational design and development • Intensify Role-based coaching	• Persistent attitude of external change consultants • Teambuilding change management team • Create connection between change mgt. team and project mgt. and line organization • Rewarding exemplifying behaviour

Table 97 Redesign requirements for ES*i*OD

8.4 Redesign of ES*i*OD

The results from the evaluations in sections 8.2 and 8.3 are complimentary. The two contributions from the SPEER organization itself in section 8.3 vary in format. First, the evaluation by the PGS team is on a generic and project management level and aims at specifying the methods that should be improved and those that can be maintained. The second more in-depth evaluation by the sounding board gives an additional amount of evaluative information on the change process and its relationship to the deployed approach.

8.4.1 *Redesign of ESiOD*

From the combined analyses in chapters 6, 7 and the reflections in this chapter 8 it can be concluded that the majority of the key players in the process, the internal project team members, external consultants and the participants from the line organization, find the entire ES*i*OD approach mostly positive. One of the respondents made the striking remark that on a high level the approach is valued as:

Very relevant and worthwhile, but sometimes difficult and intense

On a more detailed level clear relationships can be recognized between the outcomes and the deployment of the approach. A comparison of the micro perspectives of the materials management team and the purchasing team shows that the latter adopts a different format for systemic design that regrettably is not recorded in the design artefacts and that it especially adopts a different approach to competence development. This deployment results in substantially different outcomes for the competence development, design quality as well as the acceptance by the line organization. These findings combined with the explanations behind the diverse and sometimes incomplete deployment of the approach in our opinion confirms the internal validity of the ES*i*OD design.

Nevertheless, the case study also taught us a lot about how the approach as such and its use are perceived. The collected valuable statements give both insights into and motivations for improvements or adaptations of ES*i*OD. In the previous three subsections of 8.3 the MINDEF longitudinal case study is reflected on with the three assignments of ES*i*OD. This analysis results in Table 97 (pp. 423). The left column A specifies the case-independent redesign criteria based on the evaluations. The criteria situated in the rows “network development” and “systemic design” concern the integration of specific methods with assignments. Originally ES*i*OD contains nine methods each allocated to one specific assignment (Figure 54, pp. 193). The evaluations of the empirical data show that three methods work best when they are integrated with assignments and their deployment accordingly. This also better clarifies the integral notion behind these methods.

Roles, for example, originally is mainly presented as an organizing instrument to arrange participation differently than the classical project team, but it also deliberately focuses on competence development as the participants adopt a role different from their prior position in the line organization. The role instrument thus connects these two assignments. On the other hand the "various modelling method" is tightly connected to the systemic design assignment only.
Based on the findings in §8.3 (Table 97) combined with the original descriptions of the methods in §4.3.3, §4.4.3 and §4.5.3, a distinction can be made between two classes of methods.. There are methods that match one specific assignment, but there are also methods that can be seen as integrating instrument between two assignments. Table 98 shows the respective methods from the original ES*i*OD that require an increased integration with the assignments, .

	Network development	**Systemic design**	**Competence development**
Rules, LSI	X		
Various modelling method, Systemic template		X	
Coaching, Survey feedback analysis			X
Roles	X		X
Gaming& Simulation		X	X
Collaborative design WS	X	X	

Table 98 division of methods between assignments of ES*i*OD

Based on these criteria it can be concluded that the generic structure of the three assignments can be retained. The three assignments for clarification purposes and understanding are displayed one by one, but their deployment cannot be looked at separately. The integrating methods match the philosophy behind integral organizational development.

The third redesign requirement in the last row of Table 97 (pp. 423) concerns competence development and this includes a different redesign requirement that is not directly related to the methods in ES*i*OD. This requirement concerns the issue of extensive reflection as improved way of participative planning and controlling explained in Figure 55 (pp. 195) and the stage model (Figure 69, pp.240). The theoretical foundation behind the reflection mechanism is explained in 3.3.2 (pp. 128).

ESIOD is presented as an approach that is based on the self-steering principles explained on pp. 128-132. Planning and control is structured by reflection sessions (Step 4 in Figure 69, pp.240) in which the self-steering teams repeatedly exchange progress on process and content and also share experiences (5.7.4, pp. 236). Escalations are shared with the steering board that is composed of participants with a varied background and not only top management and external consultants. The rule method can also facilitate this planning and controlling process. The deployment of the reflection step as this "synchronizing principle" between the different teams in the MINDEF case failed and there was an area of tension between how project management in some situations favoured "classic" functionalistic project management to monitor and plan progress of the design content. On the other hand this was not compensated by a self-assured deployment of the reflective sessions as described in (5.7.4, pp. 236). Apparently the dynamics of the ES implementation process require a more planned and deliberate specification of this reflective principle which in other methods is called synchronisation (SCRUM).

Based on the previous findings the redesigned version of ES*i*OD is more an adaptation and refinement of its two main components which were derived in chapters 4 and 5, the ESiOD framework that explains the assignments and methods (in Figure 54 (pp. 193) and the stage plan that describes the generic stages in time (Figure 69, pp.240). The redesign of ES*i*OD is presented in these two elements, but also includes a third improvement on the original format:

1. The altered ESiOD framework that shows the composition of the assignments and methods
2. The adapted stage model as guiding structure for its deployment
3. A set of implementation experiences that can function as guidelines or simple heuristics. These are added to the previous two elements as a further enhancement..

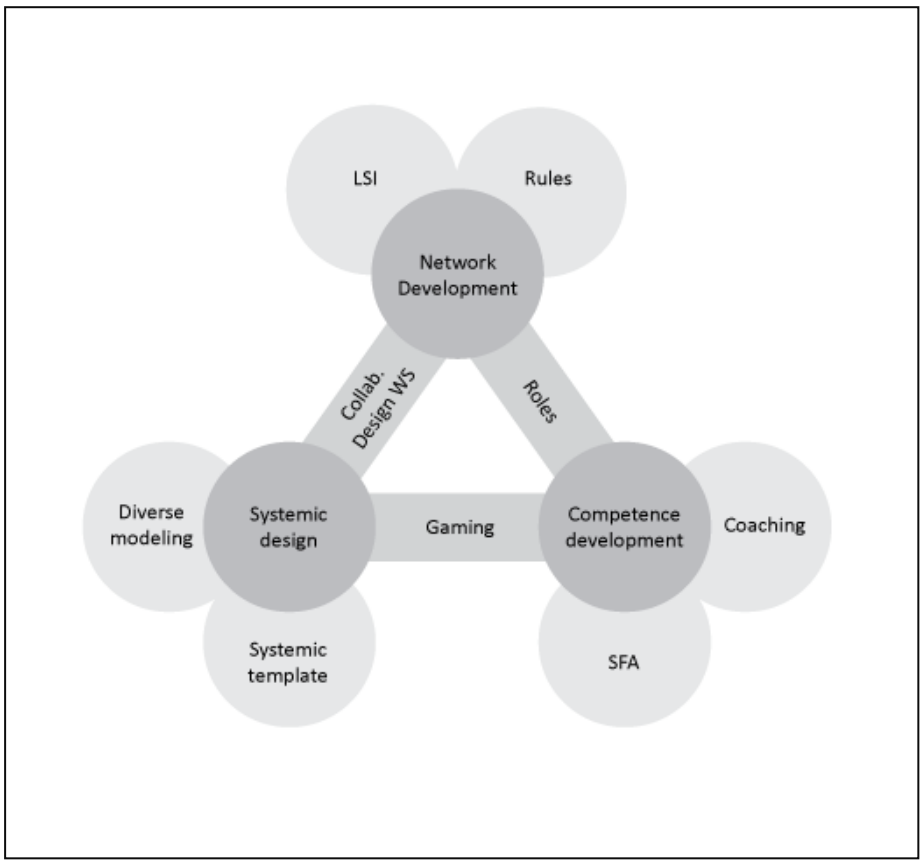


Figure 94 Adjusted version of ES*i*OD

1. The altered ESiOD framework explaining assignments and methods

The redesigned generic structure of ES*i*OD is shown in
Figure **94**. Compared with the original structure, three methods are replaced based on the findings from Table 97 and Table 98. The argumentation behind the three adapted methods is as follows:

1.1 The collaborative design workshop as mediating element between systemic design and network development.

This method is not substantially altered, but the evaluation in the MINDEF case showed the need to further specify the objectives and conditions for this method. It was shown that the participants diligently participated in this method, but the different backgrounds of the participants in some situations impeded the progress or even worse caused disagreements between the several stakeholders. Therefore specific attention has to be paid to how the deployment of these workshops matches the knowledge level and skills of the participants in the network.

The improvements to the original description of the collaborative design workshop are displayed in Figure 95.

- Objective is to create a systemic description ofthe selected business process or parts of it
- In the workshop various aspects of the organizational change, including competences, should be specified
- The workshop should be organized in a varied size and format matching the specific needs of objective and audience
- It should incorporate
  - Role play
  - Simulation
  - Reflection
- It should result in specified design outputs that suit different backgrounds of the participants
  - Designs that fit the different participants from the network
  - Designs that meet SAP standards for the configuration facility

Figure 95 Specified description of collaborative design WS deployment

This redesigned and reallocated method addresses the need to create systemic design descriptions by integrating design and development in several different design workshops. It also addresses the request for different formats from the participants in the SAP configuration facility and line organization.
This redesign specification requires the following boundary conditions:

- Elaborate training and introductory material that explicate the different deployments of the generic workshop
- Appropriate modelling methods
- Prepared external consultants
- Different design templates for configuration team and line organization

The MINDEF case-specific deployment in addition to the prior generic boundary conditions requires:

- Adaptation of BSF and PMF documentation
- Enhancement of the MAVIM modelling environment
- Education and training of PGS members and external consultants

1.2 Roles as integrating element between competence development and network development

The second integrating method originally is positioned in network development where it is deployed as organizing structure that defines role initiation and staffing.
In its original quality roles is especially aimed at releasing participants from their position in the line organization and enabling the competence development process in the development organization.

A tighter combination between the role element in network development and in competence development is required to facilitate this latter learning process of the participants. This is realised by first explicating the integrating function of the role method to the participants and secondly by a more extensively staged description of the role method and the actual integration with the methods of competence development. The enhanced description of the role method now includes:

1) Role initiation. Determining necessary roles dependent on the change problem and organizational context. Staffing and training of the participants
2) Role deployment. Participants act according to their role and receive feedback via coaching and repeatedly via organized exchange sessions in which experiences are shared with "role mates" in the development organization and later on in the growing network. A role mate represents a participant who deploys the identical or similar role, but are not necessarily in daily contact or organized within one team.
3) Role development. Based on the evaluation of role deployment the participants receive dedicated training and coaching in either group or individual settings.

The enhancement especially focuses on steps 2 and 3, whereas step 1 represents the original description of the role method in the single assignment network development. This is now improved with specific survey feedback analysis methods such as personality typing for role staffing. Role deployment and development is improved by coaching and role play that are dedicated to the initially defined roles in network development (E.g. Sustaining sponsor or process owner). Coaching can be accompanied by dedicated SFA methods such 360 degrees survey to assess role deployment and development.

This redesign specification requires the following boundary conditions:

- Acceptance and awareness of top Management
- Top management should show exemplary behaviour and be involved in the change process in good but especially in difficult times. The exemplary role of sustaining sponsor is decisive and requires a persistent role performance.
- Ordering in competence development.
    a) Top Management should start first and deploy competence development by for example executive coaching or leadership development. This is followed by showing exemplary behaviour.
    b) The members from the development organization follow by a role assessment and role-based coaching

The MINDEF case-specific deployment in addition requires:

- Improve role-based coaching as roles are well defined, but especially deployment is lacking in MINDEF
- Facilitation of role deployment in the line organization (in the investigated case there was a lack of personnel resources)

1.3 Playful elements to incorporate behavioural elements and facilitate specifying competences.

Simulation & gaming as third combined method in the redesign is positioned in between systemic design and competence development. This is based on the numerous design experiences in the MINDEF case where the use of playful elements was either scarce or loosely connected with the design content. The specific interaction between performing the design activity, but also experiencing the simulated future environment in various settings can improve the design as such and help the learning process of the participants.

The inclusion of gaming and simulation in design workshops or as standalone interventions can support the experiences of the participants.

The enhanced method not necessarily implies merely using complex simulations or extensive games. Already the simple inclusion of simple playful elements during design sessions can make be an improvement on plain designing. By just playing through different design scenarios without extensive artefacts the participants can imagine what this designed situation would look like and how it would affect social interactions, behaviour and necessary competences. Of course more advanced computerised simulations or organized role play can improve this ambition, but the essential idea behind the integration of this method between systemic design and competence development is to make it a habit for designers and participants to not only graphically design, but experience design proposals, learn from these experiences and specify both the soft as well as the hard design properties in the systemic design description.

2. The adapted stage model

Figure 96 shows the stepwise approach compared with the original ES*i*OD which is more explicit about initial conditions and the deployment of action and reflection. This second element of ES*i*OD concerns the third redesign requirement in Table 97 (pp. 423). It explicates the need for a specific dynamic and order in the deployment of ES*i*OD. The early involvement and development of higher and top management is essential (1). This is followed by an assessment of the participating members, including the appropriate training. During this installation of the development organization (2), an open dialogue is initiated with the members from the line organization to explicate way of working, responsibilities and design content. Top management plays an important role in this agreement process that is formalised by the mutual agreement on the implementation rules (3). Prior to the iterative part the development organization assesses the projects context and organizational setting, based on investigations and the open dialogue with the line organization (4). This sets the stage for steps 5-8, the iterative cycle that starts with (5) mutual sense making of how to deploy integral design and development in this specific context. Followed by the action (6), reflection (7) and decision making (8). Steps 5-8 iteratively are followed until the line organization and development organization collectively agree on accepted systemic designs that meet the criteria for the configuration of the ES, but also specify future competences.

Especially the cyclical adoption and the equal inclusion of action versus reflection meets the redesign requirement from the evaluation statements on mutual way of planning and controlling of the change process and the lacking time for reflection and organizational learning. Steps 6 and 7 can be seen as the similar, but mirrored deployment of the ESiOD framework displayed in
Figure **94**.

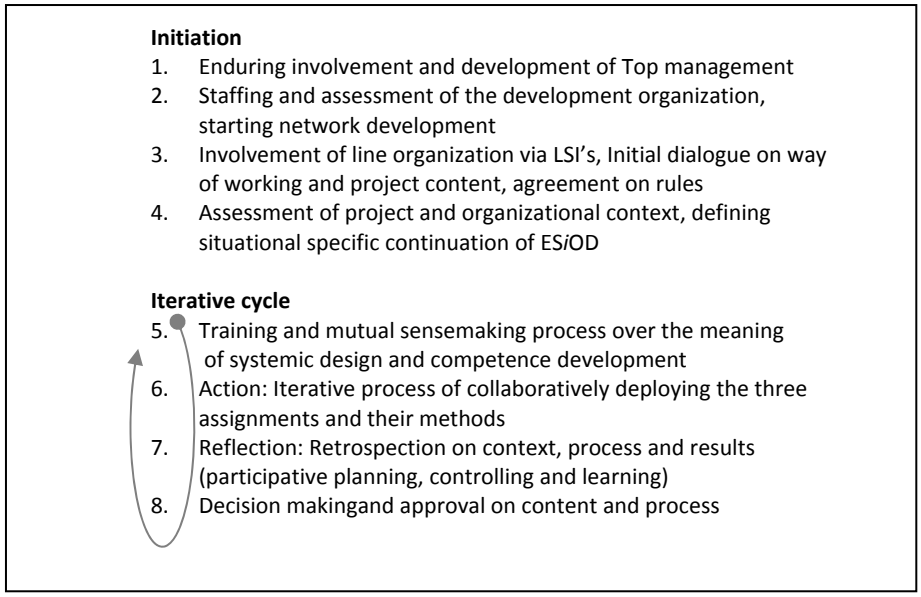


Figure 96 Generic Step approach

3. Implementation experiences and guidelines

Finally as last contribution to the redesigned version of ES*i*OD the following list of implementation experiences is derived. It is an overview of case-specific "lessons learned" that can give insights into the deployment of the approach and help future practitioners that intend to deploy ES*i*OD. It includes elements that can be recognised in ES*i*OD, but the specification in this list emphasises its importance or contribution. The list also contains specific themes that are outside the scope of ES*i*OD, but that substantially affected the implementation experience. The attention paid to these themes can help practitioners adapt their deployment in the specific situation.

I	Order in competence development to facilitate Enduring Involvement and sponsorship of top management	Competence development is an important contributor to the changing people during the ES implementation. The experiences in MINDEF show a specific ordering is necessary for a fruitful deployment. In chapter 1 an extensive literature review shows top management support is a major success factor. In ES*i*OD the involvement of top and higher management is facilitated by special roles and network development. Top and higher managers have an important role in demonstrating exemplary behaviour and showing the future directions. At decisive moments in the process, top managers did not show their appropriate behaviour in their sponsor-keeping role. This substantially affected the outcome of the change process. Time on the other hand is short for most top managers and therefore the competence development process should run ahead of the process of before the other participants. It is suggested to initiate a dedicated competence development initiative in the 1st envisioning stage of the ES implementation. This can be facilitated by executive coaching and leadership development
II	Balance between staffing criteria and maturity of the introductory program	The MINDEF case shows that at least one of these two elements needs a solid foundation. An organization with a high change competence level is able to staff the development organization with mature and experienced participants. This can compensate the lack of elaborate training and introductory material. On the other hand a well-defined introductory program and documentation can also facilitate and compensate an organization with low change competences that has difficulties with appropriately staffing the development organization. The MINDEF case shows that a lot of time and energy is wasted if both criteria are not met. It took the development organization a substantial amount of time to get a grip on the meaning of IOD and deploy this into action.
III	Reward specific behaviour	Changing the organization requires experimentation and courage of the participants. In the MINDEF situation, there are several examples of people who distinguished themselves from average, and show innovative or sometimes controversial ideas. In the MINDEF situation, not all of these initiatives were appreciated. In some situations they were even condemned and it was argued that a complex implementation project requires one standard way of working. Such an attitude will not be beneficial for competence development or real reframing of existing organizational schemata. A PER implementation for most organizations is an exciting affair, but perceiving this process as significant organizational change process requires cherishing and rewarding such initiatives. The integration of design and development in the PER context especially does not require just deploying an average or standardized version of ES*i*OD. Even short moments of exemplary behaviour from a substantial number of involved participants can help break the barriers to learning (Schimmel, 2007). It can help turning a paralyzed organization that condemns failures to an experimenting and learning organization.

8.4.2 *Reflection and line of reasoning behind the redesign*

In this chapter a number of essential elements of this dissertation come together.
For the reflection on the redesign of ES*i*OD we return to section 3.2.5 (pp.122) where the five principles from integral organizational development are specified to the PER ES implementation context. The ES*i*OD approach, as explicated in chapter 4, is based on these principles and specified to the case context in chapter 5. The deployment of this approach in the MINDEF case shows the multiparadigmatic way of thinking (principle 1) is a difficult affair for this organization. The principles of extensive participation (principles 2 and 3) are deployed to a successful degree. The 4th principle, systemic perspective, then again is not successfully deployed by the entire participating group, but to a large degree this can be explained by the initial lack of fulfilled boundary conditions. Finally the 5thprinciple is partly and especially differently deployed by the several teams, which results in different outcomes.

In his work on the same SPEER program case Schimmel (2007) also looks into the deployed integral approach. His work explains the barriers to organizational learning and change and relates this to the approach. In his reflective chapter Schimmel links two main findings: the approach is not deployed as intended and the organization does not succeed in a second order learning and change. This proves that not using the approach results in not realizing the intended effects. He explicitly states that this does not prove that fully deploying the approach will result in the predicted outcomes.
Compared with the thesis in front of you that PhD research explored a similar case setting, but from a different perspective. Schimmel explicates measures to overcome learning barriers that should be taken into account during the implementation. His work also incorporates a comparison between the materials management and purchasing team, but expands its research perspective to include the entire SPEER project.
The ES*i*OD research in this book takes a more instrumental prescriptive perspective on implementation methodologies and change approaches. It investigates the process and effects on a more minute level within the teams and its individual participants. Taking that into consideration we would like to nuance Schimmels' opinion that the approach as such is not deployed.

The deployment of ES*i*OD in the MINDEF SPEER case is incomplete. On the other hand the participants certainly do not neglect the entire approach and its way of thinking and working. The participants during the case study show a substantial adoption of the approach and in varied levels also understanding of the ideas and meaning behind the approach as such. There are large differences between how teams and sometimes even individuals begin with, assimilate and change the approach in the fourteen-month case study. In our opinion this elegantly demonstrates exactly the usage of the approach. It shows how instrumental artefacts, such as ES*i*OD, are deployed in real life, resulting in how different adopters initiate different interacting processes. It also confirms the situational-specific character of ES*i*OD that is explicated in section 4.6, pp. 192 and that is specified to the MINDEF case context in section 5.6, pp. 220.

The ES*i*OD approach prescribes a number of specific elements as well as methods and tools to support or facilitate a way of working with three assignments. On the other hand the ES*i*OD approach purposefully leaves room for interpretation of the actual deployment of these specific elements.

Case-specific deployment and recommendations

The redesign specifications from section 8.3 give a specific set of the following recommendations for the continuing deployment in MINDEF. Table 99presentsthese recommendations including a short explanation in the left column. The right column features the deployment within the MINDEF SPEER project up to the beginning of 2008. This information is based on the work of Schimmel (2007) and short interviews with a selected set of participants.

Recommendations	Deployment up to 2008
Change design tooling and templates	In September 2007 the SPEER project decided to exchange the Mavim modelling environment with the extensive ARIS Toolset. This extensive method creates better opportunities for a systemic design, but still requires that the systems thinking approach is accompanied by a varied and diverse way of modelling to really create systemic designs.
Enduring Involvement of top management	A first fruitful initiative is realised by installing a Supervisor. The supervisor is part of the SPEER organization and is directly appointed under the Secretary-General. He received decision authority and as sustaining sponsor connects the development organization and the decision makers in the line organization. This is a substantial improvement.
• Create connection between change mgt. team and project mgt. Team • Persistent attitude of external change consultants • Teambuilding change management team	The initiatives started in the beginning of 2006 quickly realised a tighter team. Understanding of the approach and each other's line of thinking and way of working increased. Nevertheless the project dynamics over the time period are relatively large and a substantial number of change consultants from that period have left the project. The team element does require that a continuing attention and internal reflection can improve this
• Different more dynamic project organization • Facilitation of role deployment in the line organization	PGS is organized differently with the High level design structure. This is adopted mid 2006. It does not yet incorporate clusters and repetitively changing arrangements of teams or groups, but takes a different perspective on the dynamics of the design process by generic high-level design to detailed smaller design sets that can be elaborated on in smaller teams.

Table 99 Recommendations and actual deployment in MINDEF

9. Conclusion and recommendations

--Every knot was once straight rope. (*From Into the Woods*)--
Stephen Sondheim (1930-..)

This last chapter concludes this PhD dissertation and presents conclusions, contributions, and recommendations. Section 9.1 offers an overview of the concluding results. Section 9.2 reflects upon the conclusions and the research process itself. Section 9.3 discusses the main research outcomes subdivided into scientific contributions and implications for practice. Section 9.4 rounds off this chapter with guidelines for the application of the results in practice and gives recommendations for further research.

9.1 Research results

At the start of this research (chapter 1) it is argued that the field of ES implementations has been covered by an extensive amount of scientific and empirical literature. The contributions however are often descriptive or explorative and the small amount of prescriptive literature often remains on a conceptual level. From different perspectives the organizational change process during ES implementations is regarded as problematic and this dissertation's aim is:

> *To design an approach that is based on the principles of integral organizational development and that fits the project stage of the current ES implementation practice so that it contributes to a successful organizational change process of the adopting organization.*

In the previous eight chapters different research outcomes are described and explicated in order to realize this research objective. The conclusions are structured according to the three main research questions in this dissertation:

9.1.1 ***Research Question 1***

What theoretical and empirical knowledge can be derived from IS literature, the organizational science, and the organizational change domain in particular, in order to develop an integrated change approach for an ES implementation?

This research question is answered in chapters 1 and 2. After our literature review (chapter 1) we start with an analysis of the core contributor to the deployed implementation practice: the current implementation methodologies.

Extensive scientific research into this specific topic is scarce and a scientific analysis and comparison of different implementation methodologies is lacking. Therefore, first a generic analysis framework is developed , called the ESIMM (ES Implementation Methodology Model, Figure 15, pp.59). The generic format enables us to use this model both as analysis as well as design framework during this entire dissertation as it allows us to structure the main elements of an implementation methodology.
The results of the analysis confirm specific findings from chapter 1 (§1.4.3, pp.32). Present methodologies facilitate a narrow and very specific deployment of the change process. Within the organizational change domain there are several scholars who argue for a more holistic perspective and different approach during the change process (2.4).Chapter 2 concludes with a feasibility analysis that shows that the current and potentially most important ES implementation type is PER. This analysis also shows that, within the practical limitations of feasible PhD research, integral organizational development (IOD) can best be applied during the project stage of the implementation process. These research outcomes from chapters 1 and 2 come together in §2.7 (pp. 99),which gives a condensed answer to research question 1.

> The application of IOD in the ES implementation process essentially comes down to the initiation of a planned large-scale process in which the organizational members ideally simultaneously perform *and* experience an integrated design and competence development process. The project stage from the ES implementation process fits this requirement with its opportunities for large-scale participation and concrete design assignments. Secondly, the application of IOD means adopting its multiparadigmatic way of thinking as the founding philosophy of the methodology. This implies helping the participating members with both functionalistic as well as interpretative perspectives during the implementation process. This stimulates the integration between the design and development processes and also facilitates the necessary 2nd order change process in order to create frame breaking designs and break free from the current schemata, organizational behaviour and social interactions.

This answer lays the main foundation for the change approach and defines the upper level of a methodology; *philosophy*. The multiparadigmatic way of thinking (integration of design and development) marks the outset for part B in this dissertation: The in-depth analysis and design of an applicable organizational change approach for a PER ES implementation during the project stage. This is answered in research question 2.

9.1.2 ***Research Question 2***

What is a relevant and operational change approach that fits the implementation methods and implementation practice during the reengineering and design stages?

This research question is answered in chapters3, 4 and 5. Chapter 3 starts the analysis section and first digs into the philosophy of integral organizational development.

This is carried out by a process perspective in order to capture the essential properties of integral organizational development and the meaning of integrating design and development (§3.2). This line of thinking is then applied in the specific situation of the PER project stage and specified using the ESIMM elements *framework* and *tools* (§3.3 and §3.4).The combination of the process perspective with the ESIMM structure makes it possible to analyse the typical design and development processes during the project stage as well as the methodological elements in order to initiate and facilitate these processes. The outcomes of this analysis are structured as method fragments in the categories philosophy, framework and tools (§3.5). This concludes chapter 3 and defines the design requirements for chapter 4.

Chapter 4 introduces ES*i*OD. It is a pragmatic, context-specific approach composed of three integral assignments:

Network development (§4.3)

- This assignment aims at organizing large-scale participation in a growing network model. It pays attention to the need to repeatedly exchange participants during the design and development process. It supports the creation of new social interactions and initiates setting up open dialogues on existing networks of coalitions.

Systemic design (§4.4)

- This assignment instructs the participants and helps them to create a systemic design that fulfils their organizational needs. The systemic design starts from the high-level ambitions obtained in the first stage of the ES implementation. It acknowledges the specific characteristics of the Enterprise System, the PER design rational, but also includes the necessary structural, social and behavioural elements of the future state of the organization.

Competence development (§4.5)

- This assignment focuses on the facilitation of competence development simultaneously with the systemic design assignment. It acknowledges the different situations of individual participants and helps explicate and experience personal development. This development is based on increasing skills, making participants aware of personal experiences and motivations, and it also pays attention to the affective components during the change process.

The idea behind this way of organizing "framework" is to give the organizational members concrete assignments so that extensive participation is initiated. ES*i*OD contains a specific set of methods and instruments that accompany the assignments to facilitate the integration of designing with developing. The deployment of ES*i*OD is context-specific. The meaning and objectives of each assignment and its accompanying instruments, as well as suggestions for accompanying ways of working are specified. Nevertheless, the actual deployment and process dynamics are left to the participating practitioners depending on the projects and organizational context (§4.6).

Chapter 5 continues this line of reasoning and explains the context-specific situation of the longitudinal case study in the Dutch ministry of defence (MINDEF). It provides guidelines (§5.6) and situational-specific adaptations of ES*i*OD (§5.7) based on the organizational analysis (§5.3) and the project characteristics (§5.4 and §5.5).

This completes the generic and applied design of ES*i*OD. In chapters 6,7 and 8 the design is evaluated in the case-specific setting of MINDEF. This assessment covers research question 3.

9.1.3 ***Research Question 3***

How does the change approach work in practice and what adjustments can be made based on the practical experiences?

This research question is answered in chapters 6, 7 and 8 by the ex-post process and product evaluation of the actual deployment of ES*i*OD. Extensive information and data from the longitudinal case study are inspected and analysed.
Chapter 6 covers the process analysis and explains how ES*i*OD is applied in practice. The process is analysed using micro perspectives of three different participating groups that describe how the process evolves and how ES*i*OD is deployed. This includes two teams from PGS ((§6.5, §6.6) and the participants from the line organization (§6.7). The project stage is also analysed on a higher level using a macro perspective in sections 6.3and6.4. These sections present the significant events during the entire case study timeline. The different teams and individuals during the longitudinal case study start to work with ES*i*OD and adapt it to their objectives and experiences. This behaviour repeats findings from practitioners in the field during an IT-driven change process (Aydin, 2006; Hirschheim et al., 1995).
The purchasing team mainly applies an interpretative perspective, whereas the other materials management team employs a functionalistic perspective on the change process and the use of ES*i*OD. The line organization as third micro perspective is extensively involved by intensive participation and equally approves the deployed approach from both teams.

Chapter 7 focuses on the product evaluation. It assesses the effectivity of ES*i*OD by looking at the outcomes of the process. This is analysed by design quality (§7.3.1and §7.4.1) and competence increase (§7.3.3, §7.4.2,) of the two teams. Also the perceived design quality (§7.5.1) and a limited perspective on competence increase of the participants from the line organization (§7.5.2) is investigated.
There are differences in the applied design format and structure between the two inspected teams, but there is no significant difference in the entire design quality or its perception.
A significant difference is observed in competence increase between two teams. The purchasing team shows significant competence increase by the congruent development of the technical, narrative, and affective dimensions. The materials management team shows less congruent competence changes.

This team adopts specific skills and knowledge (technical dimension), but the affective and narrative level are not different. This marks a more focused increase in capabilities, but does not represent personal development in the sense of Schuiling's model (Figure 82, pp. 332). The third micro perspective is assessed differently and presents the adoption of new knowledge and of new cognitive schemata.

Chapter 8 combines process and product evaluation and investigates viable cause and effect relationships between deployment of ES*i*OD and its effects, but also how the specific project context and dynamics influence the course of the process. This is done by a cluster analysis and root cause analysis of the findings from chapters 6 and 7, accompanied by the outcomes of reflective sessions with different participating groups at the end of the longitudinal case study (§8.2).The analysis shows that integrating designing with developing is the critical factor in the MINDEF case study and the participants respond that specific elements within ES*i*OD should be more intensively integrated. This is realised by adaptations to three methods that now each aim at integrating two respective assignments. The redesigned ES*i*OD, as final research outcome of this dissertation, is presented in §8.4.

9.2 Reflection on the research process and its outcomes

9.2.1 *Reflection on the research process*

In chapter 1 (§1.6.2) it is argued that this research adopts multimethod research and incorporates different perspectives into one research effort. This way of working confirms the philosophy of ES*i*OD. In more popular words:"in this research we practice what we preach". In hindsight this way of working nevertheless also complicated the research effort and made the researcher himself aware of how difficult it can be to have to swiftly change paradigms and combine or analyse the different research outcomes. Nevertheless this endeavour also paid off since the research results give a complete view of the longitudinal case and the different research results corroborate each other. The participants in the MINDEF organization offered the researcher the opportunity to come close and in some situations this resulted in difficult moments for the researcher. Hunt (1989) and Kleinman & Copp (1993) explain how researchers can start to emotionally identify with the subject of their research. The researcher has experienced this effect himself during a small number of workshops. This effect in our opinion supports the need to combine interpretative studies with a more functionalistic deployment of surveys and interviews. The alternating combination of both research methods in hindsight can give confirmatory explanations resulting in more confident and validated research outcomes (Nandhakumar & Jones, 1997).

9.2.2 *Reflection on the research outcomes*

Comparing the research ambition (stated in 9.1) with the research outcomes shows that this research ambition is partially realised and, in line with the scientific notion, also led to new questions.

> *To design an approach that is based on the principles of integral organizational development and that fits the project stage of the current ES implementation practice so that it contributes to a successful organizational change process of the adopting organization.*

We divide the reflection on this ambition in two themes: first the composition of ES*i*OD itself and secondly its effectivity.

1.
This PhD thesis created a generic format for an integrated change approach. When reflecting on the main ambition the question arises whether this format is the only viable design. The answer is clear: it certainly is not. ES*i*OD is created from many existing elements and insights and a variation of format (or framework) is imaginable. Nevertheless, the foundation behind ES*i*OD is crafted on sound and validated relevant research and based on an extensive problem analysis in chapters 1 and 2. ES*i*OD takes a different point of view compared to the existing implementation practice, but does not neglect its existing methodologies. It deliberately tries to integrate the line of thinking of IOD and to initiate a simultaneous design and development process. Based on the extensive analysis in chapter 3 and the reflections on the philosophy and framework in chapters 6, 7 and 8 we are able to conclude that ES*i*OD contains the essential and relevant elements to achieve this integration.

2.
Can we conclude whether ES*i*OD is a valuable addition to the already extensively staffed landscape of methods, tools, instruments, methodologies, etc. because it contributes to a successful organizational change?
This can only be partially answered due to the case-specific influences. The case study did not include Go Live because of the delay in the SPEER project. Consequently the change process was not entirely analysed. Yet, the assessments of different groups of participants show developments in different dimensions. The majority of the participants in the network express their approval of the way of working and see how it could influence the design process. They reward this with an increase in acceptance for the design and forthcoming situation. These network participants also show an increase in knowledge, new social interactions and an increase in mutual trust.
The process teams in the development organization show different results that depends on their own deployment of the approach. The majority of the purchasing team shows substantial personal development and this can be attributed to the way of working of the team. The team crafted design artefacts that are comparable to those of the other teams and ES implementation processes in general.

This finding shows that participants who use the approach are able to integrate design and development in a feasible manner in the ES implementation context. The last step of creating systemic designs proved to be one bridge too far in the case study itself, but the reflection sessions made the teams aware of this omission. Based on these reflective sessions it can be assumed that, within certain limitations, the participants after this learning experience also would be able to deploy this assignment and both create systemic designs and experience competence development. This is a not a research outcome that can be generalised upon, but a convincing proof within this longitudinal case study of the contributions and effectivity of the ES*i*OD approach.

9.3 Contributions

Chapter 1 explained the ambition of this dissertation to create practically applicable knowledge for a specific problem by deploying an applied scientific research approach. On the one hand, this research is an extensive design study. It digs deeply into one specific longitudinal case study and enriches the current insights of that specific domain. Both aspects can be recognised in the scientific and practical contributions of this research.

9.3.1 *Contributions to research*

This research synthesizes insights from different disciplines and research domains, especially from organizational science and the IS implementation and methodologies domains. This dissertation clearly selects integral organizational development as its foundation and adds to this school of thought with a situational-specific approach for large-scale ES implementations. The concept of integral organizational development is described well, but also criticized for being too conceptual or situational-specific. In this dissertation the line of reasoning behind “design and development” as process, outcome and philosophy is further specified. The meaning and impact of the integration of “design and development” is also extensively explained and a pragmatic and deployable approach is described. This is achieved by the integration of different theories and concepts from the IS and ISDM domain that earlier were not specifically connected to the school of integral organizational development.

An important contribution is the specific attention given to personal development in a large-scale change process. At first sight this seems paradoxical, but the deliberate attention paid to competence development of the organizational participants functions as a connection to truly specify the organizational change itself and simultaneously let people develop and learn during the design and development process.

The result, ES*i*OD, is not a frame-breaking design in the perspective of contributions in the organizational change domain. Several elements are established interventions, but the entire combination of the individual interventions and their mutual adjustments is new. The integration of the networked way of working is relatively new in this line of thought, especially the pragmatic explanation of its deployment and the integration with the large-scale interventions. Also the inclusion and specification of the notion of competencies are an addition to this research field.

ES*i*OD from the perspective of the IS methodologies domain also includes existing methods and ideas. It confirms the ideas of an increasing group of scholars who argue for agile, incremental and participative approaches. The innovating aspect of ES*i*OD is the application of these elements in the large-scale context of Enterprise Systems together with the limited degrees of freedom that characterize these COTS packages. The study shows that ES*i*OD conceptually, but also operationally is able to integrate the planned and staged ES approach with agile principles of self-steering teams and repetitive reflective action.

Finally it is especially the multidisciplinary combination between these two fields that marks the contribution of ES*i*OD. In chapter one it is argued that the majority of the ES implementations are characterized by substantial organizational changes, but apparently the implementation practice "forgets" to pay attention to the social and behavioural aspects of this change. ES*i*OD does so, but requires reframing current views, especially those of practitioners, on the ES implementation process. The reflection on the employment of ES*i*OD shows large-scale change programs can only be planned and predicted to a limited extent. Therefore ES*i*OD is a situational-specific approach in which a generic structure of assignments and way of working is suggested, but its detailed deployment is left to the participants themselves. The analysis also shows that giving more deliberate attention to reflection is necessary, since designers and consultants tend to favour functionalistic deployment of project management and the design process. This perspective impedes the competence development process and hinders the successful adoption of new organizational behaviour that is strictly related to the adoption of this new information system.

In its effort to answer the research questions, this study has resulted in various research models that can be applied in further research.

1. The ESIMM

This model can be used to assess different implementation methodologies. At the moment of writing (2008), different ES vendors and implementation partners consider changing implementation approaches or, even more fundamentally, substantially rebuilding the methodology. These new initiatives can be analysed and reviewed by the ESIMM. Secondly, the ESIMM can be used as the foundation for the (re)design of such approaches or methodologies. It unites the domains of design and technology, project management and organizational change in order to shape new relevant initiatives for current problems. The rich empirical material from this study can enhance this design process.

2. The process model

One of the outputs is the research process model based on Schuiling (2001), Vansina (1995) and Boonstra (2006) (Figure 34, pp. 121). This process model focuses on organizational improvement initiatives in which information technology plays the dominant role. Therefore, it is not necessarily bound to the field of ES, but can be used in large-scale change initiatives that are driven by a new technology in which

participative design receives an important place and deliberate attention is given to the development of the people in the organization. The strength of the model is its simplicity, but also the elaborate research instruments that come with it (e.g. the developed questionnaires that can be used in different settings).

3. The questionnaires

Two specific survey instruments grew out of this research.

First a specific self-efficacy questionnaire, which includes a dedicated set of questions to assess the self-efficacy of participants during large-scale change processes not necessarily driven by IT. It acknowledges technical competences of participants in the typically design-oriented skills, but also the affective and social capabilities.

The second survey instrument is a very specialized set of pair-wise comparisons that can be used to assess the shift of cognitive schemata of participants in ERP or ES implementations. The line of reasoning behind the created materials management and purchasing function can easily be extended to other business functions, such as finance and controlling or HRM.

4. Extensive and in-depth material of a part of one of the largest IT implementations in the Netherlands

The main incentive for this PhD research was to come up with rigorous research that leads to an applicable approach. The specific extensive case setting and the multidisciplinary character of the research problem required a holistic perspective as well as the appropriate research methods. This has resulted in an extensive description and explanation of the process itself. The combination of narratives, surveys, and observations make this a unique data collection that can be used for further research. This may be comparative research, but also in-depth analysis of the available data in order to generate heuristics, perform factor analysis, and relate it to other CSF research in this domain, or make use of the extensive qualitative data.

9.3.2 ***Contributions to practice***

The contributions phrased in the previous section can to a certain extent also be transferred to the practical domain. This especially includes the already stated possibilities of the ESIMM as design structure for future methodologies, but also the extensive descriptive research results that can function as a body of knowledge for future consulting practices. Nevertheless, one specific approach stands out for its contribution to practice: the adapted ES*i*OD approach.

The redesigned version of ES*i*OD, as outcome of this research, is deliberately in a generic format. Its conversion into an implementation methodology for an ES vendor or a consultancy company is possible, but this would require some adaptations. Current implementation methodologies already offer vast amounts of tools and methods. ES*i*OD limits itself to the essential methods to the participative design and development process. Several topics that are addressed in the organizational change domain are not explicitly addressed under their labels.

Themes such as communication, stakeholder management, resistance, education and training do not receive a detailed explanation about their deployment or the respective method compared with current ES implementation methodologies. ES*i*OD touches upon these themes, but also some are deliberately left out. ES*i*OD for example gives extensive suggestions on how to initiate a learning process, but leaves out the detailed deployment of an education and training plan. This is in line with the ambition to stimulate competence increase. In other situations the themes are embedded in ES*i*OD, but in a more implicit way. Communication for example is not explicated in one specific method or instrument.
The analysis in section 3.2 shows that communication, resistance and risk assessment are not the weak points in current implementation methodologies. Standardised communication channels such as newsletters, intranet sites and road shows are already available in the current ES implementation methodologies. The link between ES*i*OD and communication is implicitly connected by the assignment network development. The creation of social networks and large-scale interventions can be used as extra ports of communication. The focus on the project stage also implies specific themes are assumed to be initiated in the preceding 1st envisioning stage, such as the selection of the ES package and the definition of the business case. Also top management involvement, as one of the most important critical success factors, is expected to start in stage 1. This does not imply that top management involvement is taken for granted, but it is assumed that a selection of top and higher management is getting more and more involved during this stage. ES*i*OD facilitates top management involvement and leadership development by for example assigning specific roles such as sponsor or change agent.

Chapter 8 presents the improved and adapted version of ES*i*OD. It is a pragmatic approach and this contribution is especially intended for the practitioners in the field. The main objective of this dissertation was to create a generic foundation and a specified set of method fragments or job aids for the practitioners within the MINDEF organization. As shown in the chapters 6 and 7, the practitioners embraced this foundation in their own way and an extensive part was used and sometimes further developed. Specific elements were hardly used in some situations due to reasons that afterwards could be explained by the case contextual analysis. The practitioners in the field valued the approach in the end, but also expressed that they had to put substantial efforts into its deployment.
This is in line with the philosophy of ES*i*OD: stimulate extensive participation and initiate a simultaneous design and development process with a selective set of methods and instruments. Organizational members will gradually increase their competence level and by deployment and innovation, new ways of working or methods will be suggested and initiated. This exactly marks the paradoxical format of ES*i*OD as only a “half-filled cookbook” for designing and developing. ES*i*OD gives a basic amount of support, but also leaves substantial room for its deployment by the practitioners. This stimulates competence development that does not happen all by itself; it requires blood, sweat, and tears, but the reward is all the better.

9.4 Recommendations

9.4.1 *Recommendations for further research*

The empirical case study is extensive. This has its advantages since a substantial part of the entire design stage as well as the application of the approach by the organizational participants is captured. Still, due to focus reasons only a limited, but representative set of the participants and only a specific phase of the ES implementation are investigated. Recommendation 1 therefore aims at altering the research scope in different settings:

1. Change the research scope to other organizations

The employment in one longitudinal case setting clearly limits generalisability to a certain extent. The MINDEF organization shows typical characteristics and this has certainly influenced the change process. The findings can be extended to other forces and to a certain extent to bureaucratic organizations such as ministries or other governmental institutions. The transition to business organizations nevertheless requires extra caution since these organizations have different organizational characteristics. It is expected though that such organizations show a higher potential for change capabilities and this should influence the process positively.

Further research in such case organizations can help create more extensive insights into the specific adaptations of the approach. The models applied in this dissertation can help perform such research, with an adaptation of the research design. In this PhD research the researcher uses different research methods to produce both qualitative as well as quantitative research results. This provides a complete picture of the research setting and the outcomes. On the other hand, this approach complicates the research process and does not speed up the investigation either. The approach can be validated in other organizations by a multiple case investigation in which especially the survey-based research is repeated and compared with the results from this dissertation.

SMEs, beside the previously phrased large-scale organizations, nowadays so enthusiastically embrace the ES concept. They can also benefit from the change approach. The approach is extensive and tested in a large-scale organization and project. This does not imply that smaller-scale projects or smaller organizations cannot benefit from the approach or its insights. But a careful deployment of specific elements is necessary for smaller or inexperienced organizations. Further research into for example a piecemeal deployment of ES*i*OD in this SME setting can give insights into the employability and success of this method for this specific category of organizations. This research should not necessarily be carried out by the previously phrased more quantitative multiple case comparison. The design study as deployed in this PhD dissertation can simply be repeated in the specific setting of SMEs.

2. Expand the scope to include other stages or even the entire implementation process

This case study focuses on the 2nd stage of ES implementations due to both scientific and practical reasons, as is explained in chapter 2. Nevertheless, the adoption of integral organizational development during the 1st envisioning stage should certainly be investigated.

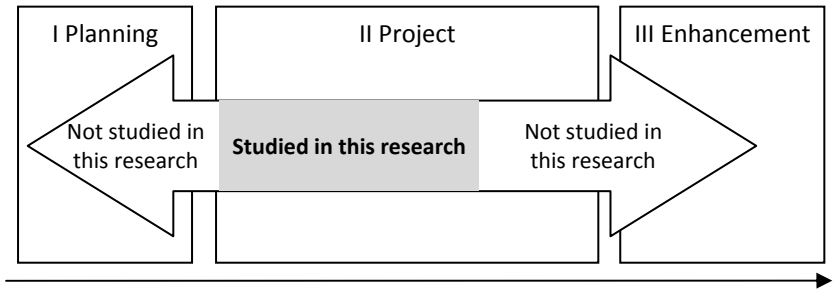


Figure Deployment of ESiOD in the project stage

One of the research results shows that the competence development process requires extensive top management involvement prior to the 2nd stage of the implementation. The change process should be anchored at top management and *their* competence development process should be initiated during this 1st stage. To a certain extent, ES*i*OD or its foundations can be applied in the 1st stage. It is certainly relevant and interesting to investigate this specific deployment. The different dynamics of this first stage and the different participation degree may require adaptations to ES*i*OD. Chapter 2 shows that the generic principles of IOD can fit this 1st envisioning stage and it is therefore firstly recommended to carry out further research in order to find a dedicated approach to this stage and situation. Secondly, this can be combined with the investigation on how these two different approaches would fit together and what the line of reasoning for the meta-approach on a higher abstraction level would look like.

The previously described expanding movement can also be carried out the other way around and limit the research scope. This brings us to the third and last recommendation.

3. Limitation of the scope to investigate specific topics in-depth

Specific elements in this dissertation arouse interest or curiosity. The concept of competence development, though intensively elaborated on in this study, also requires further investigation. In this study it is merely used as a construct for the assessment of personal growth and as a theme which designers can use to discuss future aspects of the organization.

The way in which competence increase works in-depth and these discussions or dialogues contribute to this development requires further very specific and demarcated research. A second research theme, that is related, is the integration of playful elements in the design and competence development process. Extensive research exists on how gaming can contribute and support the change process, but an in-depth understanding of how gaming and simulation interact with competence development in the specific design situation to our knowledge is lacking. In this dissertation the use of gaming and simulation is suggested and used instrumentally. The real effects of gaming during organizational design and integration with the learning and change process require an in-depth investigation of the mechanisms that play an essential role in this process.

9.4.2 ***Practical recommendations***

We would like to round off this dissertation with two more practical suggestions. Both mark the spirit of ES*i*OD and its co thinkers: "use *your* experiences to improve those of *others".*

Reflection for continuous improvement

The deployment of methodologies by practitioners in many cases varies and this can also be seen in the MINDEF case. Professionals, independently from the suggested methods and techniques, still hold on to their personally favoured ones and a general methodology will be partly used, partly ignored, mutually interpreted, but overall it will also develop throughout the process.

An approach or methodology in the researchers perspective should therefore be as "open" as possible, prescriptive only to a limited extent, and incorporate the mechanism to start a dialogue on how professionals use the approach and what each individual thinks of it, learns from it, and how to share these insights and experiences. Time should be especially taken for these subjects.

Climate

One cannot create good atmosphere by default or provide the cookbook recipe for a good party. Each reader, hopefully, recognizes the unpredictable occasions in which fun and pleasure were beautifully combined with being very effective. In many occasions these settings developed, or "just happened".

One should be aware of the positive contribution of this effect and deliberately realize the surroundings or create the context to let these phenomena happen more easily. In the MINDEF case most often this did not happen when there were tight time-boxing conditions, full packaged programs in advance, or "overly serious" attitudes from a part of the participants.

It thus requires the courage and will to partially plan ahead only sometimes, to let go, and occasionally to just play around, but be aware, believe in a good ending, and deliberately take time for informal moments.

Summary

Enterprise Information Systems or just Enterprise Systems (ES) have become increasingly popular since the last decade of the previous century. Many organizations have deployed an ES implementation and the current adoption rate of these systems is still rising. The implementation of an ES, especially when driven by a BPR rationale, has a large impact on the adopting organization. Extensive research has shown that the resulting organizational change process requires profound support, which most implementations currently lack, causing a substantial number of implementation failures. A literature overview in chapter 1 focuses on the diverse contributions dealing with this organizational change problem in the domain of ES implementations. The ES implementation process is researched from various perspectives, which leads to fragmented knowledge and mostly explorative or descriptive research results. Prescriptive research is carried out less often. This kind of research leads to conceptual change frameworks or guidelines. On the other hand, consistent creation of a profound and applicable ES specific change approach is lacking. This dissertation focuses on this omission and designs an organizational change approach, which it will then deploy in a longitudinal case study.

Chapter 2, at the outset of the regulative design cycle, starts off with an assessment of five actual, leading implementation methodologies on their available practices and methods to support the organizational change process. Here a self-derived ES implementation methodology model (ESIMM) is used that divides methodologies into three different dimensions: (i) Philosophy, (ii) Framework and (iii) Methods & instruments. The analysis shows that these methodologies are largely based on standard project management methodologies and all adopt a functionalistic perspective on the organizational change process. This is exemplified by their proposed way of working, which is emphasized on the mere introduction of the IT artefact. The investigated methodologies include a rather limited set of interventions or methods to support the organizational change process considering the current knowledge of scholars in the organizational change domain.

To further define the foundation for the change approach, different types of ES implementations are classified according to their different organizational change processes. In this dissertation we focus on the type that is currently most often deployed, called Package Enabled Reengineering (PER). This type is characterized by a BPR driver resulting in a 2nd order change process in which the organization adopts a fundamentally different way of working, including the accompanying organizational structure and behaviour. We show that the PER type can be conceptually supported by the foundations of the integral organizational development school (IOD). The essential integration of both concepts implies:

The application of IOD in the PER-driven ES implementation process essentially comes down to the initiation of a planned, large-scale process in which the organizational members ideally simultaneously perform *and* experience an integrated design and competence development process. The project stage from the ES implementation process fits this requirement with its opportunities for large-scale participation and concrete design assignments. Secondly, the application of IOD means the adoption of its multiparadigmatic way of thinking as founding philosophy behind the methodology. This implies helping the participating members with both functionalistic as well as interpretative perspectives during the implementation process. This stimulates the interaction between the design and development processes and also helps the 2nd order change process create frame breaking designs, release current schemata, and develop new organizational behaviour and social interactions.

Chapter 3 continues the regulative cycle and describes the analysis stage. It first describes the philosophy and meaning of integral organizational development and translates its principles to the PER-specific context in the project stage. This results in five essential principles that define the *philosophy* of the conceptual integral change approach. With the ESIMM structure, the analysis is further carried out in *framework*, but also the accompanying applicable *methods* and *instruments* are investigated using different concepts from the organizational science and ISDM domain. Chapter three concludes with the design specifications for an applicable change approach. Summarized, these design specifications include:

1. Continuous emphasis on design and development. Make sufficient time for the development perspective in a highly dominated functionalistic and design-based domain.
2. Generic two-staged approach to organize extensive participation and sustain competence development during the reengineering and later the ES configuration activities
    a. A growing network model to organize extensive participation in an efficient setup
    b. A deliberate focus on exchanging organizational members in new social settings during the project stage
3. Deployment of the systemic design approach to capture the design content. Business processes can be taken as a guiding structure to give participants a certain grip, but the holistic quality of the systemic model should be preserved since this facilitates systems thinking for the design and development process.
4. A specific focus on the roles and competences of internal and external participants.
    a. Assigning specific roles to participants depending on the change problem
    b. Coaching and role development as measures for competence increase

5. A situated process approach in which the participants deploy methods and instruments according to their context assessment.
    a. Requires deliberate reflection moments to discuss deployment and outcomes.
    b. Incremental and participative deployment of project monitoring and planning.
6. Control mechanism remains unchanged, but a more various staffing of the steering council is required.
    a. Cast and staffing of the steering council changes simultaneously with change objectives
    b. Requires role adoption and exemplary behaviour of sponsors and/or top management

Chapter 4 explicates the theoretical design of the change approach: ES*i*OD (ES implementation and integral organizational development). The design for this approach is based on different contributions from the organizational change and information systems development domain. It includes elements from integral organizational development, participatory design and collaborative reengineering, the application of large-scale interventions, systemic problem analysis and organizational design, situated method engineering, sense making, competence development, experimental learning, and the organization of participation. The design is a pragmatic approach that captures way of working and controlling in three assignments for the development organization, which consists of participants from the internal organization and external support. The assignments in arbitrary order are:

Network development

- This assignment aims at organizing large-scale participation in a growing network model. It acknowledges the need to repeatedly exchange participants during the design and development process. It supports creating new social interactions and initiates setting up open dialogues on existing networks of coalitions.

Systemic design

- This assignment helps the participants create a systemic design that covers their organizational needs. The systemic design starts from the high-level ambitions derived in the first stage of the ES implementation. It acknowledges the specific characteristics of the Enterprise System, the PER design rational, but also includes the necessary structural, social, and behavioural elements of the future state.

Competence development

- This assignment focuses on the facilitation of competence development simultaneously with the systemic design assignment. It acknowledges the different situations of individual participants and helps them to experience personal development. The assignment is based on the increase of skills, making participants aware of personal experiences and motivations, and it also pays attention to the affective components during the change process.

Each assignment includes three accompanying methods. ES*i*OD considers the three enacting processes of designing, changing, and learning as its joined fundamental contributors. Each assignment emphasizes one of these three processes, but it is the united deployment of the three assignments that collectively realizes a systemic design and organizational development. The approach is prescriptive in its explanation of the objectives and the line of reasoning behind the objectives (way of thinking), but leaves room for self-deployment and self-development of the actual assignments and their instruments (method adaptation).
Chapters 5, 6, and 7 describe the deployment of the change approach in the up-to-now largest ES implementation in the Netherlands (MINDEF). In these three chapters, the plan, process, and product evaluation is deployed. Chapter 5 first explicates the ex ante plan evaluation. The theoretical ES*i*OD approach is specified to the MINDEF case setting by an assessment of the organization (using OCAI and the colour model) and the inspection of the previous stages in the ES implementation project. This leads to a case-specific design that specifies:

- A detailed stage plan and a more specific appointment of roles to the participants,
- Further definition of relevant subjects or expected issues for the diagnosis and problem analysis
- Suggestions on relevant relationships between methods and instruments, and their deployment in relation to the design ambitions and the change capabilities of the organization.

From November 2004 until March 2006, the MINDEF project stage is analysed using extensive participant observation, surveying, interviews, and document inspection. During this period a total of 4 ES module-oriented teams (E.g. purchasing or finance) deploy the approach that is named “the MINDEF integral approach”. These teams, accompanied by a change team and a project management and integration team, make up the initial development organization (approximately 90 people).
First the MINDEF integral approach is compared with the suggested context-specific approach of ES*i*OD in chapter 5. Both approaches show a lot of similarities, but there are significant differences. The MINDEF integral approach is characterized by:

- A fragmented definition of the IOD philosophy in the training and project material
- A generic four-step approach that is coarser in its steps and activities, incorporates an extensive focus on network development, but lacks reflective cycles for the development organization.
- Various methods and instruments are available that resemble ES*i*OD, but their training, accessibility, and organized overview is average for the participants.

Chapter 6 continues the process evaluation with three in-depth micro perspectives that focus on the (i) purchasing team (19 people), (ii) the materials management team (21 people), and (iii) the invited participants from the line organization (app. 120 people). These micro perspectives are complemented with a macro perspective that explicates the process and its context on a higher level. It relates the individual micro perspectives to the process dynamics and context on the project level.
The significant observations of the process can be summarized as follows:
The lack of the elaborate explanation of the way of thinking behind integral design and development causes significantly different understandings of the rationale behind the change approach. This, in turn, causes teams to use the approach in different ways and deploy methods according to their own experiences and preferences. The integral MINDEF approach provides a situational-specific deployment, but this variance in deployment is unintended and, more importantly, the coordination mechanism of exchanging experiences and knowledge sharing is lacking. The four teams focus on their own objectives and contacts with the line organization, whereas internal reflection moments are very rare.
The assignment network development is deployed extensively and equally by all four teams. It results in the successful organization of extensive participation and involvement of various members from different backgrounds in the line organization. The teams also deploy the systemic design assignment equally, but this deployment does not match the objectives and rationale behind this assignment. Design activities and sessions are 'classically' driven towards EPC designs that explicate process designs and information, but lack organizational impact and issues.
The competence development assignment is mostly deployed functionalistically, and it emphasises acquiring new knowledge and partly learning new skills. Only the purchasing team deploys an interpretative perspective on competence development. This means that the notion of competence is not necessarily merely connected to skills and knowledge, but a dialogue is set up between the line organization and the team itself about the impact of design decisions on behaviour and social interactions. Unfortunately, this team also does not succeed in making these aspects explicit in systemic designs.

Chapter seven continues with the product evaluation. This evaluation is carried out in two main outcomes: design quality and competence increase of the participating members. Design quality is assessed using document analysis, interviews, and expert opinions. The designs are investigated qualitatively on their correctness and consistency, accessibility, systemic completeness, and acceptance.
There are great differences in the qualitative properties of the designs from both analysed teams.

- The purchasing team shows a pragmatic, mean and lean design format with minor flaws in correctness and consistency. The level of detail is nevertheless criticized by both the line organization as well as the experts (systemic completeness).

- The designs of the management materials team can be characterized as complex, extensive, and large in number. The number of errors is larger than in the purchasing team and the line organization especially complains about readability and comprehension. The experts criticize consistency due to the number of different designs and sub designs. The level of detail on the other hand is better than in the purchasing team, but this team's results also lack systemic completeness.

The second product evaluation criterion is competence increase for the participating team members. This is assessed using a three-layered competence development model for the purchasing and management materials team and pair-wise comparison of cognitive schemata for the members of the line organization. Competence increase is investigated by analyzing the respective increase and congruency between:

- The technical dimension that characterises skills and knowledge (by a thrice-repeated Self efficacy questionnaire),
- The narrative dimension that characterises peoples' intentions and their stories behind their actions (by interviews and twice-repeated schemata elicitation)
- The affective dimension that characterises the mood of participants during the change process (by observations and two surveys).

The essential outcomes of this product evaluation are:

- The purchasing team interpretatively utilizes the competence development assignment and shows a significant competence increase during the twelve-month period. The participants independently state an increase in skills and knowledge, but also significant changes in their acting and openness to experience. During the first seven months of the project the purchasing team also reports an inspiring and motivated spirit. Towards the end of the project stage, this decreases as the team finishes ahead of schedule, but is not allowed to proceed with new initiatives.
- The materials management team shows no competence increase in all dimensions during this same period. It expresses an indifferent perception of the change process. The participants, on the other hand, report that they feel proud of their achievement since the team during the project stage is confronted with an extensive amount of work and significant backlogs.
- The line organization as third micro perspective is assessed on the shift in cognitive schemata. It is shown that at t1=June 2005 the newly defined cognitive schemata significantly differ from old cognitions and attitudes on current purchasing and materials management practices. This indicates that the concepts that come along with the new defined process designs and way of working are comprehended and adopted. There is no further significant increase or decrease in these schemata elicitation at t2=December 2005. This shows there is no downswing in the agreed design decisions.

On the higher project level, it can be concluded that:

- Acceptance of the design and the ES system has increased significantly;
- New social interactions have grown substantially resulting in augmented mutual trust and understanding between force units that previously did not know each other or even distrusted each other's way of working.
- Increase in the knowledge and understanding of the project, its meaning, and impact
- Shift in specific cognitions in a substantial network of participants from the line organization. Approximately up to 450 participants have been involved by this network approach, either directly or indirectly.
- On the other hand the different teams classically define the design and lack systemic quality; Organizational issues such as expected behaviour and new necessary competences are not explicated in the designs themselves, and this sometimes laboriously gained knowledge is not seen as being worthy. The use of this information on and insights into the definition of the future training and development program during the configuration phase is lacking.

Chapter 8 marks the redesign of the ES*i*OD approach. A reconstruction is carried out based on evaluative sessions with the MINDEF organization (December 2005- March 2006). The participants are requested to reflect on the process, define cause and effect relationships, and make an assessment of the effective and improvable elements in the approach. The researcher uses this material in a reflective analysis (including root cause analysis) to distinguish context, process, and outcomes, and to find plausible explanations for the deployment of the change approach and its outcomes. The ES*i*OD approach is redesigned based on this analysis and the findings from the MINDEF evaluative sessions. A distinction is made between case-specific recommendations and redesign specifications that apply to the conceptual model of chapter 4. The latter are divided into major redesign issues and improvements in the existing elements.

Case-specific recommendations:

- An improved assessment, preparation, and training of the participating members. This includes internal members but also external consultants.
- The involvement and exemplary behaviour of top management. Trust and understanding between the previous force departments has increased substantially across several hierarchical layers. The translation of this mutual trust into explicit design decisions by top management is lacking. This frustrates the progress significantly and impacts the carefully gained social interactions in the network.
- A more deliberate attitude from the consulting partners compared with the self-confident MINDEF organization. This implies a more perseverant suggestion of way of working and the accompanying methods or interventions.

- Adoption of a modelling method that facilitates systemic design
- More deliberate deployment of rules as a way to facilitate the open dialogue on design proposals, to explicate organizational impact, and to make explicit design decisions accompanied by commitment from top and middle management.

Redesign of ES*i*OD

Major redesign aspects

The case study analysis shows that the three-assignment format can be preserved, but a stronger focus is required to guide the participants to a more combined deployment of both methods and assignments. The three assignments for clarification purposes and understanding can be displayed one by one, but their deployment cannot be looked at separately. This is realised by two major redesigns of ES*i*OD

First, the adaptations of three methods that now are used as bonding element to each integrate two different assignments with each other:

- The collaborative design workshop functions as s mediating element between systemic design and network development.
- The Roles method is expanded to combine competence development and network development.
- Simulation & gaming as third combined method in the redesign is positioned in between systemic design and competence development.

The redesign explains this different composition and also the adapted way of working with the assignments and accompanying methods.

Secondly, the generic stage plan of ES*i*OD also is adapted as step five “reflection” is emphasised. The deployment of E*Si*OD shows that in the beginning the participants did find it difficult to embrace and comprehend the multiparadigmatic rationale. Secondly, the participants did not realise that they should have made sufficient time for substantial reflection on the deployed process and its outcomes. This can improved by a more deliberate reflecting stage that stimulates the participants to initiate a dialogue on the essentials of the approach itself (method adaptation), and on its deployment as way of sense making process and exchange of mutual knowledge and experiences. Reflection is not about teaching the participants the essentials of E*Si*OD, but about initiating the mutual dialogue on its use and sharing outcomes and the mutual perceptions by the participants themselves.

Samenvatting (In Dutch)

Dit proefschrift is een ontwerp studie naar een veranderkundige aanpak voor de implementatie van Enterprise Systemen (ES). De invoering van dergelijke systemen als opvolger van ERP is geen sinecure. Zowel grote organisaties als het MKB zien in deze systemen grote mogelijkheden, maar de invoering is weerbarstig en gaat vaak vergezeld van substantiële organisatie veranderingsprocessen. Wetenschappelijk onderzoek heeft allerlei losstaande veranderkundige componenten van ES implementaties in kaart gebracht. Er is echter nog weinig toegepast wetenschappelijk onderzoek dat probeert om bovengenoemde losstaande inzichten te combineren met de huidige inzichten in de organisatie veranderkunde en deze specifiek toe te passen in dit probleem domein (Hoofdstuk 1).
Na een uitgebreide analyse van het probleem veld wordt in deze dissertatie afgeleid dat Package Enabled Reengineering (PER) op dit moment het meest relevante implementatie type is en dat dit type qua veranderkenmerken en dynamiek past bij de fundamenten van integrale organisatie ontwikkeling (IOD) (Hoofdstuk 2). Het ontwerp van de veranderkundige aanpak wordt als eerste afgeleid op basis van een diepere analyse van de filosofie en de manieren van werken achter IOD. Op basis hiervan wordt dit verder gespecificeerd in de typische dynamiek van de ontwerpfase binnen de PER implementatie. Dit resulteert in een veranderkundige aanpak genaamd ES*i*OD, wat staat voor ES implementation en integral Organizational Development. Het samensmelten van de cursieve *i* staat voor het geïntegreerd en simultaan uitvoeren van beide concepten. ES*i*OD is situatie specifiek en gebaseerd op de fundamenten van grootschalige participatie, competentie ontwikkeling en systemisch ontwerpen. ES*i*OD past het gedachtegoed van “ontwerpen en ontwikkelen” toe. (Hoofdstukken 3 en 4). ES*i*OD is georganizeerd in drie opdrachten: (i) netwerk ontwikkeling, (ii) systemisch ontwerpen en (iii) competentie ontwikkeling. ESiOD vergezeld deze drie opdrachten met specifieke interventies, methoden en technieken.

De generieke vorm van ES*i*OD wordt in deze dissertatie getoetst in een longitudinale casestudie binnen het Nederlandse ministerie van defensie. Deze organisatie is bezig met een grootschalige ES implementatie. Door middel van een ex ante plan evaluatie is ES*i*OD situatie specifiek beschreven voor de betreffende case (Hoofdstuk 5).
Gedurende een periode van 14 maanden is door middel van participatieve observatie, interviews, document analyse en vragenlijsten geëvalueerd hoe de veranderkundige aanpak door de deelnemers wordt gebruikt en tevens geanalyseerd welke effecten het gebruik van deze aanpak heeft. Deze ex post evaluatie is beschreven in proces evaluatie en product evaluatie (respectievelijk Hoofdstuk 6 en 7). In de product evaluatie is gekeken naar de competentie ontwikkeling van diverse participanten en de kwaliteit van de gemaakte ontwerpdocumenten. Bij de proces evaluatie is gekeken naar hoe de participanten de aanpak hebben gebruikt en hoe dit afweek ten opzichte van verwachte ofwel voorgeschreven componenten van de aanpak.

De studie laat zien dat binnen deze case er vooral veel aandacht is geweest aan netwerk ontwikkeling en dat dit heeft bijgedragen aan een toename van het draagvlak, begrip voor elkaar en toegenomen vertrouwen van diverse organisatie onderdelen binnen de verschillende krijgsmacht onderdelen. De opdracht systemisch ontwerpen is door alle onderzochte projectteams niet op een systemische wijze voltooid. Alle opgeleverde ontwerp documentatie beperkt zich tot het vastleggen van informatiebehoefte, bedrijfsproces logica en systeem functionaliteit. De bijbehorende "zachte" componenten zoals gedrag, competenties en samenwerkingsverbanden worden niet expliciet
beschreven. De opdracht competentie ontwikkeling is gevarieerd ingevuld door de verscheidene project teams. Er zijn duidelijke verbanden te herkennen in de aanpak van teams en hun uiteindelijke competentie ontwikkeling. Op basis van de uitkomsten is door middel van root cause analysis een inventarisatie gemaakt van de case specifieke invloed op het verloop van het veranderingsproces en onafhankelijke reden tot herontwerp van de aanpak (Hoofdstuk 8). Op basis van deze analyse sluit deze dissertatie af met een generiek herontwerp van de veranderkundige aanpak en met situatie specifieke aanbevelingen voor het verdere gebruik door het Nederlandse ministerie van defensie.

Biography

Christiaan Katsma (1970) is currently an assistant professor in the department of Information Systems and Change Management at the University of Twente in the Netherlands. He holds an MSc in Aerospace engineering and worked in the chemical and ICT industry in Germany and Japan. During this period he was engaged in research & development and later worked as system developer and as consultant. He has various research interests, but these all, in one way or another, have to do with the use of information technology. His research themes include the adoption of I-music, the use of E-health technology and especially the implementation of information systems and organizational change. In this latter area he focuses specifically on the integration of organizational development with system implementation. He teaches several Bachelor and Master courses, such as design and implementation of Business Information Systems, Organizational Change and IT as well as a course on Enterprise Systems in particular.

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Appendices

Appendix CH2

Activities	Outputs	Stage (1-3)
Planning the project (set time, scope, budget, resources)	Project plan, Migration strategy	1
Set Up the Business Case	Business Case	1
Define current status (technology, business processes and organizational structure)	Process descriptions	2
Design blueprint (working routines, business processes, authorities, organizational structure, roles and functions, information and data new design business processes, system functionality and information support)	Blueprints, process design, Training descriptions	2
Interfaces and data conversion deals with the connection or information exchange with legacy systems. Sometimes legacy systems can be replaced completely in other cases parts of the legacy systems need to continue and interfaces have to be initiated.		2
Migration of existing Information systems and current procedures.	Substituted and/or out phased legacy systems.	2
System configuration and testing	Working ES	2
Training	Schooled users	2
Go live	Up and Running ES	2
Acceptance test	Agreement and Definition of the system including possible redesign and system changes	3
Service, Support, error fixing and updates	Continuous service present	3

Table 100 Typical activities and deliverables defined in an ES implementation methodology

Tooling	Stage	Purpose
Methodology assistant/ framework	All	Electronic assistant on the top level that embeds the different available tools and methods. It presents availability of tools and methods, best project practices and supports tool selection.
Blueprint or design framework	2nd & 3rd	Sometimes this toolset is part of the methodology assistant, but it also is positioned as a separate tool due to its extensiveness. It is a repository or Question and Answer database to store descriptions as well as documents of the various requirements and results for work items. It functions as a knowledge repository both during the project and afterwards, sometimes even delivering the basic foundations of online help files. This tooling in most methodologies does not accommodate process or data modelling tools. Mostly only (web based) diagram viewers are present to view examples of process models. The blueprint usually is described in the Q&A or in a regular document. Most methodologies use or recommend third party tools can be used to model processes and data
Business case analysis	1st	Stepwise analysis and creation of both qualitative and quantitative business case. Often accompanied with spreadsheet templates and direct relationships to already extensive described best practices.
Process designer	2nd	Graphical support to craw process charts possibly combined with process templates -and documentation. Often supplied by a 3rd party
Data design	2nd	Tooling specified on data analysis and design possibly connected to process charts. Also sometimes supplied with data cleansing and migration strategies and templates. Often supplied by a 3rd party
Test system/ test tools	2nd & 3rd	Full mirror of the final system. Published in different releases. Mostly restricted to external consultants. This allows consultants to record a sequence of actions (insertions, etc), analyse effects and replay them. This way, when configuring a consultant can run the script (for example, to execute all steps of a purchase order) to see whether all actions and data is still accepted by the system.
Configuration assistant/	2nd & 3rd	This tooling is mostly used by functional consultants as a checklist when configuring the system, and contains an exact list of the configuration database tables that need to be configured.
Training/ Workshop templates/ assistant	2nd	Templates to facilitate different training sessions in the train the trainer perspective. Sometimes also in the form of online tutors that facilitate the step by step creation of training material including screenshots from the master repository.
OCM assistant	All	Electronic knowledge base or number of Templates to support the change management process during the implementation. Often embedded in the project management toolset or with direct relations to the risk assessment tools.
Project plan toolset	All	Several tools exist for project management. Often a project plan template is provided, that can be extended with a planning in for example a spread sheet or project plan software. Furthermore, a Project Estimator exists. This is often a spreadsheet based tool that calculates estimates of workload, planning and costs of an implementation. Often a Risk assessment component is part of the project management toolset. Risks are assessed on technical, project and people criteria. The tool supports to explicate relationships between the general project plan and potential risks.

Table 101 Overview of the typical tools in ES implementation methodologies.

Appendix Chapter 3

Interventions mainly aiming on Alternating perspective	
Creativity sessions	Workshops that facilitate open mind setting or creativity (de Bono) during a brainstorm process
Cause mapping, mental or mind mapping	Specific support to explicate patterns, relationships , causes and issues and facilitate the explication of the different cognitive scheme of the participants
Paradoxical thinking workshops	Workshops based upon paradoxical thinking (Barrett). Support participants to reflect upon contrary concepts as way to come up with reframing new insights(Contrary thinking, Hegelian Thinking
Interventions mainly aiming on Participation/Staged Process	
Networking	Initiation and fostering of contact -and social networks.
Collective planning	Set up and Development of project structures,. collective planning and adjustments of tactical plans
Team Building	An intervention designed to increase cohesiveness/ cooperation of people who work together.
Interventions mainly aiming on Systemic design	
Job Descriptions	An intervention intended to analyse duties performed by job incumbents and to describe what results they are to achieve. Changes in job descriptions may affect individual behaviours and accomplishments.
Open System Mapping	An intervention designed to identify relevant inputs, outputs, and transformation processes of an organization.
Quality Circles	An intervention designed to use small groups, often work groups, to identify methods of improving production or to solve work problems.
Work Flow Planning	An intervention designed to plan the flow of work between two or more components of an organization.
Reengineering	An intervention also known as process innovation and core process redesign- a radical redesign of business process to achieve breakthrough results.
Work Redesign	An intervention in which the work itself is changed.
Quality of Work Life	An intervention designed to improve working conditions and to increase employee participation in decisions that affect them and their organizations.
Interventions mainly aiming on Competence development	
Process Consultation	An intervention designed to focus attention on how individuals or groups interact.
Survey Feedback	An intervention designed to collect information from members of an organization, report the results, and use the results as a starting point for action planning for improvement.
Counselling /Coaching	An Intervention designed to formalize/ increase helping relationships in which individuals may relate their problems to sympathetic listeners or be advised how to deal with work or interpersonal problems.
Values Clarification	An intervention designed to help access or determine individual or group values.

Table 102 Different interventions from the OD domain based on (Rothwell et al. 1995)

Appendix Chapter 5

Clusters \ Sourcing organization		Air Force	Navy	Army	MP	Department	External SAP consultants	External change consultants
1	Offering of services	2	2	4	1	3	1	1
2	Procurement	2	2	4	1	3	1	1
3	Financial transactions	3	3	4	1	3	2	1
4	Controlling and accounts keeping	3	3	4	1	3	2	1
5	Management of materials	3	3	4	1	2	2	1
6	Repair and servicing	3	3	4	1	3	2	1
7	Transport and logistics	3	2	4	1	3	2	1
A	Administrative Staff (secretary, project desk)	1	1	2	0	3	0	0
B	Change experts in IOD	1	1	1	1	1	3	7
C	Project & Integration Management	1	1	1	1	1	3	3

Table 103 staffing example for the initial development organization

Clusters \ Roles		Process owner	Expert	Scanner(D)	Narrator(D)	Sponsor	Coach	Change agent (D)
1	Project team leader Integration Management		2	2	2	4	2	
2	Procurement	2	2	4	1	3	1	1
3	Financial transactions	3	3	4	1	3	2	1
4	Controlling and accounts keeping	3	3	4	1	3	2	1
5	Management of materials	3	3	4	1	2	2	1
6	Repair and servicing	3	3	4	1	3	2	1
7	Transport and logistics	3	2	4	1	3	2	1
A	Change experts in IOD	1	1	1	1	1	3	7 [14]
B	Project team leader Integration Management	1	1	1	1	1	3	3
C	Project team leader Integration Management		2	2	2	4	2	

Table 104 Minimal cast of roles within one cluster (D= optional double role adoption by one person)

[14] (= Sum of above clustes)

Appendix Chapter 6

Categorie	Bouwsteen	Korte omschrijving
Vervullen behoefte	Vervullen behoefte – Verwerven basis (VBB)	Vervullen behoefte aan goederen en diensten bij Defensieonderdelen.
Bevoor-rading en materieel-beheer	Bevoorrading – Basis (BVB)	Inslaan, opslaan en uitslaan van goederen door Defensieonderdelen. Ook Tracking & tracing van artikelen wordt ondersteund vanaf een depot in Nederland oefengebied t/m de aflevering aan de gebruikende eenheid, inclusief artikelen in transport.
	Administratief Materieelbeheer (AMB)	Registreren en beheren van de geautoriseerde en de daadwerkelijke materieellogistieke uitrusting (materieel en voorraden) van defensie onderdelen.
Onderhoud	Instandhoudingonderst euning (IHO)	Ontwikkelen en beheren van baseline- en actuele configuraties van (wapen)systemen. Ontwikkelen en beheren van systeemplannen en ILS-plannen voor (wapen)systemen.
	Onderhoud – Basis (OHB)	Identificeren, plannen en uitvoeren van enkelvoudige onderhouds- en modificatieopdrachten.
Financiën	Bedrijfsadministratie – Kas / verplichtingen (BKV)	Verzamelen, registreren en verwerken van alle bedrijfstransacties die leiden tot het aangaan en realiseren van verplichtingen of vorderingen en het uiteindelijk betalen of ontvangen.
	Bedrijfsadministratie – Kosten (BAK)	Verzamelen, registreren en verwerken van de gevolgen van bedrijfstransacties in kostentermen.
	Planning, Begroting en Budget (Finance and controlling)	Het opstellen en beheren van meerjarige Defensieplannen, het opstellen en beheren van de departementale begroting en het verdelen hiervan in afzonderlijke budgetten, uitgezonderd de geïntegreerde input vanuit Asset Llifecycle Management (ALM) processen.
	Managementinformatie – Financieel (MIF)	Verzamelen en distribueren van financiële informatie omtrent de materieellogistieke processen in de Defensieorganisatie.

Figure 97 Basic building blocks for PGS plateau 1 defined from the vison in stage 1 prior to PGS

Input voor workshop stap 1.7.x (zie output 1.5)

1. Business scenario's in extenzo
2. Volledig aantal business scenario files
3. Proces master files in aanzet.
4. Actiepunten + issues (zie workshop 1.5.)

Input voor workshop stap 2.2.x (zie. Output 1.7.)

1 Eisen en wensen
2 Per Business scenario file
   a EPC
   b Procesbeschrijvingen en instructies
   c SAP ondersteunt …..
   d Impact op de organisatie
   e Impact op ICT
3 Vragen en open plekken.

Doel workshop

1. Best practices en issues detailleren en verbeteren.
   a. Verschillen tussen best practices en huidige practices zinvol bespreken
   b. Inventarisatie issues en actiepunten
2. Acceptatie van voorstellen verhogen: in eerste instantie binnen PGS-team en tweede instantie in netwerk.
3. Commitment bij SPEER/PGS/ontwerpen en besluiten versterken.

Output

1. BSF's en Proces Master files:
   a. Benoemd en vastgesteld.
   b. 1e: Acceptatie in team, 2e: Acceptatie in netwerk
2. Issues vastgesteld
3. Afspraken binnen team en met netwerk over vervolgactiviteiten:
   a. Nader onderzoek van de actiepunten
   b. Uitwerking en escalatie issues
   c. Terugkoppeling op organisatieonderdelen.

Inrichting workshop

2 Introductie
   a Toelichting op programma SPEER en doelstellingen workshop
   b Toelichting op werkwijze van deze workshop
3 Presentatie en bespreking functionaliteit en haalbaarheid Best Practices (procesflow)
   a Checken op volledigheid
   b Inrichtingskeuzes bespreken en vaststellen
   c Analyse van BP's o.b.v. eisen en wensen (zie stap 1.1.en 1.6.2)
   d Analyse van BP's o.b.v. bestaande veranderprojecten (bv. DMO i.o. etc..)
4 Inventarisatie onderwerpen voor 'verhalen' : (proceskwaliteit)
   a wat irriteert/stoort het meest!
   b Waar zijn we het meest trots op!
   c Selectie onderwerpen voor 'verhalen', o.b.v.
      i Overeenkomsten met issues SPEER team
      ii Urgentie en belang
   d Verhalen vertellen en vastleggen
      i Vastleggen m.b.v. oorzaak gevolg diagrammen (cause maps)
      ii Analyse van de cause map
5 Inventarisatie van oplossingen en issues
6 Planning van vervolg activiteiten
   a Extra bijeenkomsten
   b Uitwerking issues
   c Samen met netwerk oplossingen uitwerken, nader onderzoek etc..

Middelen: Computer, beamer, overhead, brown-paper en geeltjes, flipover.

Figure 98 Process Quality Workshop template

Opleiding Verandermanagment in de "geintegreerde aanpak PGS-VM t.b.v. PGS en VM medewerkers"				
Module	**Onderwerpen**	**Werkvormen en instrumenten geintegreerde aanpak**	**Het Waarom van werkvorm en instrument.**	**Wijze van opleiding**
Resultaatgericht veranderen	Veranderstrategie; Wie is eigenaar veranderingsproces		Walk the talk: besturingsmodel Defensie. Wat is willen?	
	Verzamelen eisen Defensie	Resultaatverwachting	Vaststellen van: wat verstaan wordt onder eisen; resultaatverwachting, performance van de nieuwe processen	Overleg met PGS
	Verbeterpotentieel inschatten	Resultaatverwachting 2e stap.	Resultaatverwachtingen expliciteren opdat deze communiceerbaar zijn.	
	Business Benefits Case	instrument of niet	What's in it for us? Wat zijn targets? Hoe monitoren? Het belang hiervan!	Wat doet BBC?
Organizeren veranderingsproces	Rol van SPEER in veranderingsproces Defensie;	Gezichtspunten en kritische factoren verandermanagement	Spelregels van verandering, wat kan wel en niet binnen Defensie.	
	Fasering aanpak Stap 1. Toepasbaarheid best practices & impact verandering inschatten; Stap 2: Veldonderzoek en Stap 3. Validatie besluitvorming	Break down activiteiten van de geintegreerde aanpak;	Samenhang ontwerp en ontwikkelactiviteiten; Rol verdeling PGS en VM; Bewaking planning en voortgang.	presentatie uitwerking aanpak PGS - VM
	Netwerk in beeld brengen	Role map	Bepalen wie betrokken is en moet zijn, in welke rol, hoe en door wie te benaderen, vastleggen.	oefening eigen teamnetwerk
	netwerk mobiliseren	Gesprek; start up bijeenkomst; communicatie naar leden netwerk	plan veldonderzoek contracteren met beslissers; uitspraken van beslissers (beleidsverantwoordelijken en lijnmgt) over hun resultaatverwachting;	training start up workshop.
	Plan Veldonderzoek opstellen	Plan van aanpak	Volgorde, werkwijzen, wie, wanneer.	oefening plan van aanpak opstellen

Figure 99 Educational plan to support IOD

Module	Onderwerpen	Werkvormen en instrumenten	Het Waarom van werkvorm en instrument.	Wijze van opleiding
Geintegreerd ontwerpen en ontwikkelen	Onderzoek van best practices, issues en expliciteren vraag	workshop(s) procesflow en proceskwaliteit; interviews; brown paper sessie	Netwerk aan tafel; Issues bespreken; extra issues inventariseren; expliciteren van de vraag; betrokkenheid en vertrouwen in Best practices vergroten	training inrichting workshop;hanteren instrumentarium proceskwaliteit;
	Issue management	oplossen of escaleren	Zie work flow: minimaal escaleren. Escalatie monitoren	
	Diepte van de verandering bepalen.	interviews, (ind. en groep) of workshop	Naast proces en ICT andere veranderingen noodzakelijk? Voor zover nodig worden dit issues: wel of niet binnen SPEER oplosbaar.	
Communicatie	Weerstand en conflicthantering			case?
	Feedback: geven en ontvangen			case?
	Samenwerken in veranderings-processen		Faciliteren van bijeenkomsten; rollen (belbin); teambuilding; de oefenende organisatie	
	Terugkoppeling op netwerk en startup groep.	presentatie	Relatie onderhouden met betrokkenen	
	Informatiesessies	presentaties	interactieve bijeenkomsten met toekomstige gebruikers	
Validatie en besluitvorming	Onderzoek standpunten beslissers/sponsors	formeel: interviews; Informeel: telefonisch; langslopen.	verhogen sponsorship; projectactiviteiten verankeren bij beslissers/leiding.	
	Selectie best practices		Selecteren volgens aanbod PGS en toepassen van bekende beslisregels; besluitvorming zo laag mogelijk in de organisatie. we.v.m. issuemgt.	
	Besluitvorming	Decision support room MOA.	alle beslissers, bespreken voorstel plus issues, en aanpak van issues. Proces tot besluitvorming brengen	

Figure 100 Educational plan to support IOD (part 2)

Doel van de spelregels	
• Snelheid van ontwerpen en ontwikkelen op tempo te houden. • Participatie van derden en tijdige acceptatie bij hen van voorstellen positief beïnvloeden • De altijd aanwezige spanning tussen ontwerp en ontwikkelactiviteiten begrijpen en binnen deze spanning constructieve interventies kunnen doen, die het leren en experimenteren enerzijds en het produceren anderzijds positief beïnvloeden • Concrete afspraken (spelregels) hanteren door teams, kernteam, stuurgroep en uiteindelijk ook de staande organisatie. • Spelregels zijn een voorbode, voorbeeld hoe de productieorganisatie ook zou kunnen werken.	
Productieorganisatie Regels	**Ontwikkel/veranderorganisatie Spelregels**
Functies en functie**be**schriijving	Rollen en rol**om**schrijving
Verantwoordelijk voor een effectieve en efficiente taakuitvoering.	Verantwoordelijk voor het verander en leerproces van de organisatie, binnen een ruim gedefinieerde scope, met onbekende condities.
Bevoegdheden	Persoonlijke wilskracht
Bepaald resultaat en gerichtheid	Onbepaald resultaat en gerichtheid
Functionele kritiek wordt verwerkt. Onduidelijke kritiek leidt tot vertraging.	Commentaar op voorstellen voorzien van een alternatief wordt altijd in behandeling genomen. Zonder alternatief is dat niet zeker. Met alternatief is altijd duidelijker.
Leidinggevenden zijn verantwoordelijk voor het implementeren van de veranderingen.	Teamleden en leiders stellen zich persoonlijk garant voor het realiseren van de veranderingen.
Voor functionarissen worden condities gerealiseerd. Zij focussen op taken en resultaten. (ideaaltypisch)	Van Teamleden wordt verwacht dat zij naast producten en reslutaten realiseren ook hun eigen condities voor ontwerpen en implementeren mee helpen realiseren.
Aanspreken op resultaat en verantwoordelijkheid. In de vorm van beoordeling.	Aanspreken op initiatieven nemen. Vergiffenis als het fout gaat. Beloven dat het beste nagestreefd wordt.
Leidinggevenden	Leidinggevenden worden c.q. zijn sponsor van het veranderingsproces in woord en daad.
Onderliggende waarden: Heldere verdeling verantwoordelijkheden, taken, bevoegdheden en loyaliteit.	Onderliggende waarden: Verantwoordelijk voor het geheel, vriendschap en loyaliteit
Loyaliteit is onderschrijven en uitvoeren van bedrijfsdoelstellingen en regels	Loyaliteit is blijven meewerken ondanks verschil van inzicht, ook fundamentele over doelstellingen en werkwijzen.
	Voer een dialoog, niet discussiëren.
	Willen Onderscheid met verlangen.
	Ervaren onveiligheden: als gevolg van sociale en organisatorische beperkingen, regels etc. bespreken, angst van het risico van het nieuwe laten bestaan, kortom durf het nieuwe, het andere te doen.

Figure 101 Role descriptions and Rules for the development organization

Appendix Chapter 7

Dimension	Item (SE Question)	Source Item
Emotional intelligence	Deliberately not express emotions during your work if you think doing so will not have the desired effect	Researcher
	Find a suitable way of talking about feelings of insecurity with your team leader or change consultant	Schuiling
	Consciously express emotions during your work if you think this will be beneficial to your objectives in for example a session or group process	Researcher
	Find a solution to cope with feelings of insecurity together with your team leader or change consultant	Schuiling
	Sense and reflect on feelings of stress or tension that are related to your work	Schuiling
Specifying competence	Ask for the reasons behind someone's opinions during a design session or workshop	Researcher
	Specify future desired behaviour in the new work situation, due to the introduction of the ES	Researcher
	Specify future collaborations and social interactions in the new work situation, due to the introduction of the ES	Researcher
	Specify future competences in the new work situation, due to the introduction of the ES	Researcher
Setting personal limitations	Show others how to do parts of your work	Schuiling
	Reassure yourself that work is finished and you really are ready	Schuiling
Janusian Thinking	Be a moderator so that participants with different opinions can have a constructive dialogue	Researcher
	Stimulate dialogue instead of discussion during a session	Researcher
	Make other people aware of their behaviour if you think this will otherwise hinder the new work situation	Researcher
	Stimulate other people to challenge their ideas on a specific topic and possibly change them	Researcher
	Critically reflect on your own schemata and possibly adjust hem	Researcher
Acting assertively	Convince others that you are doing the right things	Schuiling
	Make sure that you are being heard if you present a problems	Schuiling
	Stand up for yourself if you feel you are being treated unfairly	Bandura
	Express your opinion even if you know that the other participants do not agree	Schuiling
	Be firm when someone expects something unreasonable from you	Bandura
Networking	Stimulate people in your network to expand the network with other relevant stakeholders	Researcher
	Stimulate people in your network to intensively discuss topics that are related to the PGS project	Researcher
	Make contact with new people who you consider relevant because of their contributions to the topic you are responsible for in PGS	Researcher
	Create a relationship of mutual trust with people previously unknown to you	Schuiling

Designing	Specify the information requirements that are related to a specific business process	Researcher
	Present complex processes in a such a way that they are accessible to and comprehensible for laymen	Researcher
	Depict a working scenario including the relating process logic in a process model	Researcher
	Specify desired behaviour of the people who will be involved in this process in a process description	Researcher
	Model a suitable organizational structure that fits a specific business process or parts of it	Researcher
	Achieve the necessary level of detail in the process master files	Researcher
Specifying problems	Return to the original motives behind the problem	Researcher
	Specify the problem behind the problem	Researcher
	Uncover the reasons behind current collaborations between people	researcher
	Uncover the reasons behind someone's current behaviour in the work situation	Researcher
Designing and developing	Make a different design decision based on the majority of opinions from the participants, although you yourself have a different opinion	Researcher
	Give a group of participants from different backgrounds influence during the design workshops	Researcher
	Throw away a design that you think is appropriate, but that the majority of the involved stakeholders does not accept	Researcher
	Use an interpretive approach and create a design after several sessions	Researcher
	Initiate a collaborative design session not only to create a high quality design, but especially to let participants share their experiences and gain understanding for each other, even though this may not lead to a concrete design artefact.	Researcher
Process Vision development	Design based on a vision instead of a concrete objective	Researcher
	Have a view of different social interactions in a future business process.	Researcher
	Have a view of the necessary organizational behaviour in a future business process.	Researcher
Creating space	Decide for yourself what is best	Schuiling
	Dare to make mistakes	Researcher
	Fulfil your own expectations	Schuiling
	Create room to develop competences that are necessary for your own expertise	Schuiling
Collaborating	Ask your team members to help you if you get stuck in your work	Schuiling
	Ask a colleague for help if you are not feeling comfortable with your task	Schuiling
	Work in a team	Bandura
	Help other team members with specialist tasks	Schuiling
	Ask your team leaders for help in case you got stuck in your work	Bandura
	Fulfil the expectations of your direct team members	Schuiling

Table 105 Questionnaire of self efficacy.

		t0	dec 2004	t1	may 2005	t2	dec 2005
Items	**Questions**	**valid n**	**Alpha**	**valid n**	**Alpha**	**valid n**	**Alpha**
Emotional intelligence	5	24	0,76	24	0,73	25	0,69
Specifying competence	4	25	0,91	25	0,89	28	0,89
Setting personal borders	2	24	0,64	24	0,65	27	0,71
Janusian Thinking	5	24	0,86	24	0,79	27	0,80
Act assertively	5	25	0,79	25	0,80	28	0,80
To Network	4	24	0,84	24	0,75	27	0,74
To Design	4	21	0,69	21	0,65	18	0,69
To Design and develop	5	24	0,89	24	0,84	27	0,78
Explicating problems	3	23	0,67	24	0,71	27	0,72
Process Vision development	3	23	0,65	19	0,61	26	0,67
Create space	4	20	0,79	20	0,68	17	0,74
To collaborate	6	21	0,76	21	0,74	17	0,80
Collective team SE	18	20	0,87	20	0,85	28	0,84

Table 106 Cronbach alpha analysis of the items throughput t0, t1 and t2

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Emotional intelligence	-0,31	0,79	0,20	-0,74	0,11	-1,58	15	0,14
Specifying competence	-0,63	0,84	0,16	-0,96	-0,30	-3,90	26	0,00
Setting personal borders	-0,48	1,16	0,23	-0,96	0,00	-2,07	24	0,05
Janusian Thinking	-0,44	0,78	0,19	-0,83	-0,06	-2,41	17	0,03
Act assertively	-0,36	0,98	0,15	-0,65	-0,06	-2,43	44	0,02
To Network	-0,26	0,74	0,13	-0,51	0,00	-2,05	34	0,05
To Design	-0,86	1,07	0,18	-1,22	-0,50	-4,82	35	0,00
To Design and develop	-0,33	0,79	0,10	-0,53	-0,13	-3,24	60	0,00
Explicating problems	-0,33	0,49	0,11	-0,58	-0,09	-2,92	17	0,01
Process Vision development	-0,39	0,75	0,13	-0,66	-0,13	-3,03	32	0,01
Create space	0,12	1,20	0,18	-0,25	0,49	0,64	42	0,53
To collaborate	-0,13	0,34	0,06	-0,24	-0,02	-2,37	37	0,02
Collective team SE	-0,25	1,26	0,16	-0,57	0,06	-1,60	62	0,11

Table 107 **Paired T-Test Self efficacy t0-t1 for Purchasing team**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Emotional intelligence	-1,29	1,79	0,44	-2,22	-0,37	-2,97	16	0,01
Specifying competence	-0,33	1,04	0,20	-0,74	0,08	-1,67	26	0,11
Setting personal borders	-0,28	1,49	0,30	-0,89	0,33	-0,94	24	0,36
Janusian Thinking	-0,67	1,37	0,32	-1,35	0,02	-2,06	17	0,06
Act assertively	-0,44	1,27	0,19	-0,83	-0,06	-2,35	44	0,02
To Network	-0,46	1,07	0,18	-0,82	-0,09	-2,54	34	0,02
To Design	-0,28	1,34	0,22	-0,73	0,18	-1,24	35	0,22
To Design and develop	-0,46	1,64	0,21	-0,88	-0,04	-2,19	60	0,03
Explicating problems	-0,67	1,14	0,27	-1,23	-0,10	-2,49	17	0,02
Process Vision development	-0,27	1,15	0,20	-0,68	0,14	-1,36	32	0,18
Create space	-0,30	1,47	0,22	-0,76	0,15	-1,35	42	0,19
To collaborate	-0,03	0,97	0,16	-0,35	0,29	-0,17	37	0,87
Collective team SE	-0,43	1,28	0,16	-0,75	-0,11	-2,66	62	0,01

Table 108 **Paired T-Test Self efficacy t1-t2 for Purchasing team**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Emotional intelligence	-1,29	2,95	0,79	-2,99	0,42	-1,63	13	0,13
Specifying competence	-0,52	2,11	0,46	-1,49	0,44	-1,14	20	0,27
Setting personal borders	-0,15	3,33	0,74	-1,71	1,41	-0,20	19	0,84
Janusian Thinking	-0,50	1,65	0,44	-1,45	0,45	-1,13	13	0,28
Act assertively	-0,51	2,15	0,36	-1,25	0,22	-1,42	34	0,17
To Network	-0,32	1,68	0,32	-0,97	0,33	-1,01	27	0,32
To Design	0,11	1,51	0,25	-0,40	0,62	0,44	35	0,66
To Design and develop	-0,10	1,72	0,25	-0,60	0,39	-0,42	48	0,68
Explicating problems	-0,36	1,74	0,46	-1,36	0,65	-0,77	13	0,46
Process Vision development	-0,21	1,50	0,28	-0,80	0,37	-0,76	27	0,46
Create space	0,08	2,10	0,34	-0,61	0,77	0,23	37	0,82
To collaborate	-0,31	2,13	0,36	-1,04	0,42	-0,88	34	0,39
Collective team SE	-0,10	1,76	0,33	-0,77	0,57	-0,32	28	0,75

Table 109 **Paired T-Test Self efficacy t0-t1 for Materials management team**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Dev.	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Emotional intelligence	-0,07	2,81	0,75	-1,70	1,55	-0,10	13	0,93
Specifying competence	0,00	2,28	0,50	-1,04	1,04	0,00	20	1,00
Setting personal borders	0,45	2,19	0,49	-0,57	1,47	0,92	19	0,37
Janusian Thinking	0,07	1,44	0,38	-0,76	0,90	0,19	13	0,86
Act assertively	0,14	1,72	0,29	-0,45	0,73	0,49	34	0,63
To Network	-0,21	1,77	0,33	-0,90	0,47	-0,64	27	0,53
To Design	0,37	1,67	0,31	-0,26	0,99	1,20	29	0,24
To Design and develop	0,20	1,86	0,27	-0,33	0,74	0,77	48	0,45
Explicating problems	0,21	1,76	0,47	-0,80	1,23	0,46	13	0,66
Process Vision development	-0,46	1,17	0,22	-0,92	-0,01	-2,10	27	0,05
Create room	0,13	2,11	0,34	-0,56	0,82	0,39	37	0,70
To collaborate	0,06	1,41	0,24	-0,43	0,55	0,24	33	0,81
Collective team SE	-0,22	1,91	0,28	-0,79	0,35	-0,78	44	0,44

Table 110 **Paired T-Test Self efficacy t1-t2 for Materials management team**

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	0,455	2,018	0,608	-0,901	1,810	0,747	10	,472
Pair 2	2,182	0,603	0,182	1,777	2,587	12,000	10	,000
Pair 3	1,909	1,221	0,368	1,089	2,729	5,186	10	,000
Pair 4	0,364	1,804	0,544	-0,848	1,576	0,669	10	,519
Pair 5	0,818	1,328	0,400	-0,074	1,710	2,043	10	,068
Pair 6	1,000	0,775	0,234	0,480	1,520	4,282	10	,002

Table 111 Paired Samples Test Old versus new schemata for Purchasing team at t1

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	0,636	2,063	0,622	-0,749	2,022	1,023	8	,330
Pair 2	2,500	0,527	0,167	2,123	2,877	15,000	8	,000
Pair 3	1,727	1,272	0,384	0,873	2,582	4,503	8	,001
Pair 4	-0,273	1,191	0,359	-1,073	0,527	-0,760	8	,465
Pair 5	1,600	1,776	0,562	0,329	2,871	2,848	8	,019
Pair 6	1,200	1,549	0,490	0,092	2,308	2,449	8	,037

Table 112 Paired Samples Test Old versus new schemata for Purchasing team at t2

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	-0,083	0,669	0,193	-0,508	0,341	-0,432	11	,674
Pair 2	1,917	1,379	0,398	1,041	2,793	4,815	11	,001
Pair 3	1,083	1,240	0,358	0,295	1,871	3,026	11	,012
Pair 4	3,000	0,953	0,275	2,394	3,606	10,900	11	,000
Pair 5	1,750	1,055	0,305	1,080	2,421	5,745	11	,000
Pair 6	1,417	1,379	0,398	0,541	2,293	3,559	11	,004
Pair 7	1,625	1,847	0,653	0,081	3,169	2,489	11	,042

Table 113 Paired Samples Test Old versus new schemata for Materials management team at t1

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	0,25	0,463	0,164	-0,137	0,637	1,528	7	,170
Pair 2	1,875	1,126	0,398	0,934	2,816	4,710	7	,002
Pair 3	1,625	1,847	0,653	0,081	3,169	2,489	7	,042
Pair 4	2,375	0,916	0,324	1,609	3,141	7,333	7	,000
Pair 5	0,750	0,707	0,250	0,159	1,341	3,000	7	,020
Pair 6	2,000	1,927	0,681	0,389	3,611	2,935	7	,022
Pair 7	2,250	1,035	0,366	1,385	3,115	6,148	7	,000

Table 114 Paired Samples Test Old versus new schemata for Materials management team at t2

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	0,244	1,734	0,259	-0,277	0,765	0,946	52	,350
Pair 2	1,174	1,198	0,177	0,818	1,530	6,645	52	0
Pair 3	0,717	1,573	0,232	0,250	1,184	3,093	52	,003
Pair 4	0,375	0,744	0,263	-0,247	0,997	1,426	51	,197
Pair 5	1,067	1,338	0,199	0,665	1,469	5,347	51	0
Pair 6	0,511	1,359	0,203	0,103	0,919	2,523	51	,015

Table 115 Paired Samples Test Old versus new schemata for Purchasing team network at t1

	Paired Differences					t	Df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	0,344	1,921	0,240	-0,136	0,824	1,432	36	,157
Pair 2	0,873	1,621	0,204	0,465	1,281	4,274	36	,000
Pair 3	1,138	1,379	0,171	0,797	1,480	6,655	37	,000
Pair 4	0,219	1,201	0,150	-0,081	0,519	1,457	36	,150
Pair 5	1,359	1,252	0,156	1,047	1,672	8,687	36	,000
Pair 6	2,000	1,358	0,168	1,664	2,336	11,875	37	,000

Table 116 Paired Samples Test Old versus new schemata for Purchasing team network at t2

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	0,130	0,991	0,113	-0,095	0,355	1,149	76	,254
Pair 2	1,628	1,196	0,135	1,358	1,898	12,019	77	,000
Pair 3	0,299	1,836	0,209	-0,118	0,715	1,428	76	,157
Pair 4	1,923	1,267	0,143	1,637	2,209	13,409	77	,000
Pair 5	1,416	1,601	0,182	1,052	1,779	7,761	76	,000
Pair 6	1,566	1,350	0,155	1,257	1,874	10,112	75	,000
Pair 7	1,375	0,744	0,263	0,753	1,997	5,227	75	,001

Table 117 Paired Samples Test Old versus new schemata for Materials management network at t1

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1	0,195	1,847	0,288	-0,388	0,778	0,676	43	,503
Pair 2	1,220	1,275	0,199	0,817	1,622	6,124	43	,000
Pair 3	0,439	1,163	0,182	0,072	0,806	2,417	42	,020
Pair 4	2,098	0,944	0,147	1,800	2,395	14,235	43	,000
Pair 5	0,854	1,783	0,278	0,291	1,416	3,066	43	,004
Pair 6	1,390	1,022	0,160	1,068	1,713	8,713	43	,000
Pair 7	0,737	1,032	0,167	0,398	1,076	4,403	42	,000

Table 118 Paired Samples Test Old versus new schemata for Materials management network at t2