Master Thesis

The Relationship between Perceived Relevance and User Participation, and its Effect on ES Implementation Success

A Theoretical Framework

Written by

S.X. Koperberg

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Author: S.X. (Sebastiaan) Koperberg BSc

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University   University of Twente

Faculty: School of Management and Governance

Program: Business Information Technology

Company: KPMG, Amstelveen

Committee: *1st university supervisor*
                       Dr. Ir. C.P. Katsma
                       School of Management and Governance
                       Chair of Information Systems and Change Management

                       2nd university supervisor
                       S.M. Eckartz MSc
                       Faculty of Electrical Engineering, Mathematics and Computer Science
                       Chair of Information Systems

                       Company supervisor
                       Drs. Ing. A.M. Meuldijk RE
                       KPMG IT Advisory
                       Risk and Compliance

Management summary

This thesis explores the phenomenon of enterprise system (ES) implementations and explains a specific part of the complex dynamics that are common during these types of large scale change processes, focusing on the relationship between perceived relevance and user participation. While user participation is a familiar term, perceived relevance describes the expectations of users regarding the relevance and importance of the new system and related change. Meanwhile, this thesis acknowledges the complexity of the research domain and recognizes that these implementations require large investments over extended periods of time, in addition to the substantial organisational commitment of all involved stakeholders. Considering the extensive constraints to which ES implementations are subjected, it is of key importance to understand what strategies can be used to ensure an optimal implementation result. The research succeeds in improving the insight into an under exposed part of the ES domain, for both professionals and academic researchers.

The research focus has been brought forward by the principal of this investigation: KPMG IT Advisory, who frequently encounter problems and issues with the acceptation, adoption and embedment of enterprise systems into implementing organisations. The specific focus of this investigation is the qualitative exploration of the dynamics that play a major role in determining the acceptation and adoption of these enterprise systems. This explains the focus on perceived relevance and user participation. The combined effect of these two variables contributes significantly to the eventual acceptation and adoption, and thus success, of the ES implementation.

By exploring the dynamics between user participation and perceived relevance, this research succeeds in explaining the underlying mechanisms in such a fashion that a number of important recommendations for practice can be suggested. It appears that the users' perception of relevance of the system is very important for motivating users to participate in the implementation. On the other hand, user participation provides a key opportunity for making users understand the new system and actually giving them influence over it and the related organisational change. Both understanding and influence prove to be essential for the system to be perceived as relevant among users. Case study research shows that current ES implementation in the field do not make use of the dynamics that have been identified in this thesis.

Concluding, this master thesis suggests a shift in the current implementation paradigms. It provides novel insights into the role of perceived relevance and user participation during ES implementation projects. It also suggests a number of recommendations for practice, regarding the management of relevance and participation. As a result, this thesis holds value for all ES implementing organisations, whether this is in the role of adopting organisation or implementation partner. In addition, the novel insights are valuable for the academic community and can be used as a starting point and foundational work for further investigations. The author would like to encourage other researchers to continue the proposed line of reasoning and support it with additional empirical validation.

Acknowledgements

Writing my Business and IT Master thesis has been a turbulent period, with highlights and lows. I have met new exciting people and gained valuable experiences, while at the same time, I have been challenged with less pleasant events on a number of other fronts. For me personally, it also means a profound transition from the familiar into the unknown, exchanging my student days for a new phase. Soon, I will have to make important decisions regarding my professional working career, but I am certain that the experiences of the past year and a half will help me during all my future endeavours. A number of people have played important roles during this process and I would like to give credit where credit is due.

Most importantly, I would like to thank my two university supervisors and my external company supervisor. Without their patience and support, this thesis would not have been completed in the current form. In order to express my gratitude, I would like to address each of my supervisors individually.

Looking back, I am still convinced that my initial preference for Christiaan Katsma as my first university supervisor has been a good one. Already familiar with Christiaan's drive and enthusiasm from his lectures in the classroom, I think I even got more than I bargained for. He frequently pushed my boundaries to new levels and certainly extended my view. Christiaan's encouragements, guidance, and enthusiasm from the initial to the final level enabled me to develop an understanding of the complex topic.

Silja Eckartz became my second university supervisor a couple of months into the project. She proved to be an excellent addition to my gradation committee: she always provided me with practical, thorough and invaluable feedback, which was especially useful when my other supervisors where pressed for time and where unable to read all the new material I send them. In addition, she always kept the project in check with reality, providing the necessary grounding for Christiaan's drive and enthusiasm.

Mark Meuldijk has been my external supervisor. His practical insight into the research domain has enabled me to explore the topic from a different, but much needed, perspective. In spite of his relentless schedule, Mark has always found the time to meet and support me, even though the process has taken substantially longer than originally planned. During the process, Mark also made me feel involved within KPMG by inviting me to the meetings of his ERP team.

Furthermore, I am also thankful for the opportunity KPMG provided me, combining my Master thesis with an internship. In addition to gaining access to their practical experience in the field of ES implementations and their clients for my case study research, KPMG offered me a chance to get acquainted with their consultancy business. This experience has been of great value to me.

Also I would like to express my gratitude towards all my KPMG ITA GPA colleagues for their contribution to a pleasant and inspiring working environment. Even as a "lowly" intern, I really felt accepted in their midst. It is my pleasure to personally thank Kimberly Lemmens, Anno Perk, Maurice Lacroix, Jochem Pasman, Alexander Jansen, Bas Huiskens, Johan Steenstra, Kees Jan van der Moolen, Frank Engel, Jan Willem van Houwelingen, Harry Boersen, Michel Troost and Jarno Roos for their interest, friendship, advice, support and/or occasional listening ear.

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The final thanks go to my parents. Over the course of my life, you have always supported me unconditionally. My Master of Science degree would not have been possible without this support and the occasional disciplining. Therefore, I would like to dedicate this thesis to you, my parents.

Sebastiaan Xander Koperberg

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1   Introduction

Information systems have created opportunities for small, medium and large organisations to provide novel products and services and make their daily routines more effective and efficient. However, integrating and embedding an information system into an organisation has proven to be complex, if not problematic. This especially holds true for implementations of enterprise (resource planning) systems, which are large and comprehensive systems, orchestrating many complex and concurrent activities. Enterprise system implementations are the subject of this Master thesis. Before diving into this broad and complex domain, let us first explore the circumstances that initiated this research.

1.1   Research motivation

This research is conducted by a student of the Management and Governance faculty of the University of Twente and constitutes the final stage in the process of obtaining his Business & Information Technology (BIT) Master of Science degree. For this specific academic study, it is usual to carry out this final research project in an external setting and not within the bounds of the university. This way the student gains, among other arguments, a valuable experience in a corporate setting. The research involves three parties:

- The student, who carries out the actual research
- Two academic experts (supervisors) of the University of Twente
- An external party with a practical need in relation to the research domain
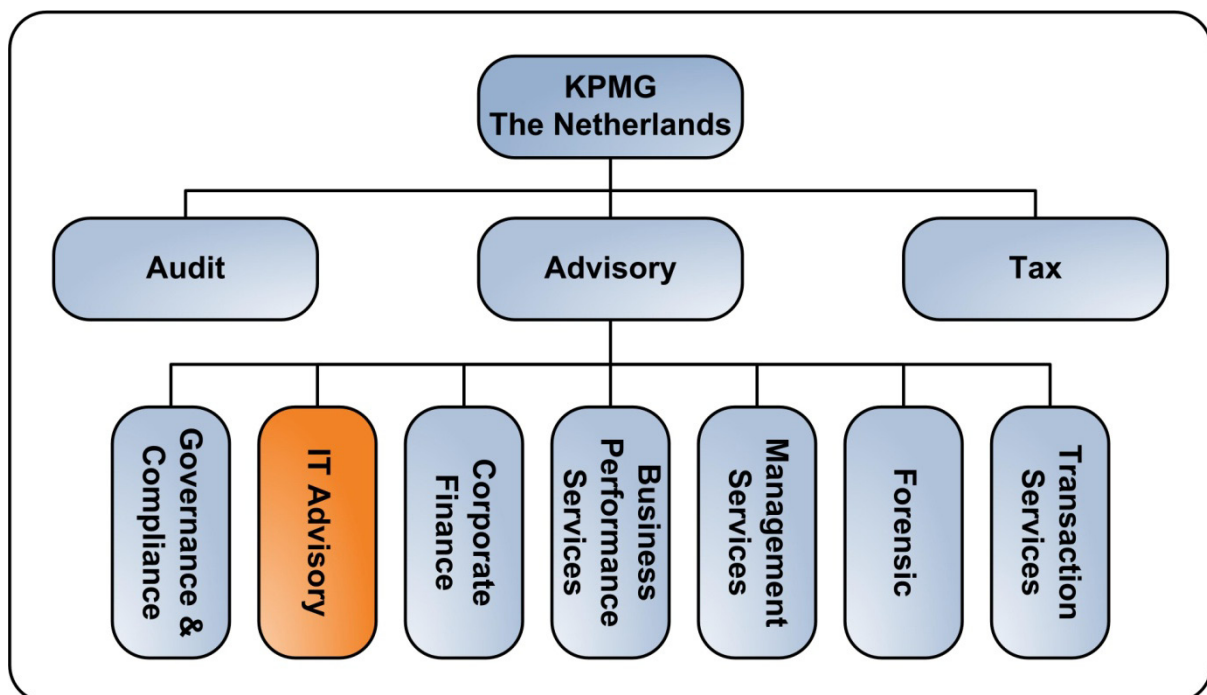
Figure 1: Organisational structure of KPMG

The external party that was approached by the student is KPMG. KPMG is an international organisation that operates in 144 countries and employs 120.000 people worldwide. KPMG has three main activities, Audit, Tax and Advisory. This research project is conducted in the IT Advisory department of the Advisory branch of KPMG. An overview of the Dutch organisational structure of KPMG with a specific focus on the Advisory branch is provided in Figure 1.

The IT Advisory department (ITA) provides assurance and advisory services to assist clients to identify risks, establishing appropriate controls and security measures arising from the use of information systems and technology. The ITA department does not only support accountants in their decision making process, but also performs IT-assessments, quality checks of existing and new systems, risk analysis, information security research, assessments of continuity plans and other IT related advisory activities. Consultancy activities in relation to enterprise system domain are carried out by the enterprise resource planning (ERP) specialist group. Figure 2 gives an overview of the different enterprise system implementation activities of KPMG that are directly provided or supported during the implementation process.
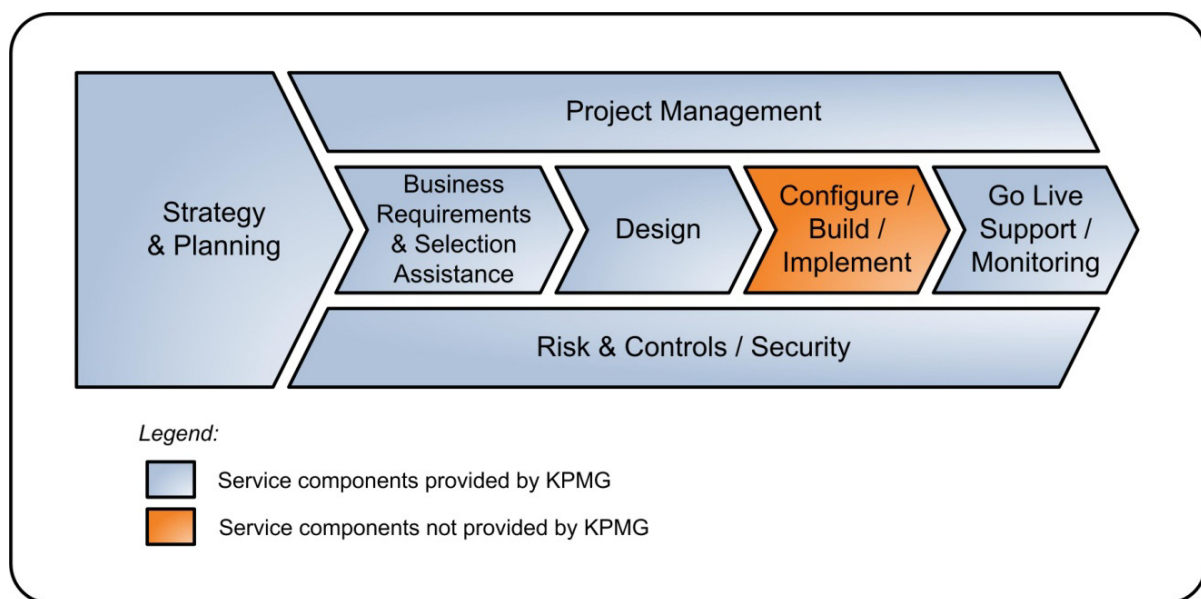
Figure 2: Overview of KPMG's ERP implementation service components

In practice, the ERP specialist group is confronted with customers that have problems and/or issues with the adoption of enterprise systems during or after enterprise system implementation projects. In most cases, KPMG is not the lead consultant such ES implementations, but they do take on responsibilities for parts of the process. In other cases, ITA is not directly involved in the actual implementation of the enterprise system, but is approached to provide quality assurance during the implementation or perform a post implementation review afterwards. Because of ITA's activities in relation to enterprise systems, KPMG provides the student with access to experts and clients, which is valuable for the realization of this research in the academic domain of enterprise systems implementations.

1.2   Background

The introduction of enterprise systems (ES) is so complex that only a minority of these projects are successful. In other words, most enterprise system implementations are not completed in time, in budget and with complete system functionality. Additionally, only a small percentage of these system implementations tend to fulfil the promise of significant return on investment (Katsma, 2008).

Although implementation often is unsuccessful and tends to introduce new organisational issues, the main purpose of an enterprise system is to solve an important organisational problem. Large companies struggle with the vast quantities of data that are collected, generated and stored in electronic databases (Davenport, 1998). The strength of an enterprise system is its capability to integrate the fragmented nature of information across functional areas in large business organisations. The enterprise system dramatically streamlines the flow of information throughout the organisation (Davenport, 1998). What all enterprise systems have in common is that they offer businesses templates of "best business practices", which when implemented should result in company-wide streamlined and efficient operations. At the same time these best practices limit the extend in which such systems can be customized to meet the organisation's needs and demands (Katsma, 2008). So instead of adapting the enterprise system to fit the organisation, radical change in the organisation is required. As the low success rate of enterprise systems reveals, the change management principles that should be applied to guide these complex projects have not yet matured sufficiently. The result is that the adoption of the best practices and the accompanying changes to the company's strategy, organisation and culture bring along significant risks (Davenport, 1998). The push towards generic business processes and the accompanying change management issues can result in the loss of competitive advantages which were realized by the previous way of working (Kawalek & Wood-Harper, 2002).

1.2.1   Implementation methodologies

The problematic nature of enterprise system implementations can be explained from the used system design and implementation methodologies. These methodologies might have been sufficient to develop and implement traditional information systems, but now fall short with systems as large and complex as enterprise systems. The important difference between these two types of systems is the impact they have on the organisation. In the case of a traditional IS implementation this impact would be limited. However, in the case of an ES implementation, the impact on the organisation is very significant and companies fail to reconcile the technological imperatives of the ES with the business needs of the organisation. Davenport (1998, p. 122) states: "An enterprise system, by its very nature, imposes its own logic on a company's strategy, organisation, and culture". Davenport further concludes that the biggest problems of enterprise system implementations are not technical issues but business problems.

Davenport's notion is supported by Muntslag (2001), who provides a layered model that categorizes the impact ES implementation have on the organisation. The model specifically focuses on the large-scale technology-driven organisational change process that is introduced by an ES implementation. Muntslag divides the ES implementation impact and the change process into three levels:

1. Changes to the business process and systems
2. Changes to the organisational structure
3. Changes to individual and group behaviour in the work situation

On every one of these levels, the induced changes need to be addressed and managed. Even though enterprise systems are profoundly complex pieces of software, requiring large amounts of money, time, and expertise to implement (Davenport, 1998), this does not mean this is the only aspects deserving attention. The organisational structure and individual and group behavioural aspects of the change should not be underestimated and certainly not be neglected. Currently the focus seems to be overly fixed on the technical and design aspects of the new enterprise systems. This is observed in practice; the methodologies for implementing enterprise systems are even more rigidly and deterministically employed than those for far less complex and invasive "traditional" information systems (Katsma, 2008). The tendency to be more in control of the project is understandable, but is actually the wrong measure to compensate for the increased technological, organisational and behavioural complexity of ES implementations. Especially the organisational and behavioural factors (also referred to as soft factors) are hard to control with rigid and deterministically oriented methodologies (Katsma, 2008).

1.2.2 Acceptance and adoption

Too little attention is given to the soft factors during large, far-reaching, ES implementations. It is not surprising that in most cases acceptance of the new ES becomes an issue among the different types of users in the organisation (Amoako-Gyampah & Salam, 2004). This is reinforced by Lim, Pan & Tan (2005), who found that acceptability of ERP systems among their targeted users is a crucial determinant for the strategic application of the system. The integrative properties of enterprise system packages introduce complications and challenges in securing user acceptance (Lim, et al., 2005). Presenting one approach to improve the understanding of user acceptance, Amoako-Gyampah & Salam (2004) depart from the famous technology acceptance model (TAM). They try to relate TAM to the context of ES systems and even though their research has some important limitations, Amoako-Gyampah & Salam did find support for their extended technology acceptance model. Acceptance is among other things influenced by the following factors:

1. user training,
2. project communication, and
3. shared beliefs in the benefits of the ES by users.

The influence of these factors on acceptance (and thereby eventual ES implementation success) shows similarities with a large body of critical success factor (CSF) research (Finney & Corbett, 2007; Nah, Lau & Kuang, 2001). CSF research in the ES implementation domain also brings up important acceptance related factors. Although some researchers point out that factor-oriented research does not provide a holistic perspective on the matter (Cavaye, 1995), critical success factor research has proven to be a much taken approach to examine ES implementation success (Finney & Corbett, 2007). Using CSF as a pointer, the focus of this research is put on user acceptance and ES adoption, which are prominent themes in the top ten CSF lists, according to various researchers (Finney & Corbett, 2007; Nah, et al., 2001).

1.2.3 User participation and perceived relevance

All in all, a sufficient focus on user acceptance is crucial for ES implementation success. User participation plays an important role in the process of increasing acceptance and thus the overall success of the enterprise system implementations (Esteves, Pastor & Casanovas, 2005). Barki & Hartwick (1994) define user participation as a series of (observable) activities or behaviours performed by potential future users and even though user participation research does not offer consistent and cumulative outcomes, some form of participation is considered desirable in most system development methodologies (Cavaye, 1995). According to Esteves, et al. (2005, p. 2) the goal of these activities and behaviours is that the participation process "results in a better fit of user requirements, achieving better system quality, use and acceptance". In addition, Robey, Ross & Boudreau (2002) pose that situated learning through user participation is another important aspect and a means for overcoming knowledge barriers that are encountered by users during ES implementations. The "shared beliefs in the benefits of the system" by users (already mentioned above) is an important factor that influences user participation. In the context of this research this is called "perceived relevance". The concept of perceived relevance is based on relevance as it is presented by Katsma, Spil, Ligt, & Wassenaar (2007). In this case that is the relevance of the new ES as it is perceived by the future users of the system. This perceived relevance has to do with the expectations the users have of the new system. Since expectations can be managed, perceived relevance can be influenced and manipulated by the organisation. Getting users to participate and involve themselves in the ES implementation project can play an important role in the realisation of perceived relevance (Katsma, et al., 2007).

The phenomenon that the motivation for a process or activity is depended on its (perceived) relevance to the receiver at the time of receipt is referred to as "elaboration likelihood", which suggests "that individuals must be motivated and able to process information in order for it to become salient and spur them to action" (Wagner & Piccoli, 2007, p. 53). The elaboration likelihood principle can be illustrated with the following marketing example:

> *"In a normal day-to-day situation, most people are not very receptive for car advertisements. However, this changes for the small group of people looking to buy a new car. For this small group car advertisements are relevant. In that case, the advertisements represent stimuli that warrant attention."*

Wagner & Piccoli (2007, p. 53) note a parallel in software design and implementation projects: "For end users caught in their day-to-day activities, involvement in new software design is often treated as no more than a distraction". Even for end users that are participating in the change process, the saliency of a new ERP system is often rather low. Here perceived relevance can have an important impact. A high perceived relevance can help improve the salience of the project.

These considerations combined explain why the dynamics between user participation and perceived relevance are the focal point of this research. Besides academic relevance, this focus is selected because of acceptance, adoption and embedment issues experienced by KPMG in practice. This constitutes this research's problem.

1.3   Problem definition

KPMG often experiences acceptation, adoption and embedment of a new enterprise system into the organisation as problematic. In practice, KPMG encounters situations where little to no attention is paid to the user acceptance of a new enterprise system. There seems to be a complex problem: even though most ES implementation facilitators acknowledge the importance of user acceptance and participation during the implementation of the ES, in most cases the responsibility of really engaging stakeholders throughout the business lies with the ES implementing organisation itself. They themselves are responsible for the cooperation of their staff. As a result it happens that external partners/consultants in the implementation process do only as much as is necessary to show they tried to get the different stakeholders involved and committed. This way they can show on paper, they have taken appropriate measures to promote acceptation and embedment of the ES, regardless of the actual involvement or commitment of the different stakeholders in the organisation. In many cases this leads to a situation where problems arise during the project or after the project is finished. In a late stage of the project it is discovered that the system is not accepted by its users or did not embed sufficiently into the organisation. These types of situations are also recognized in the academic community. In these situations, Wagner & Piccoli (2007, p. 52) describe user participation as "nothing more than a window dressing effort aimed at gaining buy-in".

As explained earlier on, the rigid and deterministically oriented management approach utilized during ES implementations is one that restrains the consideration of the softer organisational and behavioural (human) factors in the change process. Both in practice and the academic community there is a demand for change management principles that ensure an increased success rate for ES implementations (Finney & Corbett, 2007). As illustrated by KPMG's example, acceptation, adoption and embedment of an enterprise system into an organisation is a contemporary issue. Based on various existing research papers, it is established that, in relation with acceptation and embedment, participation and perceived relevance have an important, but as of yet still poorly predictable, effect on the implementation success in the ES context (Barki & Hartwick, 1994; Katsma, et al., 2007; Pasmore & Fagans, 1992). The quantitative nature of the majority of existing research and the lack of a qualitative theoretical framework hamper our understanding of the dynamics of ES implementations. This leads us to the main research question:

> *How do perceived relevance and user participation influence each other during enterprise system implementations? What is the eventual impact of this relation on ES implementation success ?*

1.4   Goal definition

This research aims to explore the qualitative relations between participation, perceived relevance and ES implementation success. It shows how perceived relevance and user participation are related and how they influence the implementation. Through insight in the elaboration likelihood phenomenon, perceived relevance and user participation can be optimally managed in order to secure ES implementation success. A good understanding of the underlying dynamics is crucial. The main goal of this research is to provide KPMG with improved insight into two important aspects of change management process that needs to accompany ES implementations. This is the practical

value of the research: for KPMG to be better equipped to perform their consulting practices in the domain of ES implementations and the involved change management principles. Next to the practical value for the business community, the investigation also leads to new insights for the academic research community. It helps to qualitatively refine the theoretical foundation of the relationships between relevance, participation and success.

1.5 Theoretical model

Based on the research introduction, problem statement and goal definition, a theoretical model is suggested (see Figure 3). The theoretical model defines the relationships between the three central variables of this research. The dependent variable is ES implementation success, while the manipulated variables are perceived relevance and user participation. Besides directly influencing ES implementation success (relations R1 and R2 in Figure 3), it is posited that perceived relevance and user participation also influence each other (relation R3 in Figure 3). In turn, the mutual relationship between perceived relevance and user participation has an effect on the successfulness of the ES implementation through R1 and R2.
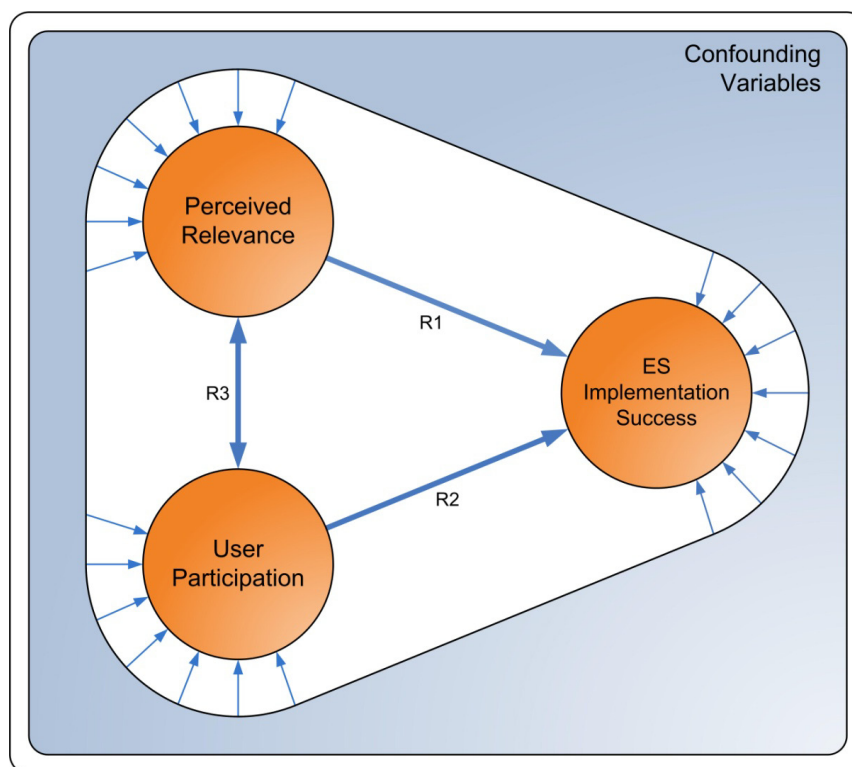
<p align="center">Figure 3: Theoretical model</p>

Beside the interaction between the three key variables, perceived relevance, user participation and ES implementation success will be influenced by a larger set of external variables. These interfering factors are represented by the confounding variables in the figure. To increase the trustworthiness of the research results, the influence of the confounding variables needs to be taken into account and/or minimized. The theoretical model is the foundation for a theoretical framework, which needs to be explored and tested in practice. How this is done will be further defined in the research design.

2   Research design

The phenomenon that is studied in this research is enterprise system implementations. More specifically, the important role user participation and perceived relevance play in this process and how these two variables influence the eventual successfulness of the ES implementation. This type of knowledge can be used to improve implementation principles and methodologies. Therefore, it is valuable to ES related consultancy firms, such as KPMG, and all other ES implementing organisations. This investigation aims to presents KPMG with a qualitative research which provides insight and recommendations to improve the efficacy of an important part of the implementation process in practice. In addition, this main body of this research helps to increase the understanding of ES implementations in the academic community.

This chapter describes the research design that will guide this investigation. A thorough research design is essential for every research and improves the reliability and validity. The research approach also provides boundaries for the choice in available research methods. Regarding problems and issues in the academic domain of ES implementations, there are essentially two main research approaches that can be distinguished (Katsma, 2008; Kim & Pan, 2006). These can be differentiated in a quantitative and a qualitative approach. These are:

- **Variance-oriented research (quantitative approach).** In the academic research community there is a lot of variance-oriented or factorial research (frequently also called critical success factor based research) available. Factorial investigations focus on a collection of independent and manipulative management variables (Katsma, 2008). By nature, factor based research is a form of quantitative research. Although it is valuable for advancing our understanding of ES implementation success, it adopts a rather static view, which limits its appropriateness for explaining the depths and dynamics of the implementation process. In other words; it does little to explain how the actual transformation from unsuccessful ES implementation to successful ES implementation takes place. However, as the quantitative approach points us in the right direction (Aladwani, 2001), it certainly holds value. Among other critical success factors identified by factor based research, acceptance of an enterprise system among their targeted users has been mentioned as a crucial determinant for the strategic application of the system (Lim, et al., 2005).

- **Process-oriented research** (**qualitative approach).** The second type of research performed is process-oriented. This approach is more valuable for explaining the underlying dynamics of ES implementations. Contrary to factor-based research, which is mostly ex-post quantitative research, process-oriented research in the ES domain focuses on empirical case studies and/or action research. Therefore, it is much more suitable to explain the influence perceived relevance and user participation have on the development of a successful ERP implementation. The process-oriented research approach better serves the goals of this research, making it the more appropriate and informative option.

Research method and model

The research design presents the path to successfully solving the research problem. The current research is aiming to explore the relationships in a theoretical model. The first step is to identify the key concepts in the research domain and to investigate the current state of academic research into these concepts: in other words, a literature study. Based on this foundation, the relationships between the key concepts are explored. Academic literature again plays an important role, but gaps in the current knowledge regarding the relations and dynamics will be expanded with the help of induction. The theoretical framework that result from these explorations is then compared with the current practices, which are established by empirical research. The reason for comparing the theoretical framework with the current implementation approaches enables the identification of practical recommendations.

ES implementations need to be studied in practical setting because the phenomenon is not readily separated from its organisational context. This also causes considerable limitations to the available research methods. The inextricable nature of ES implementations makes it impossible to simulate these kinds of projects under lab conditions. Because of the high costs related to ES implementations, most far-reaching, invasive forms of research involvement are not really possible. However, due to its scalability and limit impact, the case study research method is very suitable for studying an ES implementation phenomenon in its organisational context. The choice for the case study research method under these kinds of circumstances is supported by Yin (2003, p. 13), who defines case study research as "an empirical inquiry that

- investigates a contemporary phenomenon within its real-life context, especially when
- the boundaries between phenomenon and context are not clearly evident."

To improve the validity of the case study research, two avenues of inquiry will be pursuit, namely data collection through interviews with organisational stakeholders and a review of organisational documentation. However, before any case study research can be conducted, a sound literature study is required. Based on the theoretical foundation of the literature study it will be possible to frame the actual situation in selected organisations. Based on the literature study a new theoretical framework will be introduced. The theoretical knowledge guides the focus of the data collection during the case study phase of this research. The first cases will be used as a pilot study, and serve to offer a first glance at the subject in a practical setting and improve the evidence collection protocols that are created for this research. These pilot cases have a lower degree of reliability because of the smaller scale of the investigation in those organisations. The results obtained from the primary cases and to a lesser extend the results of the pilot cases are analyzed in an effort to identify practical recommendations and finally lead to the conclusion. In addition to adding value to the academic research community, the practical recommendation have the main goal to provide insight and support for KPMG's ES business activities.

The design of the research model is partially guided by Verschuren & Doorewaard's (2000) research design methodology. The required research steps are graphically represented in the research model (see Figure 4). The figure also provides a preview of the topics that are to be discussed in this chapter and onwards.
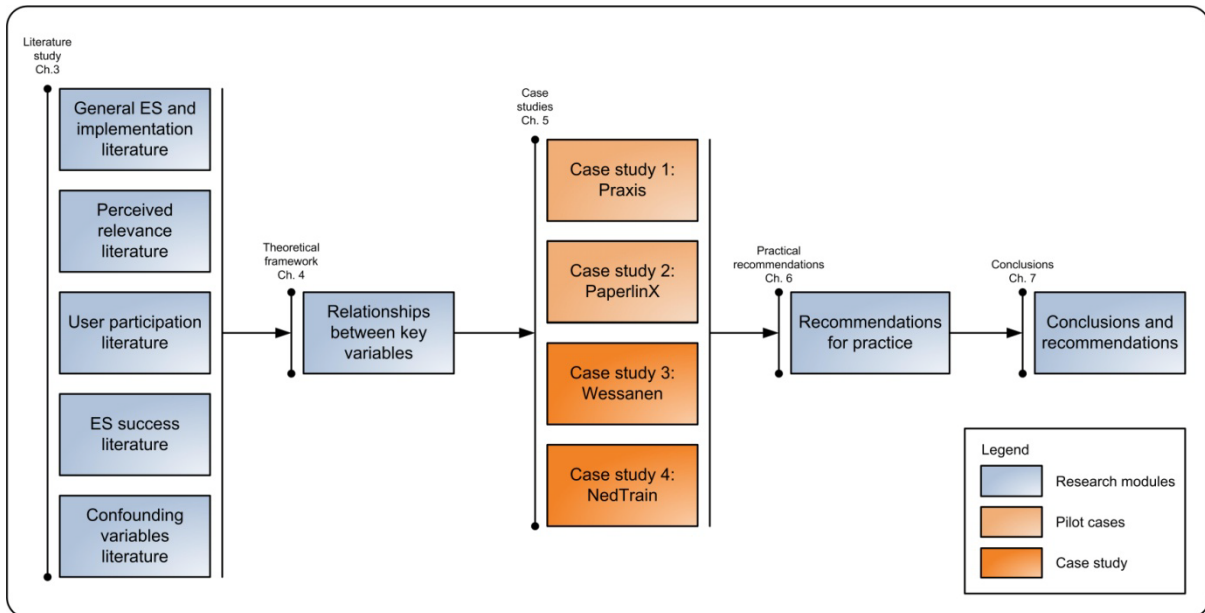
Figure 4: Research model (Verschuren & Doorewaard, 2000)

Reading guides

A number of headers throughout this document have been tagged with a small picture in the left margin of this document. These so called reading guides aim to clarify the structure of the document and indicate where in the document the reader is current positioned. They are also useful to locate a certain section in the document with more ease. The reading guides are not added to all headers, but only in cases where the structure of the chapter or section is potentially confusing.

2.1 Literature study & Theoretical framework

The purpose of the literature study is to provide existing constructs that can be both adopted and adapted in order to reach the research goals. Literature studies are essential to the academic research as they provide us with a means to learn and build upon what others have already done, instead of working alone. Combining literature sources also helps to synthesize new theory, which is done through induction and deduction. In a later stage these new constructs and structures can be validated through research methods such as case study research. The literature study effectively forms the foundation for the construction of the theoretical framework and the data requirements that will be used to guide the data gathering process during the case study research. It also helps identifying the contextual factors or confounding variables that could distort the results. The literature study consists of the identification of three important elements:

1. **General constructs.** The extensive literature study first helps to identify the general constructs in the research domain, namely the enterprise system and its corresponding implementation process. This foundation is required to identify specific characteristics within this research domain and understand the current state-of-art in the field. Also some of the general dynamics that are relevant for this investigation are discussed.

2. **Key constructs** or **Key variables.** The second element details the theoretical constructs of perceived relevance, user participation and ES implementation success in the current research context, which has been delineated by the first element of the literature study. The key constructs also help to create a set of measures in order to assess the state of the key variables in the targeted organisations during the case study research. The created set of indicators is essential to interpret the situation in ES implementing organisations.

3. **Confounding variables.** In order to account for confounding variables, an investigation of critical success factors and other contextual influences is required. The confounding variables help to explore the contextual circumstances of the ES implementation project in the organisation for interfering factors. These interfering factors potentially distort the data gathered through the case study research (Cavaye, 1995). The interfering factors for all three key variable are investigated separately.

The combined literature sources provide the foundations for the investigation of the relationships between perceived relevance, user participation and ES implementation success. This leads us to the investigation of the relationship between these constructs in the theoretical framework. The theoretical model, which has been presented in Figure 3 on page 7, provides the foundation for the theoretical framework that is investigated. The theoretical framework presents the hypothesized mechanisms that describe the qualitative relationships between the three key variables. Due to the fact that the setup of the investigation into the relationships in the theoretical framework is very specific and builds upon the findings of the literature study, the actual setup is defined at the start of chapter 4, where its discussion is more appropriate. The degree of compliance of the framework with the current implementation principles in practice are explored through the case study research that is specified in the next section.

2.2   Case study

The case study method is used to gain insight into the implementation process in a corporate setting. Through KPMG client contacts four individual case studies are initiated. To guide the design of the case study setup, parts of the methodology proposed by Yin (2003) are used. Data selection and case selection requirements stipulate the research approach. Additionally they help to mitigate the validity issues in order to create generality and reduce the variance in the research sample.

2.2.1   Data selection

There are at least six sources of evidence in case study research; documentation, archival records, interviews, direct observation, participant observation and physical artefacts (Yin, 2003). Due to their highly complementary nature, the use of as many data sources as possible is recommended. All sources have their engrained strengths and weaknesses, which have to be taken into account. The nature of this research and the imposed time constraints to which this investigation is subjected limits the number of sources that can be consulted.

The qualitative nature of this research dictates that the primary means of data collection will be through interviews. Interviews can give the process related insight that is sought after. Even though interviews are usually associated with the survey method, they are an essential source of case study information (Yin, 2003). Documentation is used to complement and corroborate the information obtained through the interviews. Beside documentation and interview sources of evidence, other sources are not discarded outright, but are also not actively pursuit. Both the documentation and interview sources of evidence, including their strengths and weaknesses will now be discussed in more detail.

Documentation as source of evidence

Relevant project documentation is used whenever possible, depending on the availability of documentation. For every case, the author requests all ES implementation related documentation the involved organisation has available and permits access to. The type of requested documents can include administrative documents, communiqués, agendas, minutes of meeting, and other written rapports of events (Yin, 2003). However, not all of these general types of documentation are necessarily useful in the ES context of this research. Table 1 presents the ES specific documentation sources in relation to the general types of documentation that are relevant in this research context.

Table 1: Relevant case study documentation sources

Type of documentation	Requested ES specific documentation
Communiqués	Organisational communiqués
Written rapports of events	Project initiation documents
	Progress reports
	Project reviews
	Major change requests

Documentation is a very important source of evidence in case study research. Yin (2003) has summarized a number of strengths and weaknesses of this source. The strengths illustrate the appropriateness of this type of source and will be discussed briefly. The strengths of the documentation source of evidence are:

- **Stability.** Documentation is stable and can be easily reviewed repeatedly.

- **Unobtrusiveness.** Documentation is unobtrusive and is not created as a result of the case study.

- **Exactness.** Documentation is exact and contains the exact names, references, and details of an event.

- **Broad coverage.** Documentation has a broad coverage and can span an expanded period of time, many events, and many settings.

The weaknesses of the documentation source of evidence require more explicit attention because of their negative implications for this research and consequently how to minimize the negative impacts. According to Yin (2003), the shortcomings of the documentation are:

- **Retrievability.** The first type of weakness acknowledges issues with regard to the retrievability of documents. Low retrievability results in an incomplete collection of evidence. During this research the retrievability of documentation can hardly be verified.

- **Bias selectivity.** The second type of weakness, which among other things is caused by the above mentioned weakness, is called biased selectivity and is caused by the incompleteness of collections of documentation. In the case of incomplete collections only a partial image of the object under investigation is provided. Most times it is very difficult to establish the (in)completeness of a collection of documents. In this research, the available documentation will be studied for signs of incompleteness. Incompleteness is detected by establishing by a gap analysis of the timeline which is described by the documents.

- **Reporting bias.** The third type of weakness also addresses a bias, which is named a reporting bias. Documents are written or composed by authors, who each have their own unknown biases. Reporting bias is hard to detect. Therefore, the objectivity of the documentation is not taken for granted. Verification of documents with interviews sources and vice versa will provide triangulation of the information and therefore overcome reporting bias.

- **Access.** The fourth type of weakness reflects issues with the accessibility of documentation. It is possible that critical or sensitive sources of evidence are deliberately blocked from the author because of their negative or harmful content. The voluntary nature of the cooperation of organisations with this investigation limits the author means to ensure companies give up all relevant documentation. Access is provided on a voluntary basis and therefore the completeness and correctness of the documentation cannot be guaranteed.

Interview as source of evidence

The main effort to collect data for this research is through interviews. For every ES implementation case a number of stakeholders is selected. The investigation of every ES implementation project is, when possible, triangulated by interviewing different stakeholders that were involved in the implementation project. This approach aims to corroborate the same facts (Yin, 2003). Because not all the same stakeholders are accessible or available in the four different cases, a changing selection of the stakeholders is interviewed for every case (see Table 2).

Table 2: Relevant stakeholders

Stakeholder	Description
The project manager	The project manager of the enterprise system implementation project. This person can be internal or external to the implementing organisation.
The IT manager	The IT manager of the implementing organisation. In general, this person acts as the official receiver of the project result. In most cases the new system is his/her responsibility.
Key users	A key user is a knowledgeable end user in the implementing organisation that has been asked to participate in the implementation project.
End users	The end users are the eventual users of the new enterprise system who are not (directly) involved in the implementation project.
KPMG consultants	KPMG consultants are advisors that have been involved with the implementing organisation. They provide an external, more objective, view of the organisation. In some cases KPMG consultants merely provide general information about the organisation.

This is also influenced by the fact that some stakeholders are unique in the organisation, while others are present in larger numbers. In order to keep the research manageable and reduce the amount of interviews (and therefore the strain on the cooperating organisations), the number of interviews per organisation is limited. One additional source of information are the KPMG consultants who were involved with the ES implementing companies and can provide a external and less biased view of the cooperating organisations.

Yin (2003) has also summarized the strengths and weaknesses of the interview approach. The interview source of evidence provides two main advantages:

- **Focus.** Interviews are targeted and have a direct focus on the case study topic.
- **Insight.** Interviews are insightful because they provide insight in the causal interferences and relationships between variables.

However, there are also some shortcomings that need attention. The interview source of evidence introduces four important weaknesses that need to be taken into account (Yin, 2003):

- **Poor interview protocol.** The first type of weakness, which introduces bias, arises from poorly constructed interview protocol. This bias can be reduced by careful and controlled interview protocol design with expert supervision. In addition, the pilot cases help to refine the interview protocol.

- **Respondent bias.** The second type, also introducing bias, is called respondent bias and is caused by individual not correctly representing their rank and file. Unfortunately, time constraints limit the maximum number of interviewees and thus the degree of triangulation that is attainable within each organisation. However, triangulation among the interviewed stakeholders should filter out extreme views.

- **Human memory.** The third type of weakness is the fact that human memory is not infallible and can introduce inaccuracies. Again, data triangulation should filter out most of the contradictory findings. To ensure the quality of the author's memory does not influence the research, the interviews are recorded in order to ensure the accurate processing of the interviews.

- **Reflexivity.** Finally there could be reflexivity; it is not uncommon for interviewees to tell the interviewer what they expect he/she wants to hear. The use of follow-up questions attempts to anticipate on any reflexivity that may occur.

2.2.2 Case selection

Explicit definition of the selection criteria for the candidate cases is very important. This optimizes the generality of the findings within the boundaries of the selection criteria, improving the external validity of this research for comparable organisations. As a result a candidate organisation should adhere to the following selection criteria:

1. **Organisation size and type.** The ES is implemented in a large organisation (>5000 employees) in the private sector, preferably a multinational. There is a preferred focus on retail organisations, but due to difficulties finding cooperative organisations this explicitly is a preferential and not an exclusive restraint.

2. **Number of users.** The ES has or will have between 50 and 500 eventual users. An individual roll-out within a business unit or geographical region also qualifies as an implementation.

3. **Implementation status.** The ES implementation project has recently been concluded. However, it should not have been concluded before 2008, in order to maximize correct recollection by the stakeholders.

4. **ES characteristics.** The ES suffices the enterprise system characteristics stated in the literature study (see section 3.1.3).

Some aspects of the case selection criteria have been influenced by the availability of cases. The author makes use of KPMG resources to gain a foothold in potential case study organisations. As a result all cooperating organisation have in common that they are all (former) clients of KPMG. Since certain types of organisation are more likely to be customers of KPMG, these are strongly represented in this research. In general, the larger organisations make use of KPMG's services, resulting in an aim on these types of businesses.

2.3 Research questions

This section discusses the research questions that guide this investigation. The research questions provide the rationale for the research. It is very important to verify which of the questions can be answered with a literature study and which questions require a case study approach to provide the appropriate answers. The main question of this research is:

> *How do perceived relevance and user participation influence each other during enterprise system implementations? What is the eventual impact of this relation on ES implementation success ?*

This main question leads to a set of sub questions. For each sub questions and indication of where the answer can be found is included. For each question the corresponding section, where the answer can be found, is indicated in italic. The research questions are:

1. What, according to literature, are valid measures/indicators to analyse, in an ES context,:
    a. perceived relevance? *(Section 3.3)*
    b. user participation? *(Section 3.4)*
    c. ES implementation success?*(Section 3.5)*

2. What confounding variables, in the context of enterprise system implementations, can be interfering with the research variables? *(Section 3.6)*
    a. Which research variables are affected by confounding variables? *(Section 3.6)*
    b. Is there a need to control for these confounding variables? If so, how can this be accomplished? *(Section 3.6)*

3. What, according to literature and logical induction, is the impact of
    a. user participation on perceived relevance? *(Section 4.3)*
    b. perceived relevance on user participation? *(Section 4.4)*
    c. participation on ES implementation success? *(Section 4.5)*
    d. perceived relevance on ES implementation success? *(Section 4.5)*

4. How, according to literature and logical induction, is the relationship between participation and perceived relevance? *(Section 4.6)*
    a. How does the relationship between perceived relevance and user participation eventually impact ES implementation success? *(Section 4.6)*

5. What, according to literature, logical induction, and case study results, are the practical recommendations that will improve current implementation practices? *(Section 6.2)*

3   Literature study

The literature study provides the foundation and definition of the key concepts within the broader research context. This foundation, based on prior academic research, is crucial for the advancement of knowledge (Webster & Watson, 2002). According to Webster & Watson, the literature study is an important aspect of any academic project. They state that literature studies are structured concept-centric, meaning concepts determine the organizing framework of the study. This concept-centric structure is also visible in this literature study. As stated in the research design, this literature study has a number of important goals, which are summarized below.

Definition of the general concepts

In order to increase our general understanding of the enterprise system implementation domain, two important concepts are defined in this section. Frequent referral to these two terms throughout the document and the central role they occupy in the research domain requires clear formulation.

1. **Enterprise system.** This research has an exclusive focus on enterprise systems. As a result, it is very important to see which characteristics differentiate an enterprise system from a regular information system. The conceptualisation, presented in section 3.1, helps to explain the differences between enterprise systems and more classical information systems. In addition, the definition of this general concept helps to formulate the exact system characteristics that are important in the selection of case study organisations.

2. **Enterprise system implementation.** The conceptualisation of enterprise system implementation shows the process oriented nature of an enterprise system introduction into an organisation. It provides us with a time oriented framework into which all implementation-related activities can be incorporated. The discussion on ES implementations, presented in section 3.2, also focuses on the difference between ES implementations principles and more traditional IS implementation principles.

Definition and measures of the key research variables

The key research variables are perceived relevance, user participation and ES implementation success. Especially the user participation and ES implementation success concepts are broad and not univocally defined (Cavaye, 1995). Within the information system research domain, there is not one single accepted definition for all three concepts. Therefore an explicit definition and scoping is required in order to ensure manageable research boundaries. One of the larger challenges of this research is to measure the three variables in the targeted case study organisations. This is also reflected in the research questions, which were presented in the section 2.3. Defining proper measurement instruments for the variables is an important element of this literature study and this research.

Due to the qualitative nature of this research, the measurement of the three key variables is the resulting focus on qualitative methods. Purely quantitative measurement methods would not provide the type of insight this research attempts to reveal. This is especially true due to the limited number of cases that can be studied over the course of this research. Most quantitative methods require large amounts of data in order to assert something with a reasonable amount of reliance and

validity. Even though this research is focused on qualitative results, it adopts and adapts (parts of) quantitative methods from academic literature. Perceived relevance is discussed in section 3.3, user participation in section 3.4, and ES implementation success in section 3.5.

Definition and measures for confounding variables

In order to reduce the influence of confounding variables on the research outcome, it is important that interfering factors are explored and, if necessary, kept in check. The interference is surveyed with an assessment of confounding variables for each of the three key research variable individually. The confounding variables for perceived relevance, user participation and ES implementation success are respectively referred to as "distortion of the perception", "user participation contingency factors" and "critical success factors". Section 3.6 describes these confounding variables and their potential impacts on the correct assessment of the key research variables. The above sequence of concepts is also the order in which this chapter discusses these topics.

This chapter is concluded with a short overview of all key variables and their confounding variables in section 3.7. Figure 5 provides an overview of the structure of the literature study chapter.
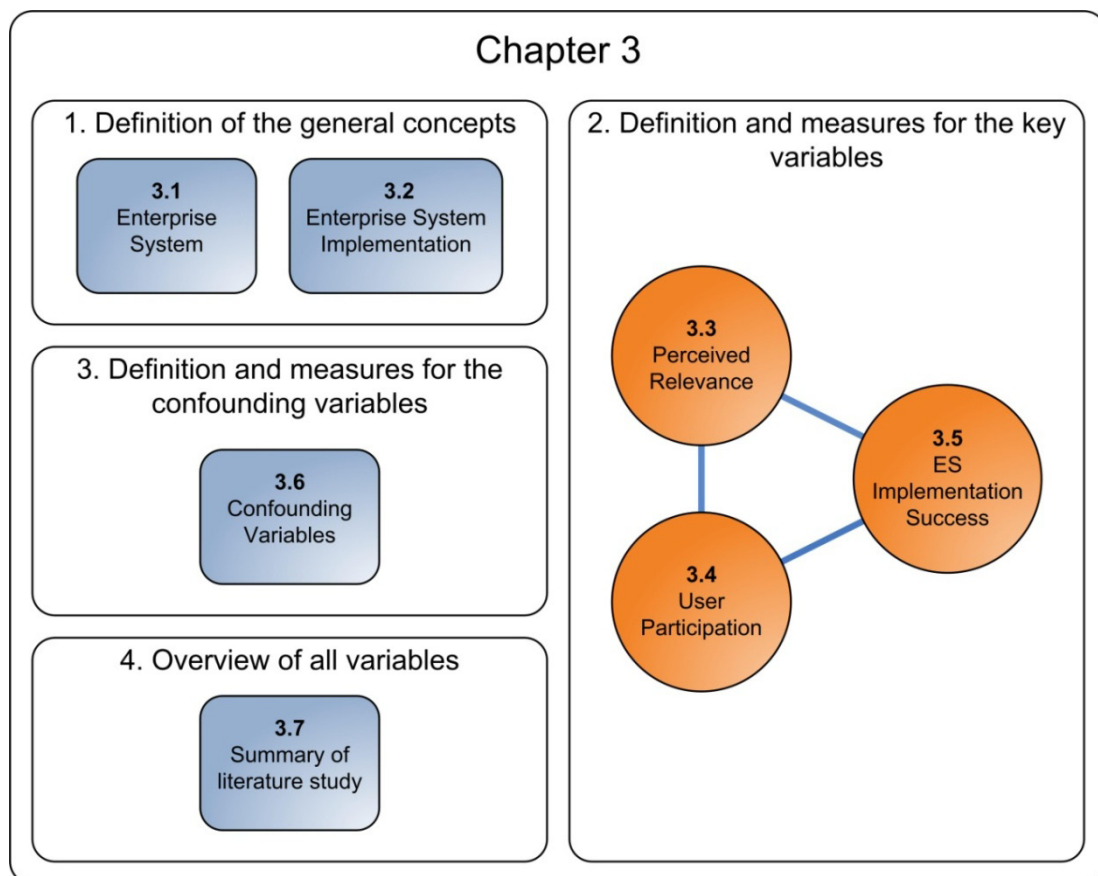
Figure 5: The literature study (overview of chapter 3)
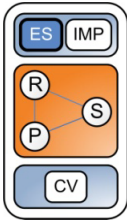
3.1 Enterprise system

Enterprise systems (ES) have evolved from enterprise resource planning systems (ERP systems). Kumar and Hillegersberg (2000) define an ERP system as a system that "integrates information and information-based processes within and across functional areas in an organisation". These functional areas include sales, finance, production, procurement, and logistics. As more and more functional and specialist modules where added to ERP systems, there has been a slow shift in the naming convention, from ERP system towards enterprise system. This better illustrates the broadened scope of this type of system. However, because both the ERP and ES terms basically refer to the same concept (Davenport, 1998), both terms can and will be used interchangeably throughout this document.

Enterprise systems are discussed in terms of their general anatomy, the functionality that makes these systems so interesting and the specific characteristics that differentiate them from other types of information systems.

3.1.1 Anatomy of an enterprise system

Figure 6 shows the general anatomy of the system, its organisational context and its business context (respectively in orange, blue and gray). It visualizes how all the different applications in different (functional) parts of the organisation are able to use a centralized database.
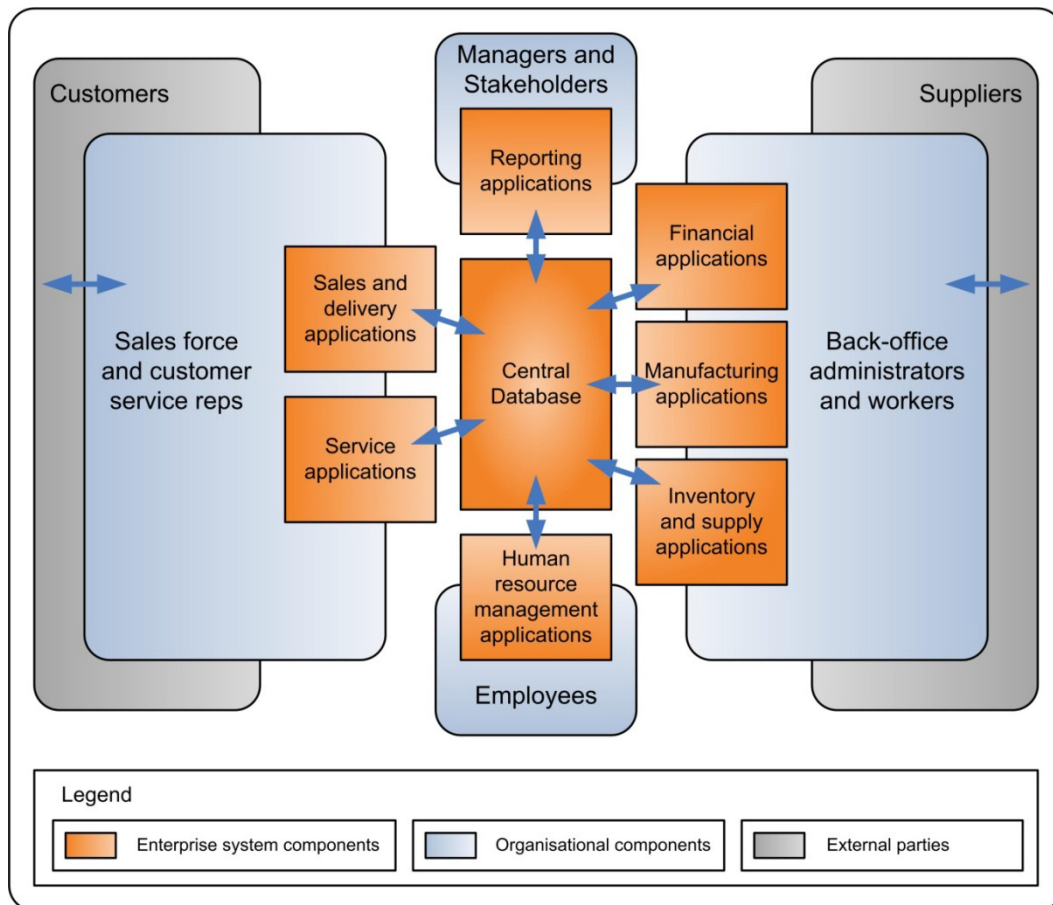
Figure 6: The anatomy of an enterprise system (Davenport, 1998)

3.1.2 Functionality of an enterprise system

The functionality of an ES can be described in more detail. For this research, that functionality is presented in terms of the benefits that these systems offer for adopting organizations. According to Amoako-Gyampah (2007), ERP systems allow companies to:

- "integrate and synchronize all their activities within the supply chain and help in the management of the supply chain and its attendant benefits such as faster response to customers, reduced cycle times and productivity increases."
- "design an integrated information system that eliminates multiple sources of data, eliminates multiple data entries and provides more accurate and timely data."
- "facilitate information flows and communication among different organizational units so as to help meet the needs of both employees and customers."
- "reduce the costs required to maintain previously segregated legacy systems that provide incompatible data."

3.1.3 Important ES characteristics

It is important to differentiate enterprise systems from other information systems. Among other things, this differentiation allows for clear boundaries of the ES domain and critical selection of system implementations for the case study research. According to Kawalek & Wood-Harper (2002), enterprise systems have two important characteristics:

1. "An ES is a large system that encompasses many organisational functions, supporting end-to-end process chains."
2. "An ES is bought commercial off-the-shelf (COTS), implying all ES are standard packages."

However, in the opinion of the author, these two characteristics are not sufficient in differentiating ES from the larger IS domain. Katsma (2008) extends these characteristics by adding four additional characteristics that greatly improve the ability to differentiate ES from IS:

3. "An ES employs best practices."
4. "Data and information are available in real time."
5. "An ES is supplied by a single supplier (not a patch work of systems)."
6. "An ES is customizable (even though it has consequences for cost, implementation time and upgradeability)."

Together the characteristics provide a complete and valid description of enterprise system. These six characteristics combined, define the ES domain and can be used to evaluate whether or not an information system qualifies as enterprise system within the context of this research.
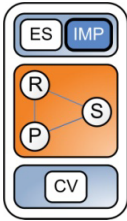
3.2 Enterprise system implementation

There are many interpretations of the term "implementation" in academic literature. Even within the IS domain, the term is used in different meanings: it can be the realization of a system, it can be used to refer to the actual programming of software code, or the post-sales process of guiding a client from purchase to use of the software or hardware that was purchased (Gottschalk, 1999). Due to this research's focus on the interaction of the key variables (perceived relevance, user participation and ES implementation success), the actual process of acceptance, adoption and embedment of the new enterprise system within the organisation is of key importance. This means that large parts of the average ES project hold relevance for this research and are therefore treated as a part of the implementation process. It is important to note that the implementation is used differently in the traditional IS development life cycle and the ES development life cycle. These life cycles are compared in the next section.

3.2.1 IS development vs. ES development

The traditional system development life cycle (SDLC) is presented in Figure 7. The figure shows the different stages of the implementation process and their respective deliverables. In the traditional SDLC, implementation means the installation of the system into the organisation. This stage starts after the development and testing of the new system and ends the moment the system is operational. Based on the research focus, the ES implementation clearly does not entail only the installation of the new system into the organisation. Such a perspective is far too narrow for the ES context of this investigation.
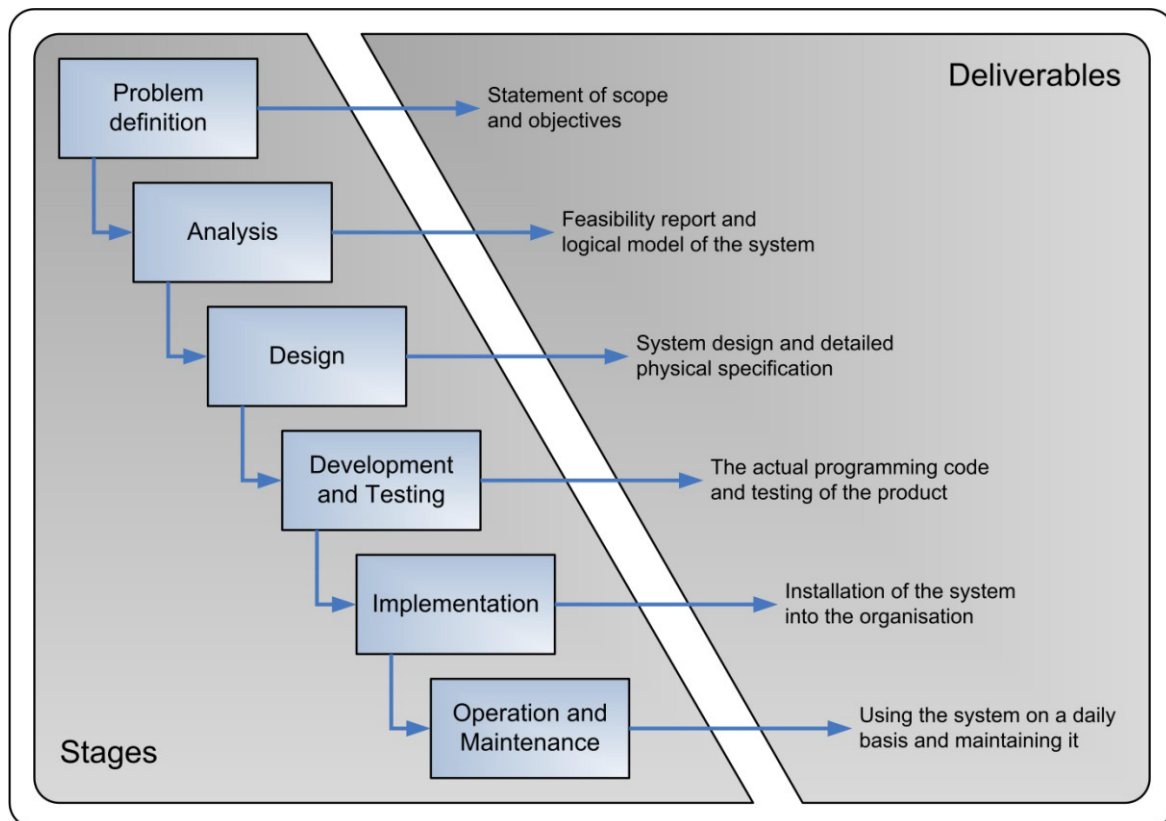
Figure 7: Traditional system development life cycle

The implementation of an ES extends beyond "flipping the switch" (Wagner & Piccoli, 2007, p. 55) and is about the various user groups accepting, adopting and embedding the system in the organisational core processes (Katsma, 2008). The radical change, which is introduced into the organisation by the ES project, makes acceptation, adaptation and embedment central aspects that require planning and attention early on during the ES project (Wagner & Piccoli).

The reason that IS and ES implementation differ, and thus go through a different system development life cycle, is because ES present a noteworthy discontinuity from traditional IS. According to Kawalek and Wood-Harper (2002, p. 14) "the established IS and software engineering literature has overwhelmingly focused upon IT as a tailorable artefact". This tailorability is a central property of the traditional system development life cycle, which stresses that an IS should be adapted to the particular exigencies and intricacies of the implementing organisation (Kawalek & Wood-Harper). However, ES require a fundamentally different approach. As already discussed in the previous section, ES are commercial off-the-shelf (COTS) packages. Even though an ES needs to be configured to "fit" into the implementing organisation, the COTS nature of such systems severely limits the tailorability of these systems. This difference between traditional IS and ES has large consequences for the steps taken during the implementation process, resulting in different models to describe that same process.

3.2.2 ES development life cycle

Based on the assessment of ES project structure by Katsma (2008), a more appropriate model for the enterprise system life cycle is selected. This model by Parr & Shanks (2000) differentiates between three important main stages of the ES life cycle, namely the planning stage, the project stage and the enhancement stage. The project stage consists of a number of phases that follow after each other, as can be seen in Figure 8. The Parr & Shanks' implementation structure is straightforward and therefore will be used as a starting point to describe and visualize the ES implementation process.
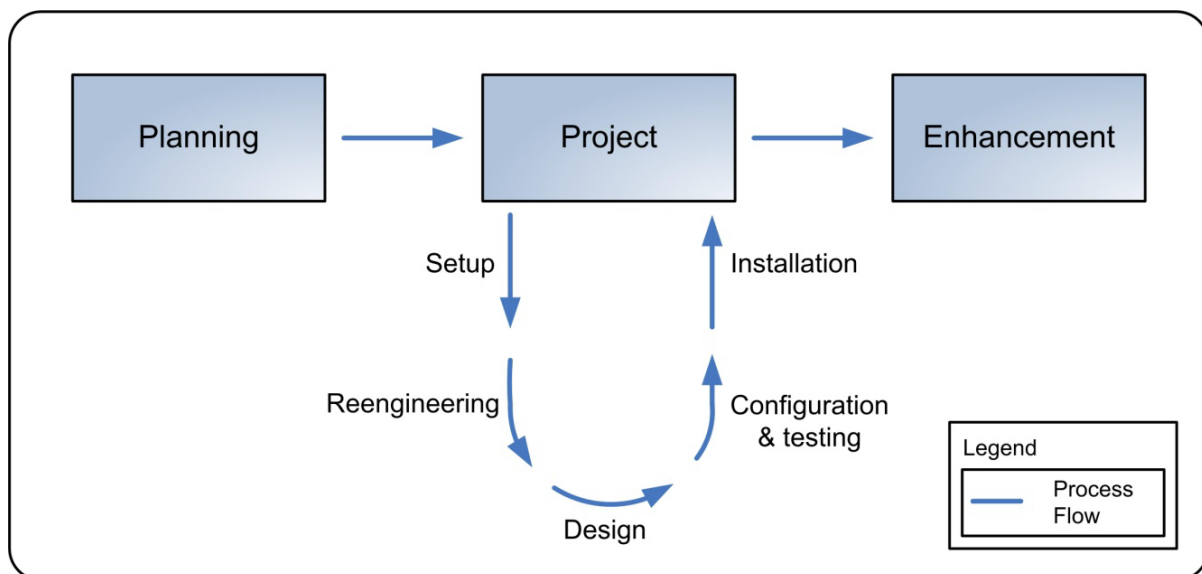
Figure 8: Project stage model of ES implementations (Parr & Shanks, 2000)

However, in order to provide a sufficiently accurate ES life cycle model, there are some additional considerations to be taken into account and some aspects of the ES implementation process are not optimally presented in Parr & Shanks' model. Research by Kawalek & Wood-Harper (2002) can be used to extend the ES implementation model.

3.2.3 The iterative nature of ES implementations

Kawalek & Wood-Harper (2002) take a specific user participation approach which, in this research, can be used to complement the model of the implementation phases provided by Parr & Shanks (2000). According to Kawalek & Wood-Harper two phases are of major importance during enterprise system implementations; the design phase (which roughly corresponds with Parr & Shanks' reengineering and design phase) and the implementation phase[1] (which roughly corresponds with Parr & Shanks' configuration and testing phase). In practice, it is very rare for these kinds of large-scale projects to be completed without a single iteration, especially when (end) users are involved in the process (Kawalek & Wood-Harper). The acknowledgement of the iterative nature of this process is especially important because of the focus on user participation and perceived relevance during the ES implementation. Even though some iteration is very common, a large amount of iteration can signal above average challenges for the project or changes in the planned functionalities of the new system.

When multiple models are meshed together like this, quickly difficulties and ambiguity in terminology emerge. As illustrated by Parr & Shanks and Kawalek & Wood-Harper, the academic ES community does not use a single set of terminology for the different phases of the ES development life cycle. Therefore, a single implementation methodology is advisable and will be adopted in this document.

3.2.4 Implementation terminology

Due to the case study setup this research would benefit from a universal and easily recognizable terminology for the key implementation phases. This way, the people that are cooperating with this research are best able to relate the author's questions to their ES implementation experiences.

Based on their practical experience, KPMG uses a general ES implementation terminology to describe the ES development life cycle. Table 3 presents the project structure which KPMG encounters most frequently in practice. It is also very similar to the terminology used in SAP's own implementation methodology ASAP (Khan, 2002). It is also noteworthy that both KPMG and SAP use a similar phasing as the Parr & Shanks model. Fortunately, the approaches do not differ much with regard to content, al-be-it with slightly different terminology for the different phases. As KPMG's version of implementation terminology will look most familiar to the people with whom KPMG is involved in ES projects, KPMG's terminology is preferred.

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[1] Unfortunately, Kawalek & Wood-Harper have chosen "implementation" to convey a different meaning as the one that is posed in this research. Kawalek & Wood-Harper interpret implementation as the configuration and testing of the system, which is very similar to the regular SDLC.

Table 3: KPMG's terminology for ES project phases

#.	Phases
1.	Initiate
2.	Blueprint
3.	Realisation
4.	Testing
5.	Training
6.	Cut-over / Go-live
7.	After-live

3.2.5 Summary of the ES implementation process

Based on these considerations about ES implementation, this research uses a combination of existing models and terminology merged into one to describe an ES implementation. At the foundation lies Parr & Shanks' model, which is extended with Kawalek & Wood-Harper's acknowledgement of the iterative nature of some key phases within ES implementation projects. Finally, to bridge the gap between academic and practical terminology, KPMG's terminology is selected. Combined, this leads to the model of an ES implementation that will be used during this thesis. It is shown in Figure 9. The ES implementation refers to the entire project stage, including the underlying phases.
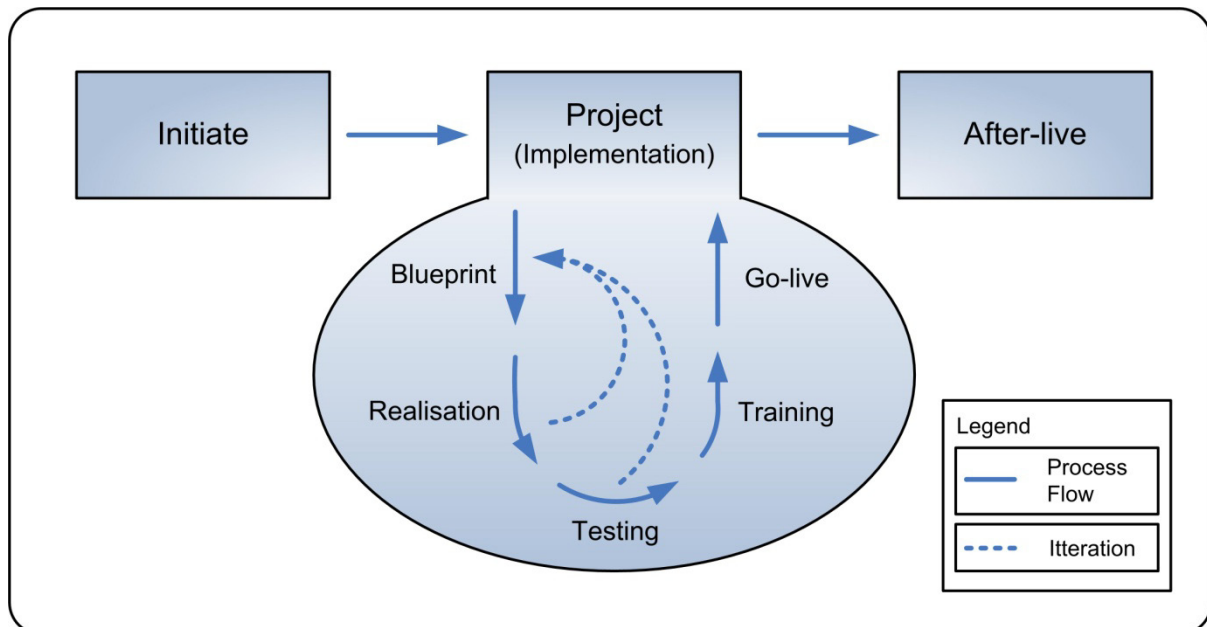
Figure 9: Combined implementation model (Parr & Shanks, 2000)
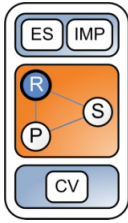
3.3 Perceived relevance

Perceived relevance is the indicator for the users' perception of the apparent value the system holds for them. It provides an indication of the importance and the relevance the users attribute to the new enterprise system. The importance of perceived relevance and its effects on related factors have been studied by various researchers. Based on their review of relevance and involvement literature, McGill & Klobas (2008) conclude that users who attribute relevance, importance or value to a system:

- use the system more,
- have a more positive attitude towards it,
- perceive it to be more useful, and
- are more satisfied with it.

It is important to notice that not all these effects are relevant in the ES context. Perceived relevance as a predictor of eventual system use is not applicable because of the obligatory nature of ES usage. As the detailed study of the relationships between perceived relevance and the other key variables in this specific domain will be discussed in the theoretical framework in chapter 4, the current section will take a more detailed look on perceived relevance.

Perceived relevance is similar to the constructs that are presented in other publications such as "user involvement" by Barki & Hartwick (1994) or simply "relevance" by Katsma et al. (2007), of which the definitions are presented below.

- **User involvement.** Barki & Hartwick define user involvement in the systems development context as "a psychological state reflecting the importance and personal relevance of a new system to its users" (1994, p. 62). Barki & Hartwick explicitly name two dimensions of user involvement that they measure with their method, namely importance and personal relevance. They actively tried to align the terminology used in the information systems research domain with other scientific research domains, especially that of psychology. Even though it is likely that there is a connection, user involvement is defined explicitly not to include other psychological states such as user attitude, which is defined as "an affective or evaluative judgement" (Barki & Hartwick, 1994, p. 75).

- **Relevance.** Katsma et al. divide the relevance of an IT development in two categories: macro relevance and micro relevance. Macro relevance is defined as "the degree to which the user expects that the ICT system will solve problems or help to realize her actual goals" (Spil, Schuring & Michel-Verkerke, 2004). Micro relevance is defined as: "the degree to which IT-use helps to solve the here-and-now problem of the user in his working process" (Spil, et al., 2004).

Perceived relevance, as intended in this research, is basically the same construct as macro relevance. Macro relevance also matches with Barki and Hartwick's definition of user involvement. The choice to use the term perceived relevance is very deliberate. The author believes the term is more intuitive than user involvement or only relevance. Additionally, while reviewing academic sources on the topic, it was found that there is large degree of inconsistency regarding the term "user

involvement". Perceived relevance is based on the future user's expectations towards the new system, as it is still under development. Micro relevance is discarded as it measures the actual relevance of the IT system after the go-live moment, once the new system is in actual use. It might be an important factor in explaining IT use (Schuring & Spil, 2003), but our focus on the relationship between perceived relevance and user participation, which occurs during the implementation project of an enterprise system, makes the concept less significant in this research context.

Summarizing, the users' perception of relevance indicates the relevance, value and importance that future users attribute to the new system before it is taken into use. Even though micro relevance (the actual relevance) also has an influence, perceived relevance plays an important role in the attitude towards the new system during its development and is deemed a herald of its overall acceptance and embedment. Because perceived relevance evaluates the relevance, value and importance of a not yet existing system, it is based on expectations of the users and their experiences with the project thus far. Therefore, it is important to understand what kinds of expectations influence perceived relevance and how these expectations change over time.
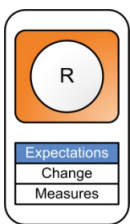
3.3.1 Expectations

The relevance, value and importance of a new ES are based on the users' expectations of how the new system will solve existing problems and/or offer new opportunities (or create threats) for those individuals that will be affected by the change. These expectations can be divided into at least four different categories (Katsma, et al., 2007). These categories are: economic improvements, social improvements, functional improvements and finally time and effort saving. These four different aspects of the users' expectations and their respective explanations are presented in Table 4 and make a more detailed examination of perceived relevance possible.

Table 4: Aspects of perceived relevance (Katsma, et al., 2007)

Aspect of perceived relevance	Explanation
Economic improvements	How the user expects the new system will affect his/her economic position in the organisation.
Social improvements	How the user expects the new system will affect the social aspects of his/her activities in the organisation. This also includes his/her expectations about the changes in the organisation's structure, hierarchy and power structure.
Functional improvements	How the user expects the new system will affect his/her functional role in the organisation.
Saving time and effort	How the user expects the new system will affect the time and effort needed to perform his/her daily tasks.

The subdivision of perceived relevance in these aspects is especially relevant in the context of enterprise systems. Small IS may only introduce change on a single level, reducing the usefulness of differentiating perceived relevance in multiple aspects. Contrary to these smaller information systems, enterprise systems introduce large changes on many levels in the organisation. In this

context, the refinement of perceived relevance in aspects creates a more in depth understanding of the perception of users. It also intends to increase the reliability of the recollection of the perception when it is assessed, because the differentiation allows users to be more actively engaged on the subject.

Based on the user's expectations, divided in these four different aspects, the new system will hold a certain degree of perceived relevance for the user. It is important to note that these expectations are not static and can change while the ES project advances. As the implementation and user participation process progress, users get an increasingly mature and detailed perception of the relevance that the new system holds for them. This maturation of perceived relevance is noted by Barki & Hartwick, who observe that at the start of the participatory process users only have "a rough and undifferentiated set of thoughts and feelings concerning the system" (Barki & Hartwick, 1994, p. 76). However, by the time the system is implemented and used "a differentiated pattern of thoughts and feelings has emerged" (Barki & Hartwick, p. 77). Wagner & Piccoli (2007)also emphasize on the same issue. The further away the change, the less likely it is for users to be able to oversee the impact of the change on their daily activities. Wagner & Piccoli (p. 52) state: "because users are busy at work and their attention is captured by immediate responsibilities, they will generally not become fully engaged in analyzing and evaluating new systems, even when the precept of early user participation is followed". As a result, it is anticipated that users have more difficulty attributing relevance to specific perceived relevance aspects in the earlier phases of the project. But it is interesting to see what is causing the changes in expectations over the course of the project. The next section takes into account the factors that change the expectations over time.
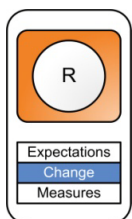
3.3.2 Changes in expectations

The user's perceived relevance of the new ES is not a static variable. During the implementation process, the expectations can constantly be influenced by the changing conditions in the ES project, the organisation and personal experiences or circumstances (Wagner & Piccoli, 2007). It is easy to imagine that the expectations of users are influenced by a number of factors, based on their existing preconceptions and their experiences during the implementation process.

For correctness it is important to differentiate between the influencing factors that are outside of the ES implementation scope, which need to be treated as confounding factors and those that are a result of the factors that fall within the ES project context. Even though it is not supported by existing references, the author hypothesizes that the following ES project related influences may play an important role:

- Communications about and promotions of the new ES.
- Corridor rumours about the new system and its implementation.
- The users' (in)direct experiences with the ES project.
- The key users' experiences during the participation process (including the effect of selection of users for the participation process and the experiences of end users during the testing and training phases of the project stage).

An additional factor that is important to take into consideration is the susceptibility of perceived relevance for change. According to Wagner & Piccoli (2007) it becomes increasingly difficult to influence the expectations of users as the project advances. It will be interesting to see whether this effect is noticed during the case study research. If so, this could indicate that expectation management earlier in the project has more impact than later on in the project, confirming Wagner & Piccoli's findings.
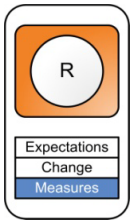
3.3.3 Measuring perceived relevance

Based on the above discussion, the measure for perceived relevance should be a composition of two elements:

- The perceived relevance (the value and importance that the new system holds for the user), divided in economic, social, functional and time and effort aspects.

- The influence of time (the implementation process) on perceived relevance.

The first element asks for an assessment of the perceived relevance the new system holds for its users divided into different aspects, which add detail to the assessment of the composite variable. Perceived relevance can be divided into four aspects, namely economic, social, functional and time and effort. The distinction of different aspects of perceived relevance is appropriate because of the far reaching change ES systems introduce into an organisation.

The second element that requires assessment is the influence of time on perceived relevance. Since the perception of relevance is constantly subjected to organisational influences and changes over time, it should be assessed at a different moments in time. Ideally, the perceived relevance would be measured real-time at discrete moments in time, however, the context of this research only allows for multiple retrospective assessments of perceived relevance. Still, multiple retrospective assessments can provide insight in the changing nature of this variable throughout the system's development cycle.

Since this research focuses on the relationship between relevance and participation, the time period of interest is that of participation process. Figure 10 shows the concept of perceived relevance in relation to the ES implementation timeline more explicitly.
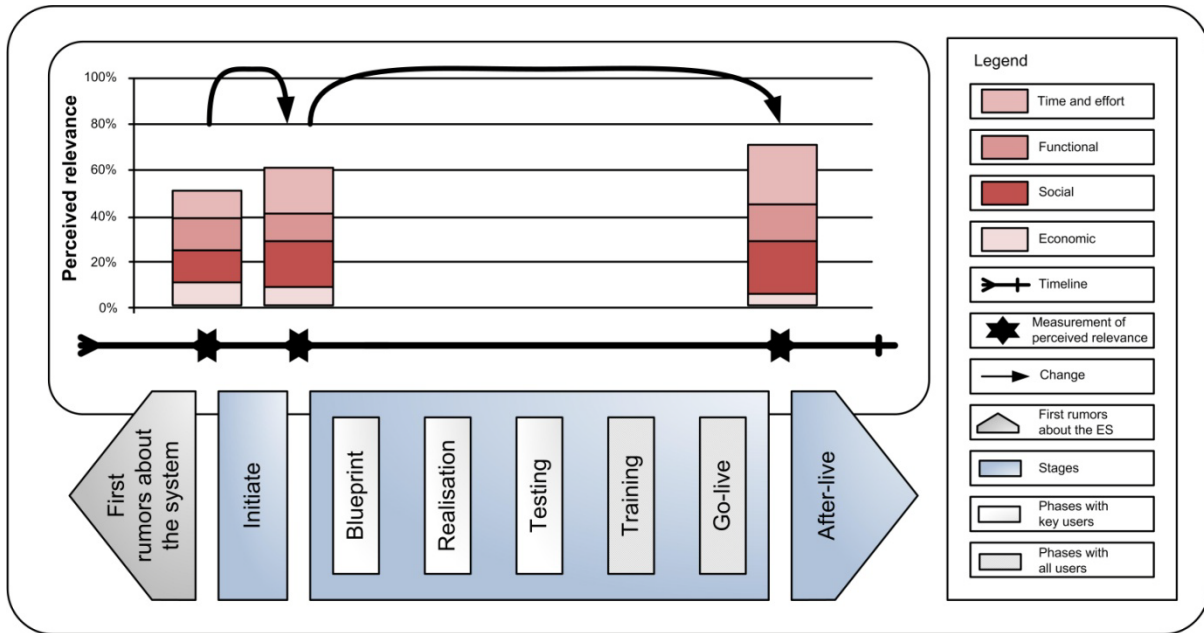
Figure 10: Fictive example of perceived relevance in relation to the ES implementation project

The first measurement should be taken before the participation process starts. Comparing the perceived relevance upfront with the perceived relevance at the end of participation process should provide the needed insight. A third measurement moment is introduced after the user participation's selection process, which is used to measure the influence of selection or dismissal for the participation process on the perceived relevance, in addition to other changes of the perceived relevance. Combined these elements of perceived relevance provide a sufficient overview the measures of the perceived relevance variable. This overview of the measures is presented in Figure 11.
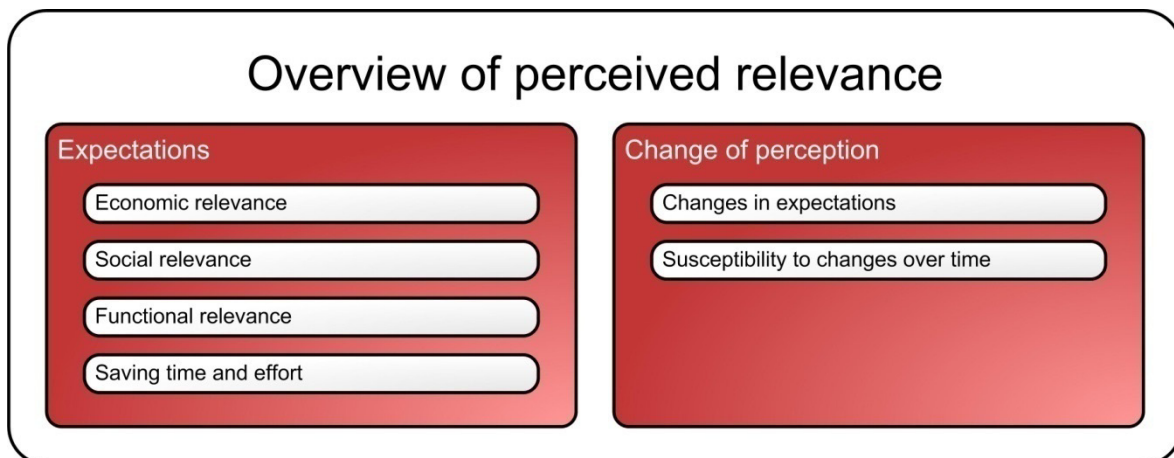
Figure 11: Overview of the perceived relevance measure
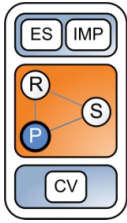
3.4   User participation

The role of user participation in information system development has been considered ever since the beginning of the 1960s (Barki & Hartwick, 1994). Over the years the phenomenon of user participation has been studied by many researchers, who were convinced of its relation with information system quality, success, user satisfaction and system use (Ives & Olson, 1984). However, Both Ives & Olson and Barki & Hartwick conclude that the relationship between user participation and information system success is not properly and consistently demonstrated in research. Cavaye (1995) offers an explanation for this discrepancy: although participation has been researched for a couple of decades, the concept is multidimensional and still does not have a single explanatory definition. As a result user participation is interpreted and measured in different ways, necessitating a careful definition of the construct. Another important consideration in the process of studying user participation is this research's focus on the very specific type of IS implementation that is researched. Therefore user participation is also approached from an ES perspective.

In this research context, user participation is defined as the participation process throughout all layers of the organisation during the different stages or phases of an ES implementation. A lot of research explicitly emphasizes on "user participation" instead of only "participation". Cavaye (1995) definition of "user" includes senior management, middle management and the employees who carry out the work. Cavaye combines this definition of "user" with a definition of "user participation" from Barki & Hartwick (1994), who define user participation as a set of behaviours, operations and activities performed by users. Through these behaviours, operations, and activities users are involved in the implementation and can influence the ES implementation to a certain degree. This research uses a combination of these definitions: Cavaye's definition of user combined with Barki & Hartwick's definition of user participation.

Participation and user participation will be used interchangeably throughout this document and refer to the same concept. In contrast, a careful distinction between (user) participation and user involvement is important.

User participation vs. user involvement

Barki and Hartwick's (1994) definition of user participation explicitly excludes the mental processes or the state of mind of users. Those types of processes are not externally perceptible or verifiable. As a result Barki & Hartwick state that user participation should not be confused with user involvement, which in their definition only refers to the subjective psychological state of the user towards the system. Barki and Hartwick (1994, p. 62) literally state that "the subjective psychological state reflects the importance and personal relevance of the object or event". As stated before, this interpretation of user involvement very closely relates to the construct of perceived relevance that is discussed in the previous section of this thesis. It is important to acknowledge that not everyone defines user involvement like this. Wagner & Piccoli (2007) deviate from the above perspective and define participation as a type of user involvement, indicating a far broader interpretation of the term. This is illustrated by Wagner & Piccoli (2007, p. 52) conceptualization of user participation as "the involvement of users in discussions over time to elicit feedback and commitment". Ives & Olson (1984) also show a similar deviation from Barki & Hartwick's definition of user involvement.

In this document, "user involvement" refers to the subjective psychological state reflecting the importance and personal relevance of the new system (Barki & Hartwick), while "involvement" will be used in the general meaning of the word.

Describing user participation

The process of describing a user participation process during an ES implementation is not straightforward. This difficulty relates closely to the above described difficulties defining the concept. This complexity is certainly not mitigated by the complex nature of ES implementation. Besides users participating in the ES development process, it is very important to acknowledge the far reaching organisational consequences of most ES implementations. The organisational change aspects also invite user participation. Therefore a dual focus is applied: on the one hand an investigation into user participation from an IS implementation perspective and on the other hand a broader organisational change perspective.
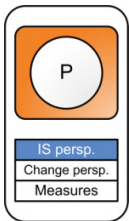
3.4.1   The IS perspective

Different researchers have all taken different approaches in their assessment of user participation in an IS implementation context. The most important aspects of user participation approaches from an IS perspective are discussed below in a point by point fashion.

User participation from an activity viewpoint

One of the most influential papers on user participation is written by Barki & Hartwick (1994). They have developed a quantitative measure for user participation. Their measure reflects a wide range of user assignments, activities and behaviours that occur during the participation process. Barki & Hartwick assigned certain qualifications to the variety of possible activities. These are:

- **Direct** (participation through personal action) or **indirect** (participation through representation by others)
- **Formal** (using formal groups, teams, meetings, and mechanisms) or **informal** (through informal relationships, discussions, and tasks)
- **Performed alone** (activities done by oneself) or **performed with others** (activities performed with others)
- **Active** (pro-active involvement of users) or **passive** (users merely following instructions)
- **Overall occurrence** (general participation events) or **stage wise occurrence** (participation events related to a specific stage or phase)

The quantitative nature of user participation measure by Barki & Hartwick (1994) limits its usability in the this research's qualitative approach. The participation of users in specific participative events was measured as dichotomies, leading to a large list of yes-no questions relating to the participation process. Even though this approach would help the author to survey user participation in a large number of organisations, it is less suitable to ascertain the underlying qualitative relationships with other concepts, which is the goal of this research.

Dimensions of user participation

Still, some aspects of Barki & Hartwick's approach are useful and have also found their way into other, more comprehensive, approaches. Cavaye (1995) provides such an approach . Based on her

review of user participation literature, Cavaye concluded that even though many attempts hold a certain degree of validity, most researches offer only a partial view on the concept. This is also true for Barki and Hartwick's approach (Cavaye, 1995). Cavaye has created an overview by identifying a number of dimensions of user participation. By combining the valid but partial and incomplete insights provided by other researchers, Cavaye attempted to compile these so called dimensions in such a way that the individual dimensions complement each other. Together, these dimensions describe the user participation concept more completely than either user participation dimension on its own (Cavaye, 1995). The dimensions can be found in Table 5, along with a brief explanation. Some of Cavaye's dimensions show a clear (partial) relationship with Barki & Hartwick's research. To illustrate this, the third column of Table 5 shows to which attributes the dimensions are related. It is evident that some important elements of Barki & Hartwick's research have been incorporated in Cavaye's user participation dimensions.

Table 5: User participation dimensions (Cavaye, 1995)

Dimension	Brief explanation	(Partial) Overlap with Barki & Hartwick
Type of participation	The proportion of the total number of users and participating users.	Direct / indirect
Degree of participation	Users have different levels of responsibilities during the participation process.	Active / passive
Content of participation	A differentiation between participation in technical and/or social aspects of the new system.	_
Extent of participation	Participative efforts vary in scope during different phases of the implementation project.	Overall occurrence / stage wise occurrence
Influence of participation	The degree of influence users can wield through the participation process.	_
Formality of participation	The formality of the participative activities.	Formal / informal

These dimensions play a major role in the remainder of this investigation. The discussion of user participation in this section as well as the interaction between key variables discussed later on will make use of the structure that is provided by Cavaye's user participation dimensions.

Timing of user participation

Wagner & Piccoli (2007) provide important guidance in the planning of user participation and stress the importance of the timing of user participation. Looking at the outcome, user participation itself does not guarantee actual user engagement. As a result, there is an important difference between a user that is participating and a user that is committed. Wagner & Piccoli (2007, p. 51) state it "becomes imperative to focus on the timing of user participation, not simply to advocate and plan

their involvement." Their research indicates that because users are busy with their daily work load and their immediate responsibilities, most users will not become fully engaged in analyzing and evaluating the new system. Analysis and evaluation performed by stakeholders can be interpreted as manifestation of the operations and activities that are mentioned by Barki and Hartwick. Issues with user engagement remain relevant, even when user participation is started early on in the project. A good reason to explain why early user participation only gives a marginal result is because of the significant cognitive effort that is called upon to envision what the end product will be, how it will change work routines, and how it affects the individual's own sphere. Only when the new system is introduced into the organisation (at the "go live" moment) will the reality of new work routines and practices become apparent to the majority of users. At that point in time, the intended end users will begin to closely evaluate the new system. They will start raising significant issues, often leading to one of the different manifestations of project failure (Wagner & Piccoli). The timing of participation can also be used to derive the importance of participation as perceived by management. Because of its potentially large influence on the end result, timing of participation is incorporated in the measurement method of user participation.

Actual vs. perceived participation

An important note is that actual participation can differ from perceived participation. Some research in participative decision-making indicates that the motivational effect of participation is more closely related to perceived participation than to actual participation (Barki & Hartwick, 1994). The experience that user participation delivers to stakeholders therefore seems to be at least as important as the actual influence that is wielded through user participation.

From an IS perspective to a change perspective

Barki & Hartwick, Cavaye and Wagner & Piccoli approach user participation from a general IS perspective, but the more unique characteristics of ES implementations, which have been presented in section 3.1 and 3.2, also need to be taken into account. Especially the large degree of organisational change that is introduced by these kinds of projects makes it worthwhile to expand the investigation of user participation to a more generic perspective. Therefore, this study does not only incorporate an IS perspective, but adds an organisational change perspective on user participation. Even though these perspectives are not necessarily mutually exclusive, each addresses participation from a different angle, individually helping to achieve a more complete view of the user participation concept.
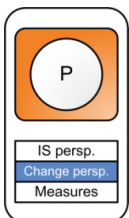
3.4.2   The organisational change perspective

For the organisational change perspective on user participation, a general study into participation, individual development, and organisational change by Pasmore & Fagans (1992) is adopted. Through their literature review, Pasmore & Fagans offer important insights into user participation from a general organisational change perspective. One of their important messages is that when participation in change processes is effective, it offers substantial benefits for individuals and organisations. However, Pasmore & Fagans provide us with a short list of important requirements that, in their view, are essential to make user participation beneficial: the selection of participants, the preparation of participants, and the goal of participation. These requirements are discussed in more detail below. Also the relevance of these requirements for the ES context is explained.

Selection of participants

Participation requires certain competences from the participating individuals. Since individuals within an organisation are not equal on many fronts, certain criteria are important to take into consideration when selecting the most appropriate employees for the job. These criteria include: knowledge, motivation, task attributes, group characteristics, leader attributes, and other organisational factors (Pasmore & Fagans, 1992). In the context of ES, this can be made far more explicit. It means that an appropriate user to participate in the implementation has at least some of following characteristics:

1. He/she is able to adapt to change and not afraid of it,
2. He/she has a thorough understanding of his/her department's processes and an overview of the broader organisational core processes,
3. He/she is able to communicate with his/her peers and has a favourable standing with their colleagues, which he/she can use to involve non-participating colleagues in the change process.

Preparation of participants

In many instances of participation the individuals are not prepared adequately (Pasmore & Fagans, 1992). Also with respect to enterprise systems this is a relevant issue. When the participating users are not knowledgeable of the principles of ES and the implementation process, if they are not aware of the functional possibilities and organisational consequences that the change to a new enterprise systems brings about, then the participation process has a poor start.

Goal of participation

Pasmore & Fagans (1992) conclude that participation in organisational change processes serves a dual purpose:

1. It is used to help transform social systems.
2. It is intended to develop and/or transform individual participators.

The development of individuals and organisation is a concurrent process. This should also be the goal of any participation process. In the case of this research, the social system that needs to be transformed is the organisation of the ES implementing company. The participators that need to be developed and/or transformed are the users of the new enterprise system. This goal definition shows that user participation is not a single mechanism or a particular program. It cannot be purchased from a consultant or bought in a do-it-yourself kit (Pasmore & Fagans). The participation process needs to be managed carefully and will certainly not run itself. One fundamental mindset is that user participation is continuous process, not an instant solution (Pasmore & Fagans). The already complex timing of user participation is aggravated by the stakeholders' natural lack of inclination to participate in change projects. It turns out that a major part of the workforce chooses not to participate when given the opportunity (Pasmore & Fagans). In the researched cases, it is important to assess the perceived goals of participation in order to assess the correct usage of the user participation mechanism. This measure is of qualitative nature and can hardly be compared in a quantitative way.

Together, with the insights that were gained in the discussion of the IS perspective on user participation, these organisational change perspective issues will be incorporated in this research's assessment of user participation in the targeted case study organisations.
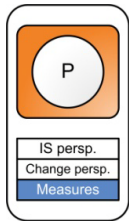
3.4.3 Measuring user participation

The structure of Cavaye's framework is used as the basis for the assessment of user participation in an ES context. and is shown in Figure 12. The above considerations from both the IS and change management perspective are incorporated in this framework, leading to a ES specific set of user participation measures.
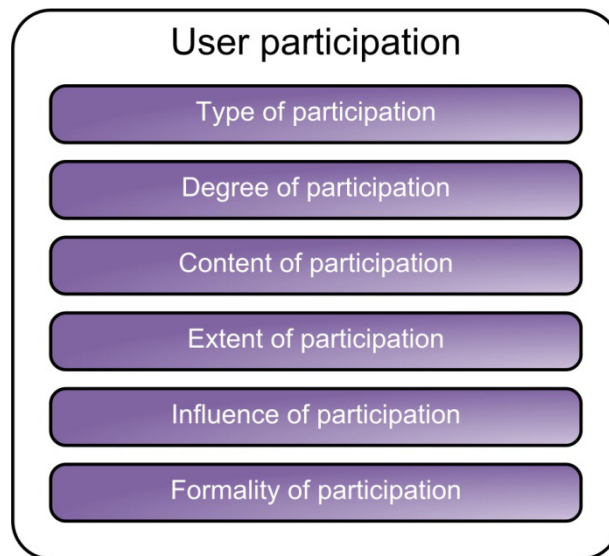
Figure 12: Overview of Cavaye's user participation dimensions

Type of participation

Description: Type of participation refers to "the proportion of users that participate in the development" (Cavaye, 1995, p. 313). The proportion of participating users is determined by assessing who are actively involved in the participation process. Even though it is possible for all users to participate in the ES implementation, it is more likely that only a representative selection of user is actively participating (Cavaye, 1995). In most situations a representation from the different functional areas is selected. These participation members are most frequently called key users or participants.

Based on research by Pasmore & Fagans (1992), Katsma, et al. (2007) and Esteves, et al. (2005) this aspect is extended to include an assessment of the selection criteria for participants. In addition, preparation of participation, as mentioned by Pasmore & Fagans, is also an important aspect that this research incorporates in the type of participation dimension.

Measure: The number of assigned key users in comparison with the rest of the users is in most cases of ES implementations sufficient to determine the proportion of participating users. Figure 13 shows a fictive example of the graphic representation of the proportion of participating users. The selection and preparation aspects of the participation process will also be explored in the process.

Type of Participation

Proportion of participating users
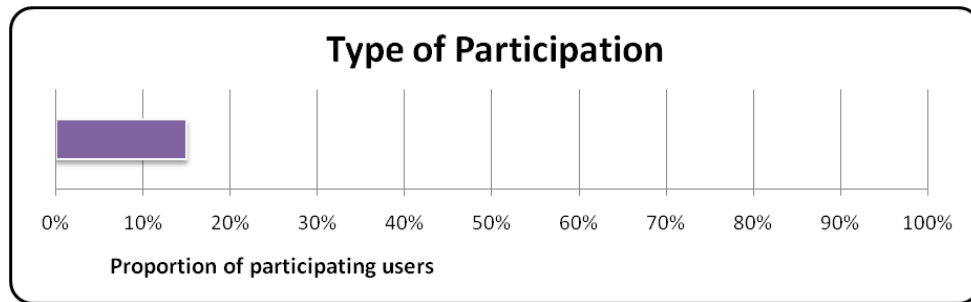
Figure 13: Fictive example of the type of participation

Degree of participation

Description: Degree of participation differentiates between participative users in the sense that they can have different levels of responsibilities during the participation process (Cavaye, 1995):

- Participating users may be active in an advisory capacity.
- Participating users may have sign-off responsibilities at various stages.
- Participating users may be deeply involved in development as part of the design team.
- Participating users may be given the full responsibility for development of the system.

Although not specifically focused on user participation in the ES implementation context, Pasmore & Fagans (1992) have developed a scale to measure what they call the level of participation in an organisation. Pasmore & Fagans differentiate between low and high levels of participative acts. They conclude that the higher the participative act, the more likely it will result in systemic and individual development. The participative act levels are presented in Table 6. In the description of the various levels make sure not to confuse system with enterprise system. Pasmore & Fagans use system to refer to the entire context of the change process, including the organisation and the workforce.

Table 6: Levels of participation (Pasmore & Fagans, 1992)

Likelihood of impact	Level	Description
Low	Conforming	Acts of simply joining and participating in a system.
Low – medium	Contributing	Acts of helping to improve the existing system.
Medium	Challenging	Acts attempting to change the system slightly while retaining the structure and distribution of power.
Medium – High	Collaborating	Acts of seeking to involve or support others, while retaining the system's essential characteristics.
High	Creating	Acts of designing the system itself.

It is important to note the overlap that Pasmore & Fagans measure of the level of participation introduces to two of Cavaye's dimensions of participation: the level of participation relates to Cavaye's degree of participation as well as Cavaye's influence of participation. However, in this research, contrary to for example (Katsma, et al., 2007), the author chooses to keep the degree participation separate from the influence of participation. The level of participation only relates to the likelihood of the influence and not the actual influence, which needs to be assessed separately.

Related to the responsibilities of the users in the participation process, it is important to ascertain the overall goal that the participation process is intended to attain. Since development of the organisation and its people are the main purposes of any user participation process (Pasmore & Fagans, 1992), it is interesting to see what the stakeholders in the management layer intent as the overall goal of the participation process and what the stakeholders in underlying layers perceive as the overall goal.

Measure: The degree of user participation can be measured on a scale. Differentiation in levels of participation can be used to measure the degree of participation in a practical setting. Because Pasmore & Fagans (1992) have already operationalized the degree of responsibility in the participation process, it is useful to adopt their measure and categories. Figure 14 shows an example of how the degree of user participation can be graphically represented.

Degree of User Participation

0   1   2   3   4   5
Level of responsibility

■ Conforming   ■ Contributing   ■ Challenging   ■ Collaborating   ■ Creating
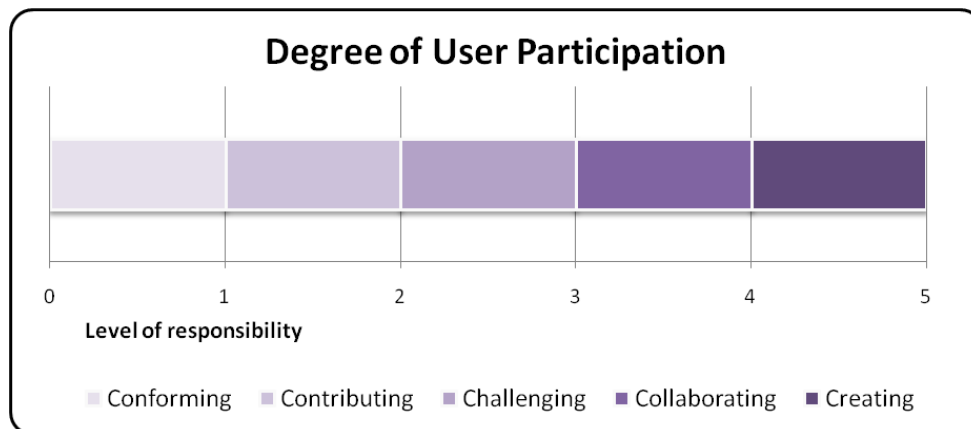
Figure 14: Fictive example of the degree of user participation

The goal of the participation process will be assessed based on the intentions and perceptions of the stakeholders in the organisation. Due to the qualitative perspective on this concept, no classification can be provided upfront. Based on the comparison of the intended goal and the perceived goal of the participation process, it is possible to determine the importance of correct usage of the participation mechanism.

Content of participation
Description: Content of participation refers to the fact that users may be involved in different aspects of ES design. Cavaye (1995) recognizes two aspects of IS design: technical design and social design. This notion is similar to Muntslag's (2001) perception of ES induced change, presented in section 1.2.1. It is likely for users to be taking part in participative activities that enhance the technical design of the system, but it is also possible for users to be involved in the social design of the system. When the latter is the case, the users consider the social and human impact of the new system on the organisation. These include the organisation structure, power structure and social structure of the company. It may be helpful to note that a comparable differentiation has been discussed earlier this chapter: the contrast between IS and organisational change perspectives. During ES implementation projects a common flaw is for management to focus on the technical aspects of the new system, while the organisational and social changes that the new system induces

are neglected (Katsma, 2008). Not coincidentally, there is a similar dynamic observable in the user participation process. Participating users can be asked to assist in only the technical design aspects of the new system, while the organisational design aspects are not even touched upon. This leads to a lopsided approach to the complete set of problems and issues which ES implementation introduce into the organisation.

Measure: In order to assess the content of participation, it is important to find out if both technical and social aspects of the system implementation are part of the participation process. The context of this research does not allow for a quantitative determination of the mix of technical and social aspects of participation, so an approximation into a limited number of broad categories must suffices. As a result, the content of participation will be assessed with the following categories: Mainly a technical focus, balanced focus and, mainly a social focus (Cavaye, 1995). A running scale with these three categories to measure the content of participation is presented in Figure 15.
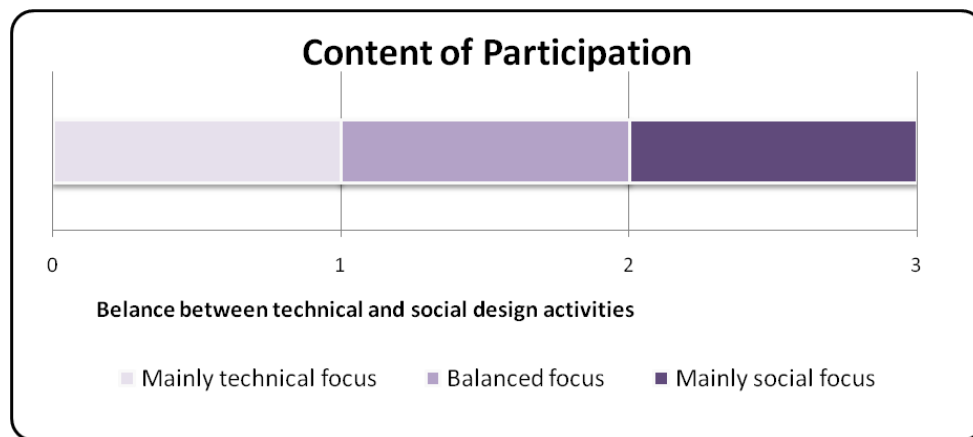
Figure 15: Fictive example of the content of participation

Extent of participation

Description: Extent of participation outlines the fact that user participation can vary in scope during different phases of the implementation process (Cavaye, 1995). This principle was already established by Barki & Hartwick (1994), who defined participative activities as having either an overall occurrence or a stage wise occurrence (see Table 5). The phasing of the user participation process is based on the investigation of ES implementations in section 3.2. Without addressing the iterative nature of the ES implementation process, Figure 16 quickly reminds us of this phasing.
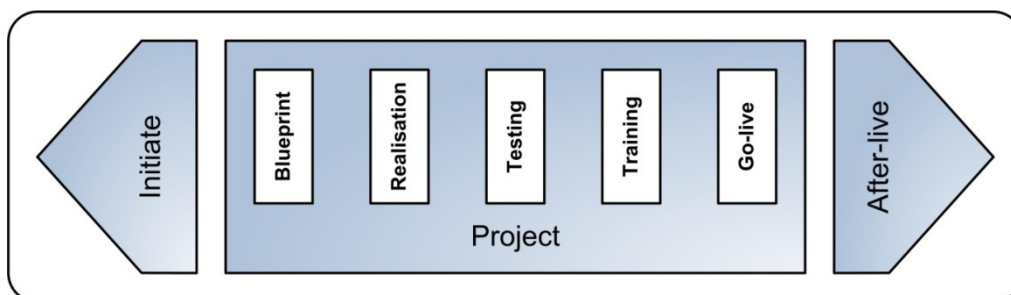
Figure 16: Overview of phases of the implementation process

Even though some participative activities can be executed during all phases of the implementation process, others are only applicable during specific phases. For example, it is common for the key users to be very active during the blueprint phase of the project, while it is likely that their involvement during the realisation phase of the project is more limited (Cavaye, 1995). One of the logical effects of the difference is the introduction of an uneven workload for key users. If not anticipated and neutralized, regular user can also experience uneven workloads because of key users reduced availability for daily operations during participation rush hours.

Measure: In order to gain a sufficient overview of the participation process, it is important to acknowledge and broadly assess the participative activities and their effect during different phases of the ES project (Cavaye, 1995). This can be attained by asking stakeholder about the planning of the participation process and reviewing the relevant planning documentation. A fictive example of the varying degree of user activity during the participation process is shown in Figure 17. In addition to the planning, the stakeholders are also consulted to assess the satisfaction they have in relation to the planning aspects of the participation process.
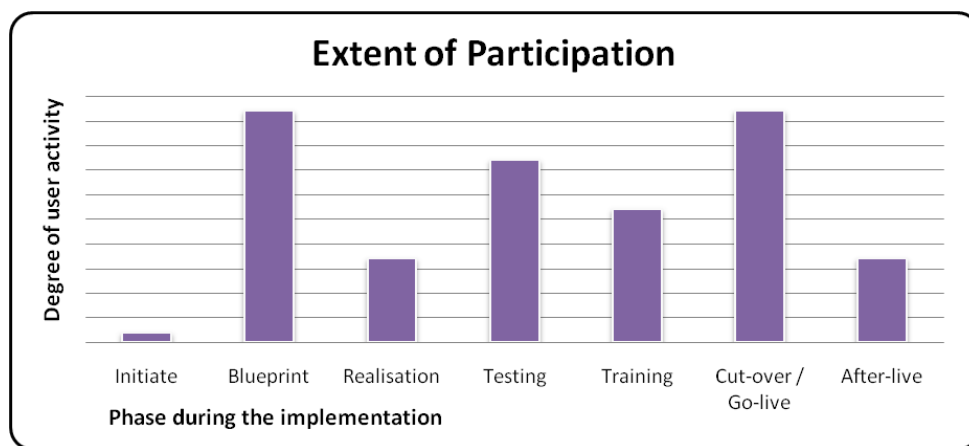
Figure 17: Fictive example of the extent of participation

Influence of participation
Description: Influence of participation addresses the effect that key users have on the development efforts of the new system, through the participation process. As discussed earlier, this should not be confused with the responsibilities of the key users. This degree of participation does not replace a separate measure for the actual influence that users have had on the development efforts. This is especially true for participative efforts that are only used as a window dressing effort aimed at gaining buy-in (Wagner & Piccoli, 2007). In those cases, it is possible that there is an entire user participation process with corresponding user responsibilities in place, giving the impression of user participation. However, no matter the degree of participation, user suggestions or input may be completely ignored. In contrasting cases, those same user suggestions and input might be taken very seriously and lead to major changes in the direction and outcome of the implementation efforts (Cavaye, 1995).

Measure: An assessment of the influence as perceived by the different cooperating stakeholder (especially management and key users, wherever possible supported by documentation) is used to

give a broad indication of the influence key users have exerted on the newly implemented system. The assessment includes an inquiry into the handling of user input as was experienced by the stakeholders. The degree of perceived influence can be displayed in broad categories of influence. A fictive example is provided in Figure 18.
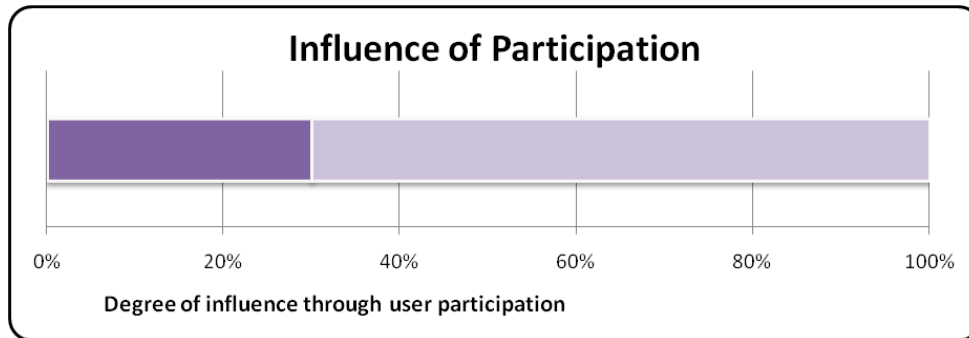
Figure 18: Fictive example of the influence of participation

Formality of participation

Description: Formality of participation refers to the formality of the participative activities. This can range from formally organised groups and teams, holding discussions in official meetings, to participation taking place through informal relationships, discussions and tasks (Cavaye, 1995). The influence of the formality does not have an easily predictable outcome on the participation process. It is merely another dimension to describe user participation. One would expect that rigid project planning and a formal character of the participation process go hand in hand. Even without a clear expectancy, the exploratory nature of this research supports the inclusion of the dimension in the measurement of user participation. The formal or informal character of the participation process could for example influence the perception and participative experiences of the users. In addition, it could be that the level of formality relates to the voluntary or involuntary character of the participative activities, although it is impossible to state that a formal participation process always has an obligatory character.

Measure: Enquiry into the formality of participation consists of a broad measurement of the formal or informal character of the process. Like other dimensions, this can be expressed in a limited number of categories. A fictive example is provided in Figure 19.
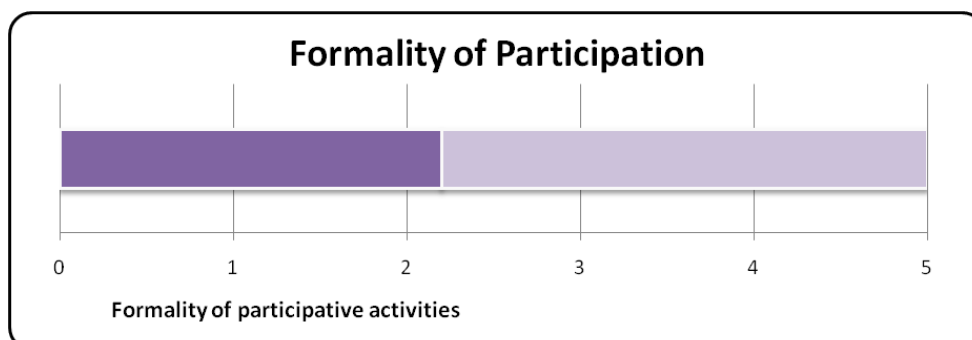
Figure 19: Fictive example of the formality of participation

Overview of the measured dimensions of user participation

The eventual measurement of user participation is a combination of the individual measures of Cavaye's dimensions and the additional sources. These measures are combined into a singular model, which presents an overview of user participation aimed towards the specific context of enterprise system implementations. Figure 20 provides this overview of the different aspects that are included in the measurement model of user participation which will be used in this research.

Overview of user participation dimensions

Type of participation
- Proportion of participants
- Selection of participants
- Preparation of participants

Content of participation
- Technical design focus
- Social design focus

Formality of participation
- Formality of participative activities

Degree of participation
- Degree of responsibility
- Goal of participative process

Extent of participation
- Time expenditure of participants
- Planning of participative process

Influence of participation
- Degree of influence
- Treatment of participant input

Figure 20: Overview of the measure for user participation
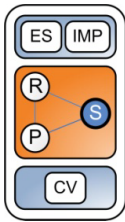
3.5   ES implementations success

It must be clear that success is of key importance for any ES implementation. However, the focus on perceived relevance and user participation in relation to ES implementation success makes it an important variable for this specific investigation. Enterprise system implementation success refers to the successfulness of the enterprise system and the implementation. As discussed in section 3.2, an enterprise system is always the product of a phased project, which in the context of this thesis is referred to as the ES implementation. ES implementation success is dependent on a number of factors that together determine the overall success of the implementation.

The first important differentiation in the assessment of ES implementation success is between the process and the product. The process refers to the ES implementation project, while the product refers to its deliverable: the enterprise system. In practice, the majority of ES implementation methodologies strongly focus on the process aspects of ES implementation success (Esteves, et al., 2005). While research shows that it is important to measure some basic project metrics to assess the implementation process (Bondarouk, 2004), an exclusive focus on time and budget constraints provides an incomplete view on ES implementation success. Beside the project's metrics, the successfulness of the delivered enterprise system also has to be taken into account. It is not self-evident that a successful project, according to the project's efficiency metrics, will by definition result in a good product, namely a successful enterprise system. So in assessing ES implementation success, it is important to measure both the success of the process and the product. This is not invalidated by the likelihood that a relationship or correlation between those two components exists. Therefore, it is deemed justifiable to assess the success of the process and that of the product separately in this research.
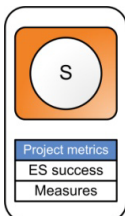
3.5.1   Project metrics

The project's metrics provide an important insight into the quality of the implementation project. Based on assertions by Bondarouk (2004), it can be divided into three related but distinct aspects. The first two aspects are budget and timeline, which display some similarity because both are key resources for a project (in addition to people). The third aspect illuminates the pursuit of functional targets during the project and monitors the presence of the initially planned functionalities in the final product (Bondarouk, 2004). It is very important to acknowledge that functional changes and/or budget and timeline overruns are not necessarily indicators of a poor product (the ES). Project metrics primarily give an indication of the quality of the process. All three aspects will now be discussed in more detail.

Project budget and timeline

Budget and timeline are key project metrics. Both are interrelated and deficits and/or overruns suggest difficulties within the project and thus reflect on the successfulness of the project. A budget overrun can indicates poor planning and/or the occurrence of unanticipated events during the implementation process. Time delays also suggest similar issues that hamper the progression of the project. Both project metrics need to be assessed in the case study organisations' ES implementations.

Based on the experiences of KPMG consultants, a minor deficit or overrun does not necessarily indicate issues and therefore, does not necessitate an explanation. In KPMG's experience, a small deficit or overrun constitutes to a maximum of a 10% budget or timeline deviation. These kinds of deficits or overruns are very common with these kinds of complex projects and do not directly indicate substantial problems. However, a larger overruns can very well indicate the existence of large problems or issues and require a more detailed explanation. Figure 21 and Figure 22 graphically illustrate fictive budget and timeline project metrics.
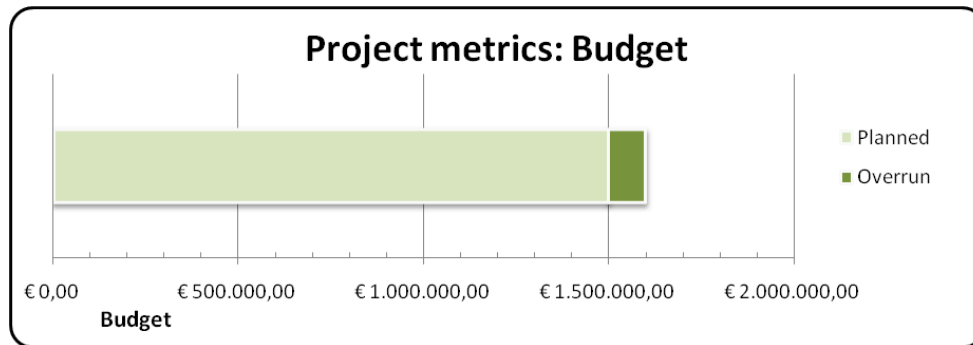
Figure 21: Fictive example of planned budget and possible overrun
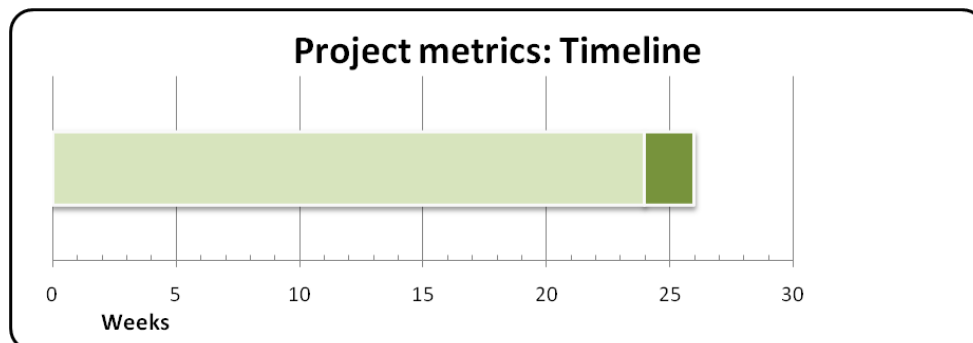
Figure 22: Fictive example of planned timeline and possible overrun

Functionalities

It is common during ES implementation processes that some of the initially specified functionalities are changed along the way. This can have multiple causes. Sometimes progressive insight during the implementation process renders initially planned functionalities obsolete. Progressive insight can also result in additional functionalities because some aspects of the new system had not yet been acknowledged. These dynamics seem to relate to the quality of the planning and blueprint aspects of the implementation process. Loss of functionality is also a way to maintain the original budget and timeline of a project. In essence dropped functionalities can indicate a suboptimal project planning, and concealed budget deficits or timeline overruns. All these suggest reduced implementation project success. Again, based on the experiences of KPMG consultants, when more than 10% of the initial functionalities are changed, dropped, or added, this could indicate extraordinary project difficulties. At that point a more detailed explanation is required in order to assess the influences of those difficulties. Figure 23 illustrates a fictive example of the functionality project metric.
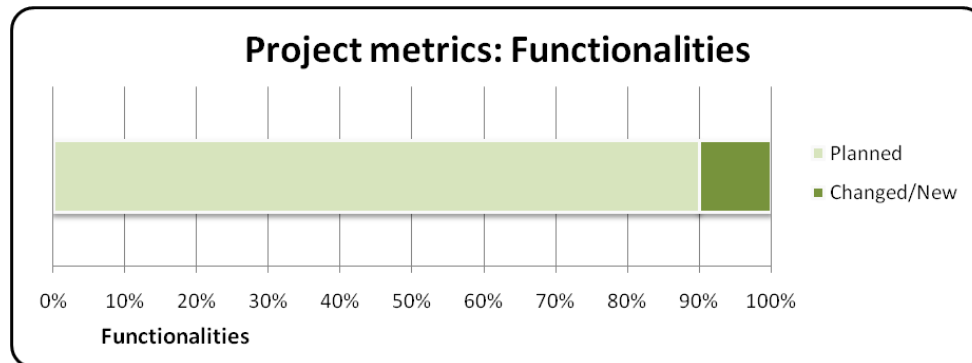
Figure 23: Fictive example of an overview of planned vs. actual functionalities
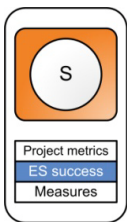
3.5.2 Enterprise system success

Enterprise system success is described in four steps. First, one of the best known IS success models is introduced and discussed: DeLone & McLean's (1992) IS success model. This model provides the foundation for an ES success model, but also has a number of notable flaws in the specific context of ES. Secondly, an ES specific IS success model adaptation by Gable, Sedera & Chan (2003) is presented, which greatly enhances the suitability for an ES setting. Thirdly, the author updates the ES success model by Gable, et al. in two distinct steps, making it even more optimally suited for the specific assessment of ES success. The first step improves the selection of success constructs, while the second step reviews the appropriateness of the individual success measures according to the ES characteristics that have been identified in section 3.1.3.

However, before reviewing and extending existing models of general IS success and more specifically ES success, it is interesting to review a number short but important statements about the ideal measure for ES success and why that approach is implausible. In an ideal setting, information system success is measured in strictly economic terms. Cavaye (1995, p. 319) states: "A system is successful if its return compares favourably with alternative investment opportunities". However, it is very difficult to correctly justify and evaluate the economic effects of intangible costs and especially the benefits of an information system (Cavaye, 1995). Even though it is not possible to express all the ES effects in financial terms, it is still a common tendency observed in practice to evaluate ES in such a manner (Gable, et al., 2003).

DeLone & McLean's IS success model

One of the most widely used and cited IS success models is DeLone & McLean's (1992) IS success model and their successive revision of the same model (DeLone & McLean, 2003). Starting with the original model, it classified existing measures of success into six success constructs (see Figure 24). The model describes a situation where the quality of the IS, which is covered by both a "system quality" and "information quality" construct. These two quality constructs influence the "use" and "user satisfaction" construct. These influence each other, resulting in a relationship in which use of the IS either improves or reduces satisfaction and satisfaction increases or decreases the use of the IS. Then use of the IS and user satisfaction result in an individual impact, meaning that on an individual level the working circumstances change. The changes in individual working circumstances finally impact the manner in which the organisation operates.
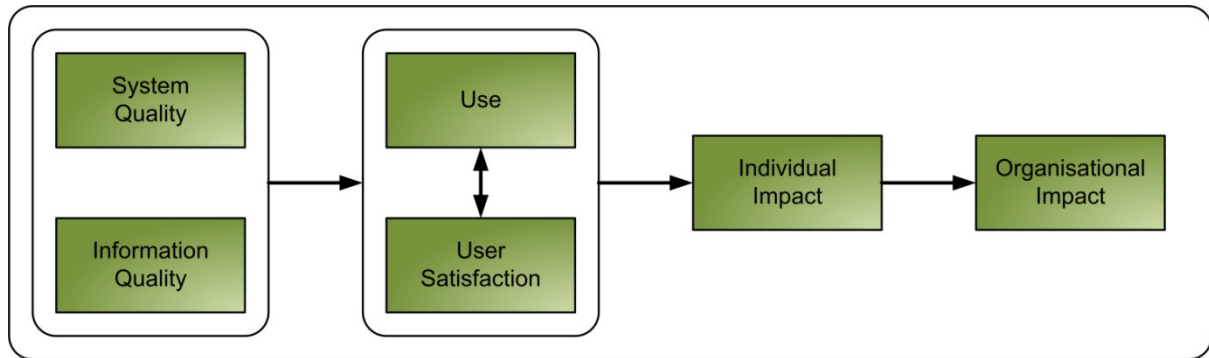
Figure 24: DeLone & McLean's IS success model (1992)

The terms that are used to measure the individual constructs of DeLone & McLean's IS success model are presented in Table 7.

Table 7: DeLone & McLean's (1992) IS success model constructs

Construct	Measures
System quality	Measured in terms of ease-of-use, functionality, reliability, flexibility, data quality, portability, integration, and importance of the system.
Information quality	Measured in terms of accuracy, availability, timeliness, completeness, relevance, and consistency of the information.
Use	Measured in terms of the frequency of use, time of use, number of accesses, usage pattern, and dependency.
User satisfaction	Measured in terms of overall satisfaction, information satisfaction, enjoyment and software satisfaction.
Individual impact	Measured in terms of job performance, decision-making performance and quality of work.
Organisational impact	Measured in terms of operating cost reduction, overall productivity gains, staff reduction and return on investment.

Gable's ES success model

An important feature of DeLone & McLean's IS success model is that it can be adapted for the contextual contingencies that are encountered in each (unique) research setting. This way organisational, technological and system characteristics can be taken into account (DeLone & McLean, 1992). Therefore, it is important to select the appropriate constructs for the measurement of system success in a specific ES context. This has already been attempted by Gable, Sedera, & Chan (2003) in their measurement model for ES success. This existing adaptation of the IS success model is specifically intended for the ES domain (see Figure 25). The figure shows that five of the six success constructs have been reused, al-be-it in a different arrangement.
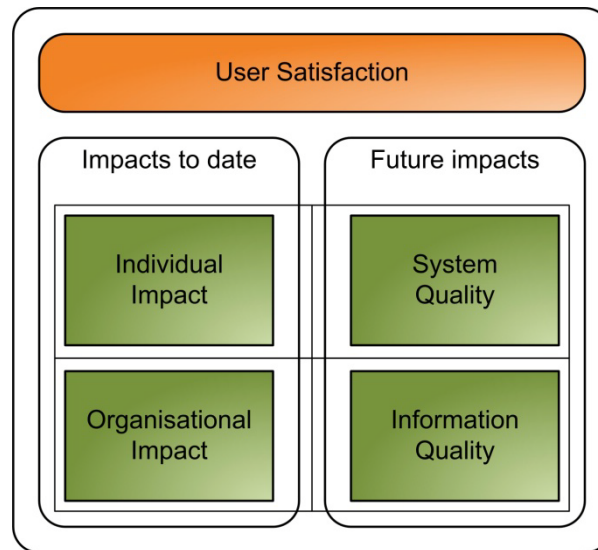
Figure 25: Gable, Sedera & Chan's IS success model (2003)

Gable, et al. have rearranged DeLone & McLean's success constructs and the three most apparent changes are: the removal of the "use" construct, the different placement of the "user satisfaction" construct, and the absence of process or causal relations between the model's success constructs. Gable, et al. discuss these changes in more detail and, more importantly, also illustrate why these specific changes to the IS success model are appropriate in an ES research context.

- **Removal of the use construct.** Similar to DeLone & McLean (1992), a notable number of studies have adopted the "use" construct in order to assess information system success (Bondarouk, 2004; F. D. Davis, Bagozzi & Warshaw, 1989). However, system use is only an appropriate indicator of system success if the use of the system is discretionary or voluntary (Cavaye, 1995). Enterprise systems are a type of system that demand obligatory use (Gable, et al., 2003) and as a result, system use should not be included as a relevant success construct for the measurement of ES success.

- **Changed role of the user satisfaction construct.** According to Gable, et al. (2003, p. 581), "User satisfaction is possibly the most extensively used single measure for IS evaluation". This is confirmed by the literature review of Cavaye (1995, p. 320), who noticed that "the success construct is usually operationalized in terms of user satisfaction, though actual instruments used to measure the construct vary". In the context of systems that require mandatory usage, user satisfaction is an especially accepted indicator. This means that user satisfaction is a valuable indicator in the ES context and an appropriate alternative for the measurement of ES success. The user satisfaction construct does not reflect a dimension of ES success (like the other four success constructs do) but is a separate measure of overall ES success (Gable, et al., 2003). This explains the separate placement of the user satisfaction construct as an individual measure of success (as was seen in Figure 25).

As user satisfaction is in literature acknowledged as a separate measure for ES success, this research chooses an analogous approach with regard to implementation success. User

satisfaction with regard to the implementation project is expected to be a valuable separate measure for the implementation success as discussed in 3.5.1 and will be used accordingly.

- **Absence of process or causal relations.** Additionally, the ES success model sets itself apart because it does not depict processes or causal relationship between the success constructs like the model by DeLone and McLean (Gable, et al., 2003). Gable, et al. very consciously excluded causal relations from their model because of a lack of theoretical grounding, the weak explanation for causality, and the mixed results from empirical studies into the causality of the success constructs. Instead of a process or causal model, Gable et al. differentiate between the impact of the system to date and the future impact of the system. The individual and organisation impacts can be used to assess the benefits that have followed from the system up until the moment of measurement, while the quality dimensions reflect the future potential of the system.

Adapting Gable et al.'s ES success model

The ES success model by Gable, et al. (2003) is a solid starting point for the assessment of ES success. However, advancing insight in the academic community makes a thorough review and revision of Gable, et al.'s model appropriate, as the current approach is determined to be not optimally suited for this research context. The rationale to customize Gable, et al.'s (2003) ES success model of are twofold:

- **Model completeness.** The first reason to change the existing model is to make it more complete. At the same time that Gable, et al. (2003) created their ES success model, DeLone & McLean (2003) revised their general IS success model. Because the ES success model is based on this IS success model, it is important to see how those new insights have altered the model and whether these changes are also relevant in the ES context. One of the major changes that has been implemented by DeLone & McLean is the introduction of a new success construct. This new construct aims to explicate the importance of service in an e-commerce setting and is named service quality. Because of the complexity of ES training and usage, the author deems it appropriate to include this new construct in the success model for ES. Even though DeLone & McLean intended the construct of service quality to represent the level of service provided to external customer in an e-commerce setting, it can be used to assess the level and quality of the (technical) support for ES end users during their daily routines. This support was not explicitly covered by any of the other two quality constructs.

The service quality constructed is measured in terms of responsiveness (the degree to which the ES support gives prompt service to users), assurance (the degree to which ES support has the knowledge to do their job well), and empathy (the degree to which the ES has the users' best interest at heart) (DeLone & McLean, 2003). The service quality construct is incorporated into the new model for ES success, as can be seen in Figure 26.
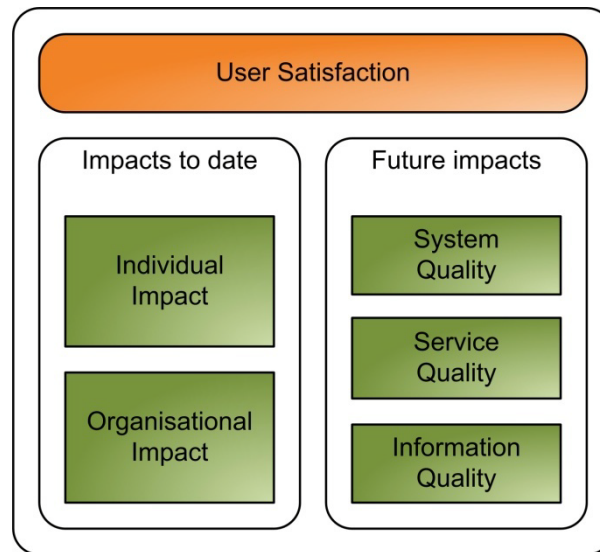
Figure 26: Adapted ES success model (DeLone & McLean, 2003; Gable, et al., 2003)

- **Qualitative vs. Quantitative.** The second reason for change of the existing model is to compensate for the differences in research methodology. The quantitative nature of the ES success model of Gable et al. (2003) requires a different approach in this qualitative research setting. Both Gable, et al. and DeLone & McLean (1992, 2003) have adopted a quantitative approach that requires a large data set and therefore extensive access to case study organisations. An objective assessment of the actual success of the enterprise systems that have been implemented in the case study organisations requires a thorough investigation. Unfortunately, access to these organisations is limited within the scope of this research project. In addition, ES success is only half a variable among multiple key variables that are under investigation. A greatly reduced set of measures, which incorporates only the essence of the above discussed aspects of the ES success model, could prove the solution. A moderated version of the ES success will be incorporated in the ES implementation success assessment.

Making the IS success construct more ES specific

Each of the success constructs that have been identified and selected thus far are mainly defined in terms of DeLone & McLean's (1992) IS domain measures. Even though most of these measures are relevant in an ES setting, it is valuable to determine which of these measures offer more or less explanatory value when specifically assessing ES success. The importance of the ES success measures is established by assessing them in relation to the ES characteristics, which separate enterprise systems from the broader collection of non-specific information systems. The ES characteristics have been presented in section 3.1.2 and are repeated in Table 8.

With the ES specific characteristics as a frame of reference, all the success constructs (see Table 7) are reviewed and discussed in order to make them (more) ES specific. The characteristics of an enterprise system emphasises certain measures of the success constructs, while others can be disregarded. This is expressed in terms of a simple ordinal scale with three values. In comparison to a

Relevance, participation and success in ES implementations

general IS setting, a measure of an success construct can be "very important within an ES setting", "as important within an ES setting" and "not important within an ES setting".

Table 8: ES characteristics (Katsma, 2008; Kawalek & Wood-Harper, 2002)

ES Characteristics	Description
Ch.1	ES encompass many organisational functions and support end-to-end process chains
Ch.2	ES are bought commercial-off-the-shelf (COTS)
Ch.3	ES employ best practices
Ch.4	ES make data and information available in real time
Ch.5	ES are supplied by a single supplier
Ch.6	ES are customizable

One-by-one the measures of the individual success constructs are reviewed.

- **System Quality**

  A high importance for *ease-of-use*, *reliability* and *data quality* measures are justified by the dominant role an ES plays in the organisation (ch.1). Especially the importance of the *reliability* and the *data quality* measures are reinforced by the real-time data/information constraints put forth by ES (ch.4). Contrary, the *portability* and *importance of the system* are two measures for which the importance is reduced by the characteristics of ES (ch.1). The scale and complexity of ES make the need for multi-platform support irrelevant. Furthermore, since all ES are very important, it will be unnecessary to differentiate on the *importance of the system*. Accordingly, these two measures can be ignored within the current ES context. The measure for the *functionality* of the system has already been touched upon in section 3.5.1. Still, for ES success (unlike implementation success) the focus lies on how well functionalities fit with the actual needs of the organisation, instead of conformance to the initial requirements. However, its importance is acknowledged by the use of best practices in ES (ch.3). Finally, the importance of the measures for the *flexibility* of the system and the ability to integrate with other systems (*integration*) is indicated by the constraint that ES need to be customizable (ch.6).

- **Service Quality**

  The scale and complexity of enterprise systems stress the demand and requirements for end user support (ch.1). An ES is primary application that steers major parts of the end-to-end process chains in an organisation. In general, many end users are depending on it. Therefore apt and adequate *responsiveness* and *assurance* of the IT support staff is key for maintaining an effective and efficient system.

- **Information Quality**

  The need for real-time information provision makes the *availability* and *timeliness* measures for the information quality very important (ch.4). However, some measures of information quality are deemed less important in an ES setting. As the system is supplied by a single

supplier, the internal *completeness* and *consistency of information* is expected to be high, reducing the importance of these measures (ch.5). Still, many exceptions can be expected when the ES is dependent on other applications for its data and information needs. The *accuracy* is a point of focus due to the large amount of data and information that is present in ES, stemming from the scale and complexity of such systems (ch.1). Finally, the *relevance* of the information in the system is not more or less important than in other types of IS, justifying moderate attention during the assessment of information quality.

- **User satisfaction**

  The specific characteristics of enterprise systems make certain measures of user satisfaction more important. The high reliance on information in an ES setting, in addition to the dominant position of such a system in the organisation, lead to a higher importance of *information satisfaction* (ch.1). The constraint of real-time information provision emphasises the importance of *information satisfaction* (ch.4). Based on the central role and wide spread use of ES within an organisation, the *enjoyment* of users is also expected to be an above average indicator for user satisfaction, and thus system success (ch.1).

- **Individual impact**

  The *job performance* of users is in an ES context more important than in a general IS setting. It is again the dominance of enterprise systems through its end-to-end process chains that make the impact on *job performance* greater than can be expected from a "normal" IS implementation (ch.1). The same invasive nature of enterprise systems, in combination with its focus on best practices, is expected to have a similar effect on the other two measures of the individual impacts, namely the *decision-making performance* and the *quality of work*. This makes all three measures especially important for the assessment of the individual impact.

- **Organisational impact**

  ES implementations are by definition aiming to have a large organisational impact. Not only does an implementation entail a large scale IT project, it also requires large changes in the end-to-end process chains and the work routines of (the majority of) employees of the organisation (ch.1). In addition, best practices and better access to industry standards should help to attain productivity gains and cost reductions (ch.3). Combined with the large scale of the required investment of resources, all organisational impact measures are expected to be very important for the measurement of ES success. However, despite their importance, it is very well possible that the scale and the complexity of ES make these specific success measures difficult to assess in real world organisations.

The process of making the success constructs more ES specific improves the assessment of ES success. After this construct-by-construct discussion of success constructs in relation to ES characteristics, an overview of the results is graphically presented in Table 9.

Table 9: Importance of IS success measures within an ES setting

ES success Constructs		
Legend:		

Δ Difference in importance of a measure within an ES setting
(+) Measure is <u>very important</u> within an ES setting
(=) Measure is <u>as important</u> within an ES setting
(-) Measure is <u>not important</u> within an ES setting
Ch. ES characteristic(s) that is/are responsible for the difference in importance
1 ES support end-to-end process chains (across many organisational functions)
2 ES are bought commercial-off-the-shelf (COTS)
3 ES employ best practices
4 ES make data and information available in real time
5 ES are supplied by a single supplier
6 ES are customizable

System quality	Δ	Ch.	User satisfaction	Δ	Ch.
Ease-of-use	(+)	1	Overall satisfaction	(=)	
Functionality	(+)	3	Information satisfaction	(+)	1,4
Reliability	(+)	1,4	Enjoyment	(+)	1
Flexibility	(+)	6	Software satisfaction	(=)	
Data quality	(+)	1,4			
Portability	(-)	1,2			
Integration	(+)	6			
Importance of the system	(-)	1			

Service quality	Δ	Ch.	Individual impact	Δ	Ch.
Responsiveness	(+)	1	Job performance	(+)	1,3
Assurance	(+)	1	Decision-making performance	(+)	1,3
Empathy	(=)		Quality of work	(+)	1,3

Information quality	Δ	Ch.	Organisational impact	Δ	Ch.
Accuracy	(+)	1	Operating cost reduction	(+)	1,3
Availability	(+)	4	Overall productivity gains	(+)	1,3
Timeliness	(+)	4	Staff reduction	(+)	1,3
Completeness	(-)	5	Return on investment	(+)	1,3
Relevance	(=)				
Consistency of the information	(-)	5			
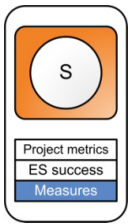
3.5.3   Measuring ES implementation success

Based on the review of ES (implementation) success literature a composite approach to assess ES implementation success has been selected. After careful deliberation, this composite measure consists of three separate measures:

- **Project metrics** The first measure focuses on the implementation process and determine some of the basic financial, time-related and functionality project metrics. These metrics provide insight into the quality of the implementation project.

- **Enterprise system success** The second measure focuses on the success of the enterprise system. This is required because even outstanding project metrics do not necessarily reflect a successful ES or vice versa. ES success is assessed by inspecting a set of basic success constructs, consisting of a number of quality dimensions of the system and the individual and organisational impacts. These ES success constructs have been made ES specific by reviewing them in relation to the ES characteristics.

- **User satisfaction** The third and final measure focuses on user satisfaction. User satisfaction can be used as a separate determinant to substantiate the outcome of the ES success assessment. Analogous to the adoption of user satisfaction to substantiate ES success, user satisfaction is also adopted in relation to the implementation process. This way user satisfaction adds an additional measure to the success of the implementation process, in addition to the assessment of project metrics.

Combined these three measures provide a qualitative composite measurement of ES implementation success. All three measures and their underlying aspects are shown in Figure 27.
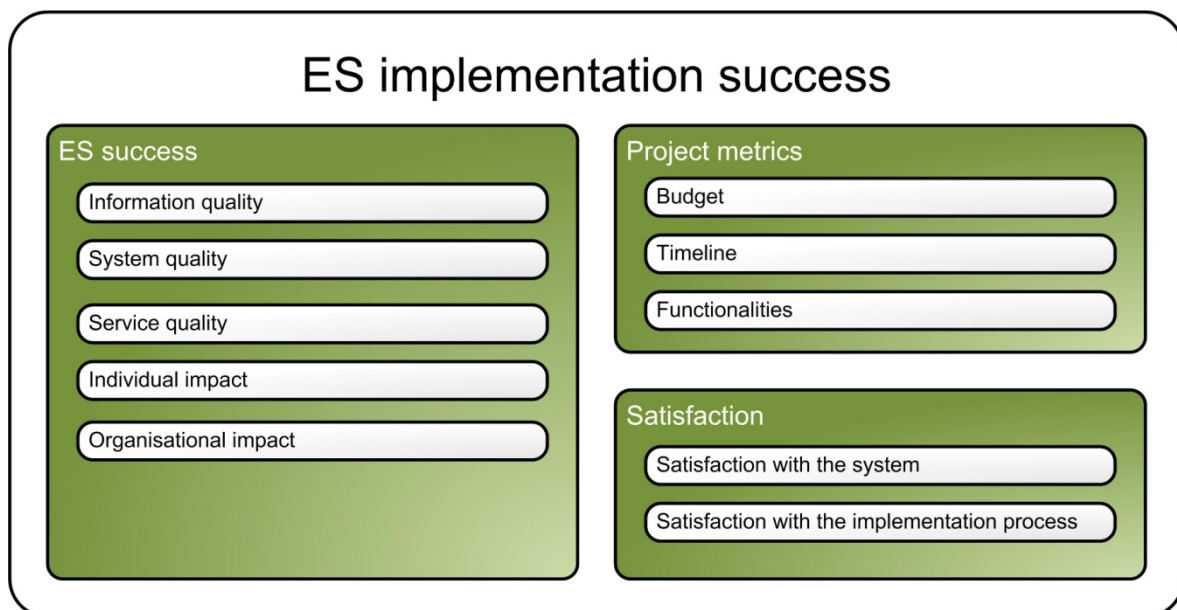
Figure 27: Overview of ES implementation success measures
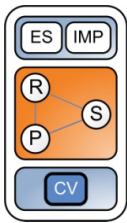
3.6   Confounding variables

In order to make a correct assessment of perceived relevance, user participation and ES implementation success, it is important to take into account the influences of confounding variables. If these would be left out of the equation, the confounding variables could distort the measurement results of the individual key variables, greatly reducing the validity of the findings of this research. This approach helps to validate the correct assessment of the independent variables perceived relevance and user participation and the dependent variable ES implementation success. Beside the important effect this approach has on the accurate measurement of the variables, it will improve the comparability of the different cases.

The confounding influences are presented in the same order as the three corresponding key variables. The confounding factors are studied individually for each of the three key variables. This way the most important distorting aspects that influence the users' perception of relevance, the effectiveness of the participation process and the successfulness of the ES implementation can be acknowledged. The distortion of perceived relevance, the contingency factors and the critical success factors are illustrated in Figure 28.
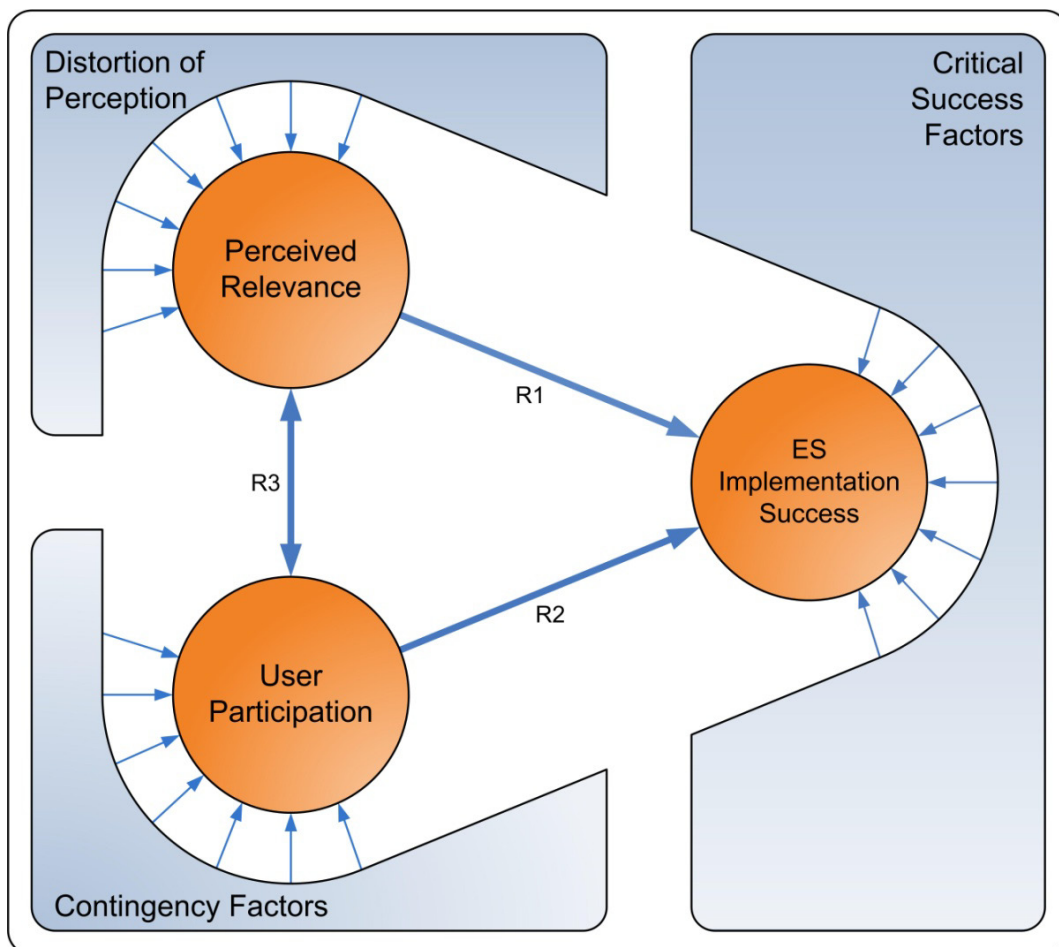
Figure 28: Confounding variables

Not all three categories of confounding variables require the same amount of attention. The differences in the approach of the confounding variables are defended by two important arguments:

- **Complexity.** The first argument is the contrast in complexity between the perceived relevance variable on one side and the user participation and ES implementation success variables on the other. Perceived relevance is a more one dimensional variable, while both user participation and ES implementation success are more complex, multidimensional, variables. Logically, this has consequences for the complexity of the assessment of the key variables and that of related confounding variables.

- **State of existing research.** The second argument for alternative treatment of the different confounding variables is the difference in academic attention that especially the more complex key variables have received so far. ES implementation success has received large amounts of focused attention through all critical success factor research. Especially with regard to the specific ES implementation context, critical success factor research has been well developed (Finney & Corbett, 2007). Contrary, user participation contingency factor research misses such a focus in the ES context. Therefore, critical success factor research is adopted more readily than the user participation contingencies research, which needs to be assessed in more detail. Note that in the case of perceived relevance the degree of detail is not sought after due to the above statement about the complexity of the individual variables.
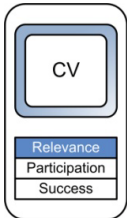
3.6.1 Distortion of perceived relevance

Besides the perceived relevance influencing factors that are presented in section 3.3.2, this research hypothesises that there are additional influences. For these influence to be part of the confounding variables it means that those are external to the ES implementation process. The relevance or value that every future user perceives is dependent on his/her preconceptions and his/her previous experiences or the lack thereof. Unanticipated influences on the perceived relevance are expected to show up during the case study research. The complexity of human psychology requires for unanticipated influences to be expected. So possible influenced are, though certainly not exhaustive:

- The users' experiences with customers and/or suppliers that underwent an ES implementations.
- The users' experiences with other large IT projects (both in current organisation as well as with possible previous employers).
- The users' general knowledge of IT systems and more specifically ES systems.
- The users' interest in IT.
- The experiences of acquaintances in the users' personal or professional sphere.

Measuring the distortion of perceived relevance

When measuring perceived relevance in a case study setting, it will be important to investigate the foundation on which interviewees base their expectations. This is not overly complex and will help to assess the external influences on the perceived relevance of the interviewee. Official communiqués also offer an indication of the level of information that is internal or external with relation to perceived relevance.
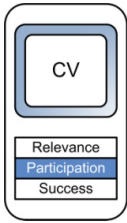
3.6.2 Contingencies for user participation

CV

Relevance
Participation
Success

Cavaye (1995) has put together contingency factors that influence the outcome of the participation process. These contingencies, which relate to certain circumstances around the new system and in the adopting organisation, influence user participation. Cavaye focuses on IS implementations in general and his contingency variables or factors are divided in three categories; organisational factors, project related factors, and user related factors (Cavaye, 1995). The description and implications of these factors from an explicit ES perspective are included in Appendix A.

Based on the review of the contingencies presented in Appendix A, it can be concluded that especially the organisational and user-related factors are important when objective measurement of user participation is an issue. It is to be expected that all the project-related factors, which can influence the participation process, are fairly constant when the research is carried out in the context of ES implementations. This can be logically explained because ES implementations are generally a comparable type of project with a similar scale. These kinds of project share the far-reaching changes that such processes introduce into an average organisation. As a result, the project-related factors do not require further investigation in this assessment of confounding variables. An overview of the significance of the different contingencies is provided in Table 10.

Table 10: Overview of relevant contingencies of user participation

Contingency factors	
Legend: √ = significant X = not significant	
Organisational	
Time for development	√
Financial resources available	√
Top management commitment	√
Project-related	
Degree of task-structure	X
Project complexity	X
Initiator of the project	X
Technology available	X
Expected change brought by the system	X
User-related	
Willingness to participate	√
Ability to participate	√
User characteristics and attitudes	√

It is anticipated that there is a relation between user-related factors, especially the "willingness to participate" and the perceived relevance variable of this research. Since perceived relevance is a key variable, the influence of this variable on user participation is one of the focus points of this research and will be discussed in more detail later on.

Measuring contingency factors

The relevant contingency factors need to be included in the data collection protocols. Project-related factors do not require investigation because of the similar characteristics of enterprise systems. Contrary, the organisational and user-related factors require assessment in each of the case study organisation. The organisational factors overlap with the information sources that are already labelled as important. The time and budget constraints of the user participation can be derived from the assessment of the project metrics of ES implementation success. Ahead of the discussion about critical success factors, top management support is also included CSF and will be assessed there. That leaves the user-related factors. The specific focus of this research towards perceived relevance shows some overlap with the user-related factors that influence the participation process. The appropriate measures for the user-related factors are discussed below.

- **Willingness to participate** It is anticipated that perceived relevance motivates the users' involvement in the participation process. Willingness to participate seems to implicate a relation to perceived relevance. Therefore, the willingness to participate should be included in the assessment of the motivation to participate. This also closely relates to the selection and preparation of the participating users.
- **Ability to participate** The (key) user's ability of participate has an impact on the participation process. Coincidentally, this factor also relates to the selection and preparation of the users, which, besides their intrinsic qualities, influence the users' ability to participate. This is already (at least partially) discussed in the evaluation of the selection criteria.
- **User characteristics and attitudes** The interaction between key users, user and specialists is important for the outcome of the user participation. As confounding variable, this aspect of the participation process should be included in the investigation.
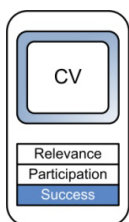
3.6.3 Critical success factors for ES

To date no successful, universal, all encompassing set of guidelines and rules concerning ES implementation projects exists. There is, however, a large amount of research on the topic of critical success factors of ES implementation available (Finney & Corbett, 2007), which can be used to be aware of the most threatening pitfalls. Critical success factor (CSF) research, in the domain of ES implementation, has proven to be a much taken approach in order to examine ES implementation success and failure (Finney & Corbett, 2007). This body of research can help to identify and take into account additional influences on the ES implementation success variable (beside perceived relevance and user participation). CSFs mark the areas that must be managed adequately for the ES implementation objectives to be attained successfully (Ngai, Law & Wat, 2008). The CSF literature review by Finney and Corbett (2007) provides a set of most important critical success factors from which the top 10 is presented in Table 11. In order to control for confounding variables within the scope of this research, only the top ten most important CSFs are taken into considered.

Table 11: Top 10 critical success factors (Finney & Corbett, 2007)

#	Finney & Corbett
1.*	Top management support
	Change management
3.*	Business process reengineering and software configuration
	Training and job design
5.	Project team: the best and brightest
6.	Implementation strategy and timeframe
7.	Consultant selection and relationship
8.	Visioning and planning
9.	Balanced team
10.	Project champion
* Shared 1st and 3rd place	

There are a couple of important notes that are important to mention in relation with such a list of CSFs. For example, Finney and Corbett (2007) observe that change management is seen as an essential factor for successful ES implementation. The impact of change management is twofold; it is included as an individual CSF, but at the same time it also influences the other CSFs (Finney & Corbett, 2007). In other words, they conclude that there is an interrelation between the change management factor and the other factors. This notion is reinforced by Akkermans and Helden (2002), who point out that CFSs are mutually related. Akkermans & Helden make a strong argument for the interrelated nature of all CSFs, as they observe that these kinds of selections of CSFs consist of interfering factors which have substantial causal relations among themselves. The factors combine positively or negatively and result in either virtuous or vicious cycles in ES implementations (Akkermans & van Helden, 2002). This makes disentangling the web of individual CSFs and their effect on the ES implementation success a fairly complex matter. The CSFs are not individually illustrated because of the generality and familiarity of these factors in the ES domain.

Measuring interference of CSFs

Due to the complex organisational context of every single ES implementation, an extensive check and comparisons for every CSF is unrealistic within the bounds of this research. Therefore only the major issues and complications are registered. This can be done by assessing the critical and memorable incidents that have occurred during the ES project. These incidents can then be linked to critical success factors.
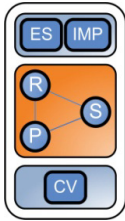
3.7 Summary of key variables and confounding factors

The literature study provides the fundamental aspects required to assess the three key variables in a specific ES context. The ES (implementation) context has been described in sections 3.1 and 3.2, while the key variables have been studied and conceptualized in sections 3.3, 3.4, and 3.5. Together with the evaluation of confounding factors in section 3.6, the combined set of elements provides a comprehensive model of the key variables within the ES implementation context. Figure 29 provides an overview of all the key elements discussed in this chapter.
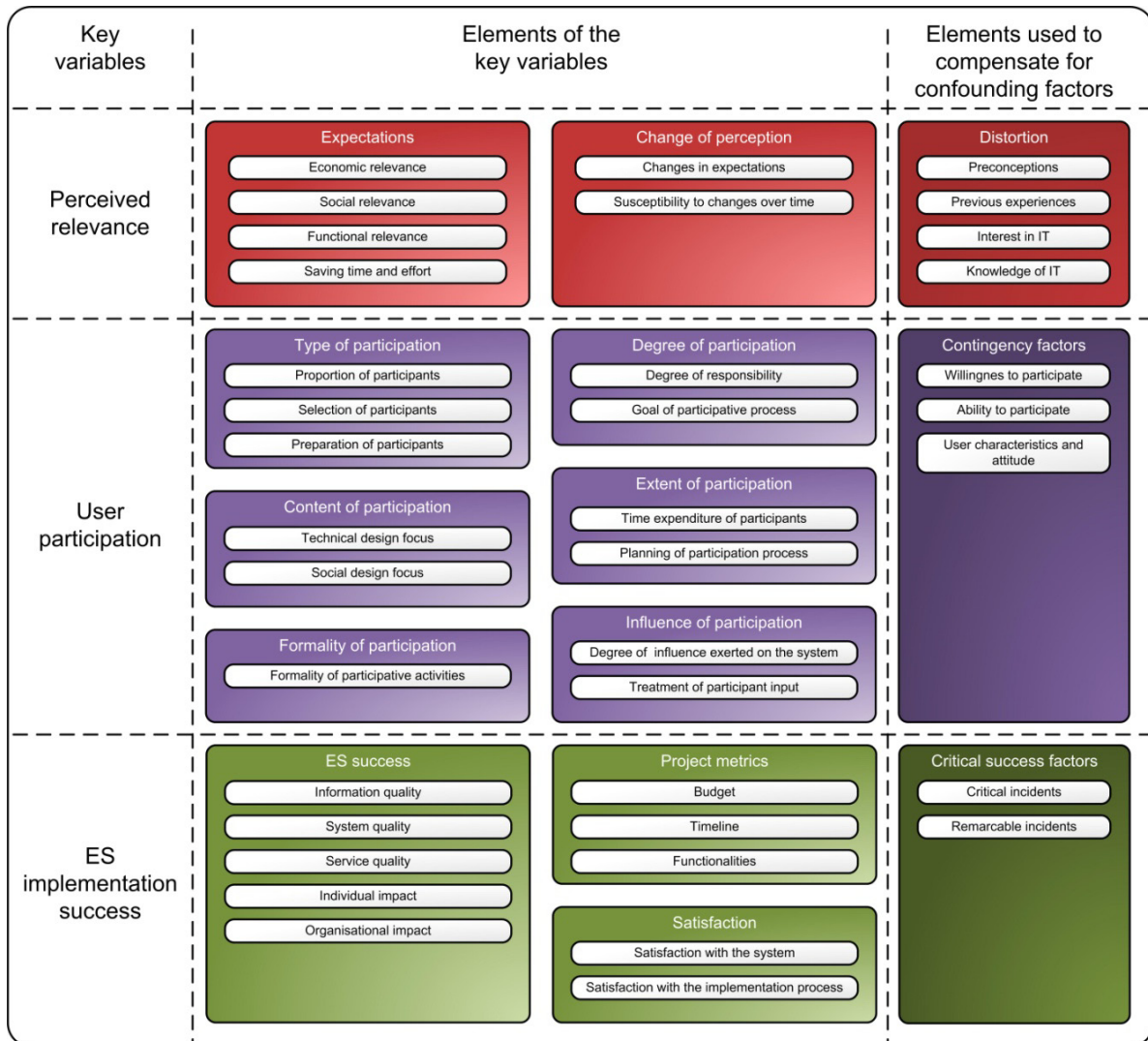
Figure 29: Overview of all aspects of the key variables and confounding factors

The conceptualizations of the key variables, the confounding variables and the contextual ES elements provide the essential input for the qualitative theoretical framework that describes the relationships between the key research variables. This theoretical framework is based on additional literature sources, the presented aspects of the key variables, and logically justified assumptions made by the author. This theoretical framework is presented in the next chapter.

4   Relations in the theoretical framework

The relationship between user participation and perceived relevance and its effect on ES implementation success is the focal point of this research. In this chapter the theoretical model, presented in chapter 1, is revisited and adopted as the theoretical framework. The theoretical framework presents the conceptualized relationships between the three key research variables that have been defined and operationalized in chapter 3. Due to the focus of this investigation, it is especially important to gain an in depth understanding of the relationship between participation and relevance and its effect on ES implementation success. After revisiting the theoretical model, this chapter discusses the research procedures for the investigation of the relationships within the theoretical framework. These two initial sections are then followed by the assessment of each of the relationships under investigation and a summary. Table 12 shows the structure of this chapter.

Table 12: Overview of chapter 4

Section	Content
4.1	Theoretical model revisited
4.2	Procedure for investigating relationships
4.3	Effect of participation on relevance
4.4	Effect of relevance on participation
4.5	Effect of participation and relevance on success
4.6	Summary of the theoretical framework

4.1   Theoretical model revisited

The theoretical model as presented in this research was first discussed in section 1.5. It represents the focus of this research and Figure 30 (a) shows this model again. In it, the relations between perceived relevance and ES implementation success (R1) and between user participation and ES implementation success (R2) are relatively intuitive (which is not meant to entail that they are easily conceptualized or demonstrated). The mutual relationship between perceived relevance and user participation (R3), which is a central theme in this research, is less intuitive. The relationship's effect on ES implementation success is also not very transparent and therefore difficult to assess.

An alternative representation might clarify the logic behind the implied relationship R3 and its relation with ES implementation success. Shown in Figure 30 (b), it allows for a step by step assessment of this mutual relationship. It is essentially the same diagram as Figure 30 (a), but emphasizes the influence both dependent variables have 1) on each other (solid lines) and 2) through each other on ES implementation success (dashed lines). In the figure, relations R4 and R5 show the untwined relationship between perceived relevance and user participation. This split allows for a unidirectional assessment of the bidirectional relationship and its effect on ES implementation success.
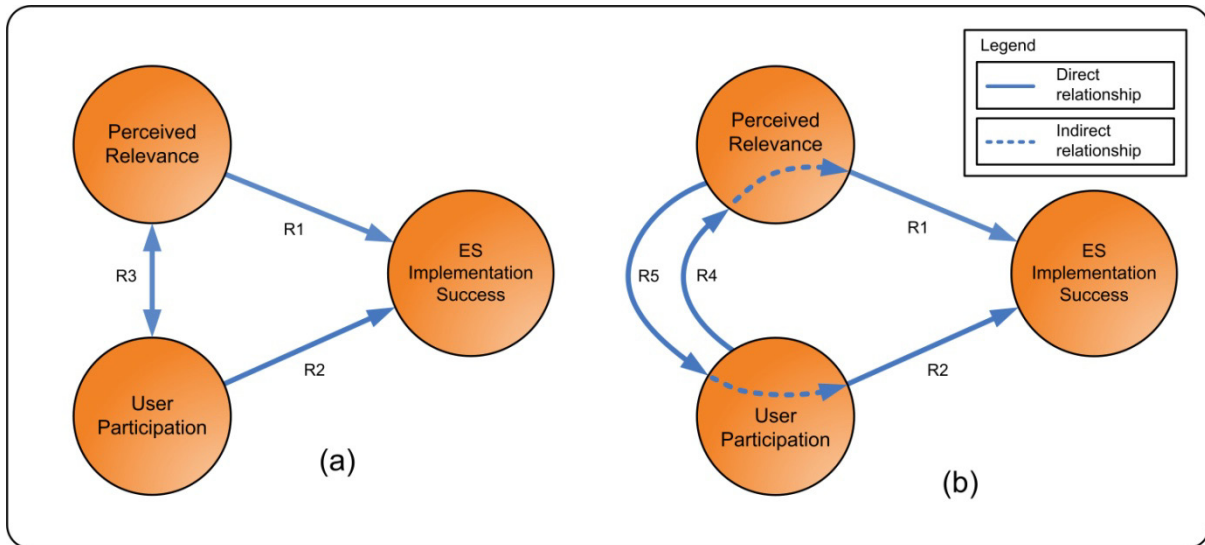
Figure 30: Review of the theoretical model and an alternative interpretation

In the investigation of the relationships between key variables, it is interesting to see whether there is "only" a direct effect of perceived relevance and user participation on ES implementation success or that improvement of one of the key variables leads to both a direct and indirect improvement of ES implementation success. In other words, it would be interesting to see if there is a certain degree of synergy between user participation and perceived relevance.

The revisited theoretical model helps to identify the relationships that need to be investigated. There are a number of main relationships/interactions of key variables that require investigation (also indicated in Figure 30). These are the relationship between perceived relevance and user participation (R3), and the effect of perceived relevance and user participation on ES implementation success (R1 and R2).

For a clearer and less complex perspective on the bidirectional relationship between perceived relevance and user participation, it is split in two unilateral relationships (as is suggested in the theoretical model in Figure 30 (b)). The resulting four relationships are assessed unilaterally, each consisting of an independent variable that affects a dependent variable. The relationships will be discussed in the order that is shown in Table 13.

Table 13: Overview of the important relationships

Independent Variable(s)		Dependent variable	Relation	Discussed where?
User participation	→	Perceived relevance	R4	Section 4.3
Perceived relevance	→	User participation	R5	Section 4.4
Relevance, Participation	→	ES implementation success	R1, R2	Section 4.5

4.2 Procedure for investigating relationships

The next step is to investigate the relationships between the key variables. Formalizing a procedure for the investigating the relations in the theoretical framework acknowledges the fact that a structured approach is required in order to describe the relationships between the key research variables consistently. Due to the scarcity of qualitative analysis and descriptions of the relationships in academic literature, the literature that is available is supplemented with hypothesized mechanisms that are logically induced by the author. The hypothesized mechanisms describe cause-and-effect chains for the four relationships under investigation. As these relationships lack a qualitative description in academic literature, the hypothesized mechanisms try to help fill the gap. Using induction, the mechanisms provide insight into the interaction of the key variables of this research. Their purpose is to provide a starting point from which the qualitative relations between key variables can be explored and refined. As stated before, the structured assessment of the different relationships is important. Therefore, each of the four relationships is founded on 1) academic literature, which leads to 2) the synthesis and an overview of hypothesized mechanisms, followed by 3) preliminary conclusions which present the overall patterns among mechanisms and the hypotheses that qualitatively describe the respective relationship.

4.2.1 Foundation for the line of reasoning

The foundation for the line of reasoning is provided by a discussion of available and relevant academic literature sources. This way, an attempt is made to identify central connecting concepts, through which the independent variable(s) can influence the dependent variable. In addition, mediating factors can be identified upfront. Figure 31 illustrates the importance of finding these connecting concepts and mediating factors: formulating such intermediary concepts and/or factors respectively increases the explanatory power of the theoretical framework and allows for the conception of a more detailed theory.
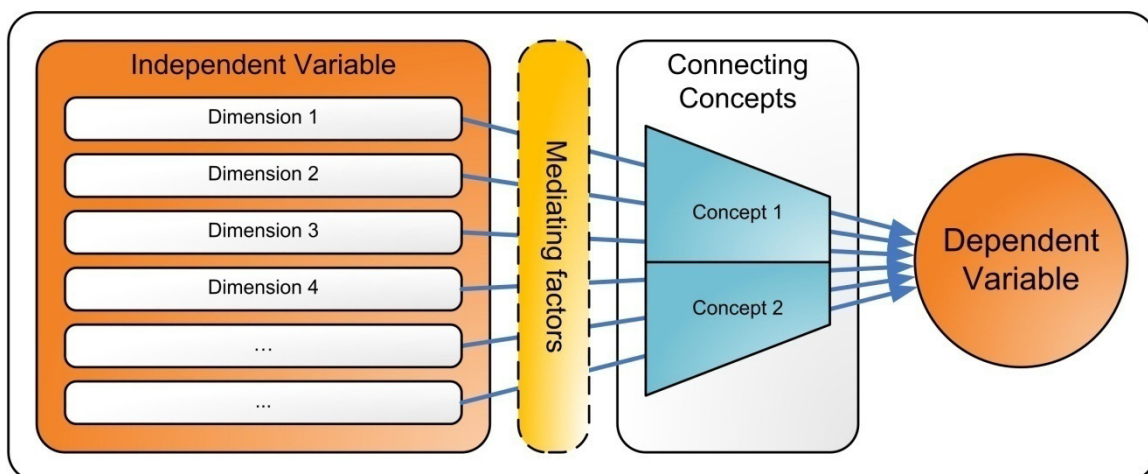
Figure 31: The role of connecting concepts and mediating factors

The relationships between relevance, participation and success are primarily, although not exclusively, supported by findings and observations of Barki & Hartwick (1994), McGill & Klobas (2008), Cavaye (1995), Katsma, et al (2007), Wagner & Piccoli (2007) and Pasmore & Fagans (1992).

4.2.2 Relationship in detail

In this second part of the investigation of the individual relationships the ES specific mechanisms are formulated, presented and discussed. These hypothesized mechanisms aim to provide a qualitative description of the relation between the independent and dependent variables within this specific IS research domain. The hypothesized mechanisms are constructed through induction, using the available literature sources as a foundation for the line of reasoning. Summarizing, the hypothesized mechanisms need to: reflect the academic literature, employ an ES specific research focus, and take into account the two indentified central perspectives (content and process), the latter of which will be discussed shortly. However, because the overall analysis of hypothesized mechanisms is the focus point of this research, the actual description of the individual mechanisms is not included in the main body of this document, but can be found in Appendix B.

An accompanying methodology, which is used to identify and formulate the hypothesized mechanisms in a structured fashion, is also of great importance for the reliability and consistency of this research. So, in addition to the entire set of hypothesized mechanisms, the methodology that is used to identify, formulate and structure the mechanisms is also included in the same Appendix B.

Overview of mechanisms

The qualitative nature of this research requires a more detailed conceptualization of the three relationships under investigation. In order to assist the conceptualization process, one can analyze the relationships from multiple perspectives. The two perspectives that are relevant in the context of this investigation are a content-oriented perspective and a process-oriented perspective. The focus of the content perspective on the key variables is straightforward: perceived relevance, user participation and ES implementation success (or their underlying characteristics) affect each other on a content level (as implied by the theoretical model). The process-oriented perspective is included because of the emphasis the ES implementation puts on the process and the timeline. As explained in section 3.2, ES implementations are always executed by means of a project, with a finite timeline. This perspective allows for the investigation of the effect of time on the interactions between variables.

Together these two perspectives help to structure both the logical formulation of the individual mechanisms (which can be found in Appendix B) and are essential for the presentation of an overview of these mechanisms. The overview is a key element in the process of defining the three relationships between the key variables. Now a discussion of the two perspectives in more detail follows.

Content-oriented perspective

From a content-oriented perspective the examination of the relation between the variables is focused on the dimensions and individual aspects of each of the key variables, which have been identified during the literature study (the summary of chapter 3 can be consulted for a complete overview). The theoretical framework, of which the relationships are defined in this chapter, needs to address the effects of a key variable's individual aspects on the other two key variables. The content-oriented perspective of the theoretical model is shown in Figure 32 and illustrates the relationship between the variables with regard to the content.
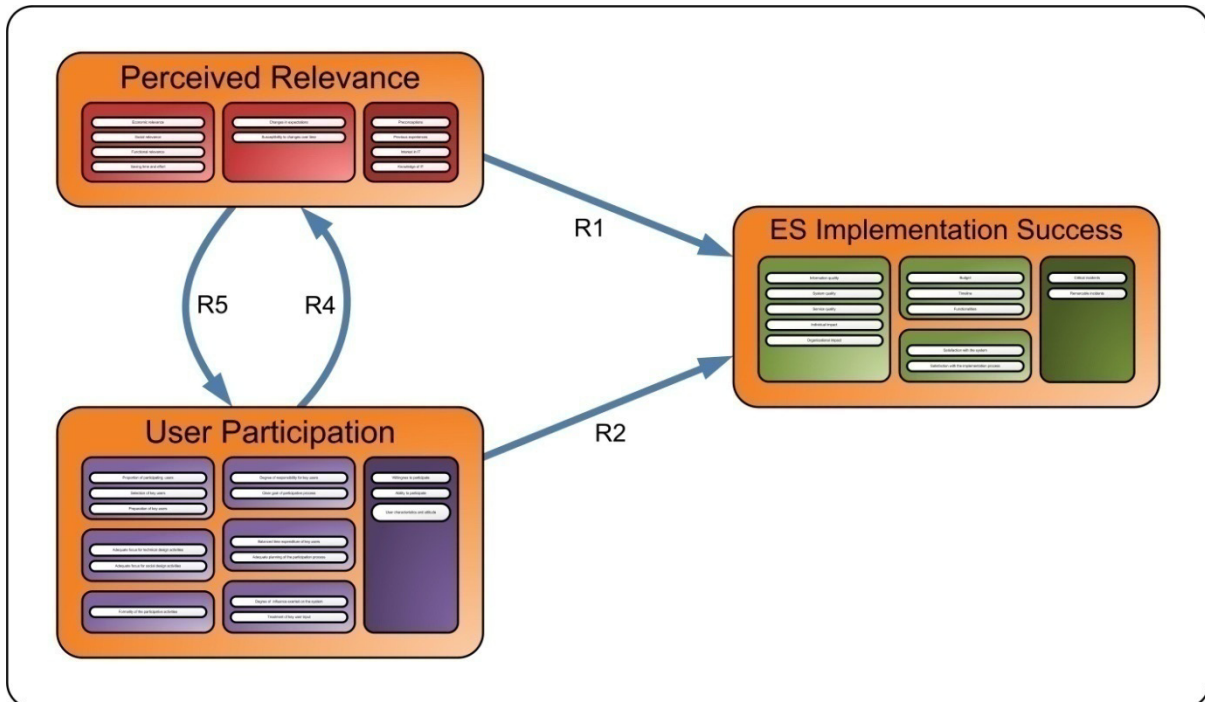
Figure 32: Content perspective on the relationships between key variables

This content perspective shows similarities to the quantitative research performed in the field of ES implementation domain. Both the content perspective of this research and the larger body of quantitative research try to relate (the aspects of) this research' key variables to each other (Katsma, 2008). However, a major difference in the approach taken by this research is the focus on a rational and logical model, which qualitatively explains the interactions between variables instead of only supplying statistical proof for the correlation of variables and factors.

Process-oriented perspective
An exclusive focus on the interactions between the key variables without any attention for the timing of the interactions would neglect a very important facet of the force field between the key variables. This is confirmed by Wagner and Piccoli (2007), who emphasize the importance of timing of user participation in relation to the ES implementation process. This suggests that the interaction between key variables is also dependent on the moment in time those interactions occur. Figure 33 provides an overview of the relationship between the key variables from a process perspective. During the implementation process perceived relevance and user participation affect each other, as can be seen in the figure. However, both variables do not start to affect each other and the implementation process simultaneously. As soon as the future end users of a new system become aware of its implementation, a perception of relevance starts to form. Assuming a participation process takes place, perceived relevance is pre-existent to this user participation process. As soon as the participation process takes off, perceived relevance and user participation are expected to start their interaction. The after-live stage and the interactions from that moment onwards are outside the research scope.
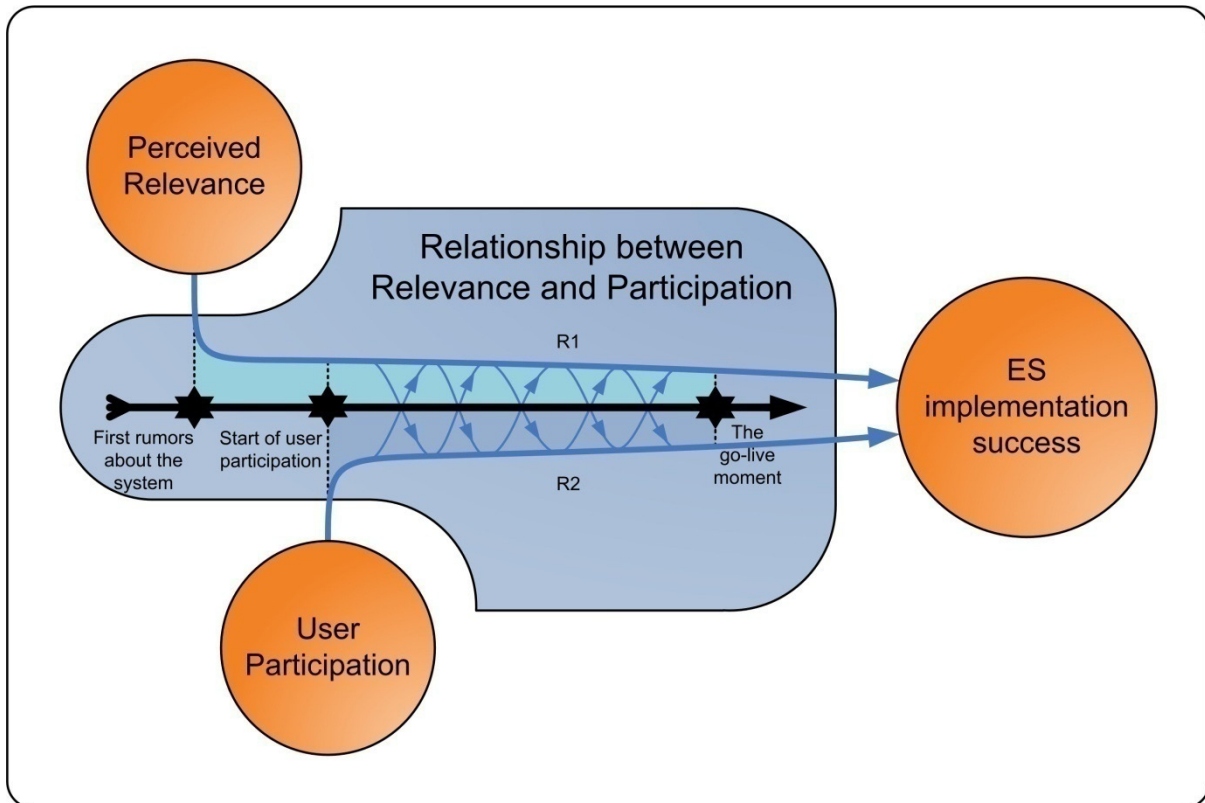
Figure 33: Time-oriented perspective on the relationships between the key variables

From this perspective it is important to emphasize the adopted definition of user participation, which has been presented in section 3.4. This research narrows down the definition of user participation as end users who play an active role in the implementation process and have been selected with that intention. Therefore, a simple notification of the upcoming change process is not recognized as a form of user participation, even though some researchers, like Pasmore & Fagans (1992), might label it as such. If this would be the case, even the first minor rumour about the new system could be interpreted as the start of the user participation process, leading to overly complex and blurry boundaries.

Regarding the start of the user participation process, Barki and Hartwick's (1994) activity-oriented view is adopted: participation starts when users actively take part in implementation activities. Participation activities generally start to take place after the implementation is initiated, which is mostly during the project phases of the ES implementation.

4.2.3 Preliminary conclusion

The preliminary conclusion provides a summary and overview of the respective relationship under investigation. Based on the overview of the qualitative hypothesized mechanisms provided in this section, overall patterns in the complete set of mechanisms are identified. These patterns are a valuable result of this research and describe an important part of the relationship between the three key variables in their ES context.

In addition, the preliminary conclusion presents the hypotheses that are the result of the theoretical assessment of each of the relationships, emphasizing the most important findings. The order in which the hypothesized mechanisms are presented in Appendix B does not really offer a structure for the discussion of an overview. Therefore, the hypotheses are ordered according to the timing of their impact during the ES implementation process. The ES implementation process has been extensively described in the literature study in section 3.2 and illustrated in Figure 34. As mentioned before, the after-live stage of the process is not reviewed as it falls outside the boundaries of this research.
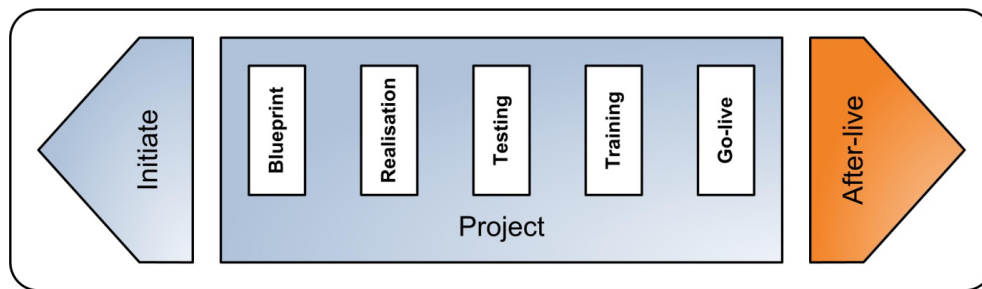
Figure 34: Timeline of the ES implementation process

It is important to note that many aspects of the independent variable(s) are planned during the initiate stage of the ES implementation process. However, even though many of those aspects are planned at the start of the ES implementation, the impact on the dependent variables will only become apparent for users as the project progresses. Therefore, it has been a deliberate choice to discuss the hypotheses related to the mechanisms in the stage/phase where their effect on the dependent variable is most dominant.

4.3 Effect of participation on relevance

One of the key relations that is being studied in this research is the effect that user participation has on the perceived relevance of a new ES. The examined relationship and its position in the theoretical frameworks are presented in Figure 35. Based on theoretical consideration adopted from literature, a set of hypothesized mechanisms is proposed. These mechanisms describe the impact of perceived relevance on user participation in a qualitative manner. Finally, an overview of recognized patterns and hypothetical implications is provided.
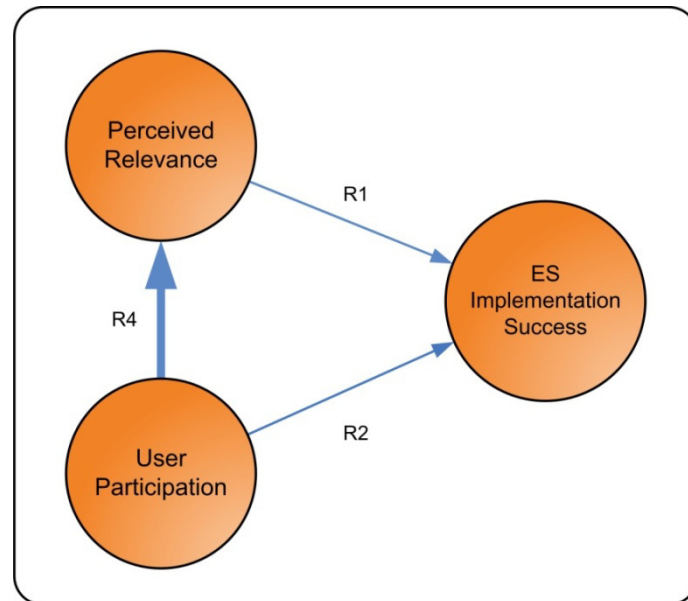
Figure 35: The effect of user participation on perceived relevance
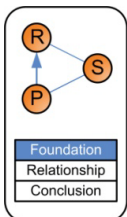
4.3.1 Foundation for line of reasoning

The high-level relationship between participation and relevance is mentioned in some literature sources, but most noteworthy by Barki & Hartwick (1994). Without providing conclusive validation, Barki & Hartwick note that, in their research, user participation was found to affect user involvement (perceived relevance) and user attitude. The three proposed connecting concepts, which Barki & Hartwick explicitly mention, are used as a departure point for the exploration of the theoretical foundation of this relationship.

Barki & Hartwick's proposed explanations
Barki & Hartwick's three connecting concepts are:

- **Influence:** Users may satisfy their needs through their influence on the project.
- **Ownership:** Users may develop feelings of ownership.
- **Understanding:** Users may develop a better understanding of the new system and how it works.

Besides the three concepts suggested by Barki & Hartwick's, no additional connecting concepts have been identified in academic literature. Still, relevant and important observations and findings of other researchers have been incorporated within the connecting concepts identified by Barki &

Hartwick. These observations and findings are used to confirm or reject the applicability of the three connecting concepts in the relation between user participation and perceived relevance. Additionally, these literature sources are also used to better define the relationship. When a relation exists, the identified concepts are very important for the formulation of hypothesized mechanisms. As a result, the mechanisms that define the relationship between user participation and perceived relevance are formulated in terms of their impact on these identified concepts.

Influence

By influencing the new system, participants have the opportunity to tailor the system to their specific needs (Barki & Hartwick, 1994). Through participation, they improve the eventual quality of the system as they provide valuable insight, and in turn improving the system's relevance and value for themselves. This notion is supported by McGill & Klobas (2008), who found that user participation determines the relevance of a system for the participants. As expected, this is not the case for non-participants, who are inclined to base their perception of relevance on the perceived quality of the system (McGill & Klobas).

Corresponding with Barki and Hartwick's suggestion, Katsma, et al. (2007) also anticipate that the relevance of the new system for end users is influenced by the implementation project (and thus user participation). Although Katsma, et al. made this remark with a focus on relevance in general (so both perceived and actual relevance), the perceived relevance of the system is expected to change based on the influence users can apply on the system during development. Katsma, et al. take a subtly different perspective than Barki and Hartwick, stating that participation has an important function to "realize" the relevance of the new system. It is the "realize" that is very interesting in this research context, showing user participation explicitly as a tool to "realize" relevance. This is concurrent with the field of research labelled "user centred design", which provides a solid foundation for the importance of the involvement of users during system development (Gulliksen, et al., 2003).

On the whole, asserting that user participation provides a means for users to influence the system under development, there is a strong indication that this influence will affect the perceived relevance of the system. The effect on perceived relevance results from the idea that the incorporation of the users' needs and preferences into the new system will increase its relevance as perceived by those users. In addition, the notion that perceived relevance is at least partially realized by user participation is of great importance.

Ownership

By offering participants the possibility to co-create the new system, user participation can improve the participants' user involvement and user attitude (Barki & Hartwick, 1994). As participants are actively involved in the implementation and investing time in the new system, they can get emotionally attached to the system. The system becomes an artefact that the participants themselves helped to create. In addition, success or failure of the system reflects on the participants, making a successful system the preferred outcome regardless of the actual outcome. Failure would suggest that everybody involved in the project failed, including the participants. As a result, participating users have an ulterior motive to make the system successful, reducing their objectivity

in the assessment of the quality of the system, which was implemented with their assistance. This is confirmed by observations of McGill & Klobas (2008), who found that the relevance of the system for participants depends more on their role in the participation process than the actual system quality. This is not the case for non-participating users, who do derive the relevance of the system from the system's perceived quality.

However, the perceived relevance construct used in this research omits a direct effect of emotional interferences on it. Barki & Hartwick (1994) explicitly attributed affective feelings to the user attitude construct. Even though it might be important to be aware of the users' attitude towards the system, this link to perceived relevance is indirect at best. It is important to note that the effect of emotions on user involvement (perceived relevance) is recognized by Barki & Hartwick, who observed that their respondents had a relatively rough and undifferentiated set of thoughts and feelings towards the system during the earlier phases of the project. In their experience, this undifferentiated set of thoughts and feelings develops and matures into a more differentiated set as the implementation project advanced. User participation might play an important role in this maturation process because of the resulting engagement with the project. This is in line with the previous section where the notion that user participation actually realizes perceived relevance was discussed.

Altogether, It seems very probable that user participation results in the development of feelings of ownership among participants. These feelings of ownership affect the attitudes of users towards the new system. However, the perceived relevance construct lacks such an emotional or affective dimension. Barki & Hartwick explicitly choose to differentiate between the relevance, value and importance of a system for the users and the users' affective and emotional attitude towards it. Therefore, in our understanding, perceived relevance does not incorporate this emotional or affective dimension that is here described as a by-product of user participation. It is possible that the act of participation helps to differentiate the participants' feelings and beliefs into user involvement (perceived relevance) and the more affective user attitude during the implementation process. This would confirm the expected importance of user participation for the realization of perceived relevance, suggested by Katsma, et al. (2007).

Understanding
By co-developing the new system, participants not only have some form of control over the project's outcome, they get a preview of the system and how it will operate. So the participants have a superior understanding of the design and inner workings of the system, compared to non-participating end users (Barki & Hartwick, 1994). The improved understanding of the new system includes its processes, functionality, realization, and user interface. As a result, participants will be better able to assess whether or not the system under development complies with their needs, affecting perceived relevance. The effect of understanding on perceived relevance is not by definition positive, as is illustrated with the following example: a better understanding of a poorly designed or low quality system also confronts participants with the gap between their needs and what is provided for by the system, in all likelihood reducing the participants' perceived relevance. However, given that the system meets the expectations of the participants, a better understanding

makes the system and the related organisational changes more tangible and transparent, improving its perceived relevance.

Additionally, according to Katsma, et al. (2007) user participation also enables and facilitates a dialogue between the different stakeholders that are participating in the implementation project. This notion is corroborated by Katsma and Schimmel (2008; 2007). The dialogue helps to create understanding and communicate respective viewpoints that otherwise could have led to misunderstanding and therefore a decline of the relevance as perceived by individual stakeholders. By understanding each other's respective viewpoint, users will be able not only to look at their own interests but also the interests, and thus the perceived relevance, of the system for their colleagues. It seems highly likely that the understanding for the in the ES context inevitable compromises, which are likely to reduce the relevance of the system for some users, leads to a less profound effect on the perceived relevance. Users will be better able to oversee the overall relevance of the system. Finally, understanding at least partially alleviates the uncertainty and the fear that is associated with the large-scale (organisational) change that is generated by a new ES (Lin & Shao, 2000).

All things considered, depending on the match between de the system and the participants' needs, a better understanding of the system and its inner workings is likely to have an impact on the perceived relevance. When the future way of working is more tangible and transparent for the participants, this is expected to improve the accuracy of their perceived relevance. In addition, an improved understanding of the overall enterprise system, opposed to understanding of only a specific domain of the system, helps to ease any negative effects that the unavoidable compromises will have on the individual's perceived relevance.

Reflection on the reviewed academic literature

The previous discussion of academic literature will be used as the basic assumptions on which further logical induction is founded. However, it seems an important mediating factor in the relationship of user participation and perceived relevance is missing. Some aspects of user participation should not be excluded even if they do not directly affect the discussed influence or understanding (the concepts that define the relationship between user participation to perceived relevance). It is assumed that aspect of user participation that impact the overall effectiveness and/or efficiency of the participation process could still have an indirect impact on the influence and understanding that user participation helps to create. Even though this is not a central concept in the relationship between user participation and perceived relevance, the additional intermediary factor needs to be incorporated in the theoretical framework.

Quality of participation

Based on the literature assessment, influence and understanding are major concepts that help define the relationship of user participation with perceived relevance. While it may be that not all aspects of user participation have a direct effect on these two concepts, it is expected that some of those aspects might still have an indirect effect on perceived relevance through the quality of the participation process. It is theorized that the aspects of user participation that affect the quality of the user participation process have an indirect effect on the influence that is wielded trough it and the understanding it brings to the participants. Therefore, quality of participation is proposed as a

separate mediating factor that is important for the relationship between user participation and perceived relevance and the timing of its interaction.

All in all, it is expected that some aspects of user participation will have an indirect or mediated effect on perceived relevance through their impact on the quality of participation. Furthermore, it is expected that the effect of still other aspects of participation on perceived relevance will be mediated by the quality of participation. In both cases, the quality of participation affects the user participation's influence and understanding and thus perceived relevance. As a consequence, it is important to note that in these cases the timing of such effects on perceived relevance will ultimately be dictated by changes in the quality of participation, instead of changes in the actual aspects of participation.

Overview and importance of discussed foundations.

During this induction-driven investigation of literary foundations, three important concepts have been reviewed that potentially define the relationship between user participation and perceived relevance. Of these three, only ownership does not fit within the relationship because perceived relevance lacks an affective element. The two other concepts (influence and understanding) are expected to play a central role in the formulation of the mechanisms that are used to describe the hypotheses. This is illustrated in Figure 36.
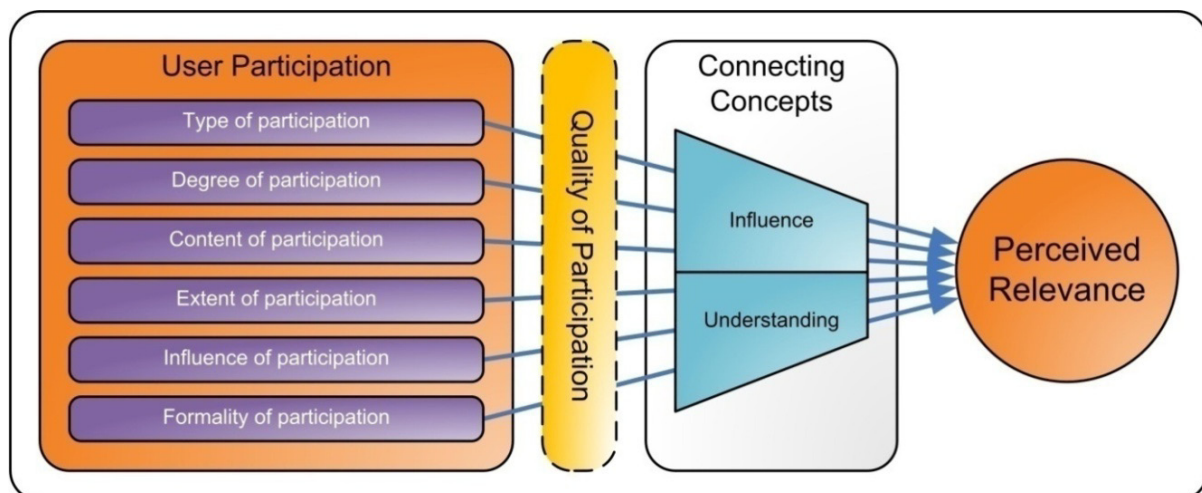
Figure 36: Overview of the dimensions of user participation in relation to perceived relevance

Each of the user participation dimensions, and more specifically the underlying aspects of participation, needs to be related to at least one of the connecting concepts in order to justify a hypothesized mechanism that couples user participation to perceived relevance. The figure shows "quality of participation" as a mediating factor through which aspects of user participation can affect the influence and understanding. This way, "quality of participation" allows for an indirect, mediated effect on perceived relevance. Unrelated but important to note, the figure might seem to indicate a link between particular participation dimensions and certain connecting concepts, but this unintentional. The next section provides such insights.
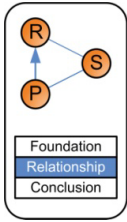
4.3.2   Relationship in detail

The review of the existing literature along the lines set out by Barki & Hartwick (1994), shows that a remarkably low degree of detail is used to describe the effect of participation on relevance. The high level connections that make up this relationship are only described with broad strokes, resulting in the two identified connecting concepts: "influence" and "understanding". Detailed mechanisms that couple the underlying aspects of user participation to perceived relevance are especially lacking. Therefore, a detailed assessment each of the user participation dimensions in relation to perceived relevance is required in order to create a qualitative relational scheme. One by one, each dimension of participation and more specifically their underlying aspects are reviewed. Based on the literature study of user participation, Cavaye's (1995) participation dimensions again provide the structure for the discussion and formulation of the hypothesized mechanisms (also see Figure 36).

In order to maintain readability, only the overview of hypothesized mechanism is presented here, in the main body of this document. However, a lengthy description of each of the 11 individual mechanisms is included and can be found in Appendix B. An encompassing interpretation of the mechanisms, the identification of overall patterns, and the hypotheses are presented in the preliminary conclusions in section 4.3.3.

Overview of mechanisms

The two discussed perspectives are essential in the development of an encompassing overview that incorporates each of the identified mechanisms. All hypothesized mechanisms have been described in terms of both the content-oriented and process-oriented perspective. First, the content-oriented perspective is used to provide an ES specific overview of the different types of mechanisms that have been found. This information is further augmented by linking the mechanisms to the two connecting concepts through which user participation impacts perceived relevance. Secondly, the process-oriented perspective helps to envisage the impact of the hypothesized mechanisms on perceived relevance over time. An ES implementation process dictates a specific sequence of implementation stages and project phases. Although all hypothesized mechanisms have been described thoroughly in Appendix B, only those mechanisms that are expected to have an effect on perceived relevance are focussed upon.

Content-oriented perspective

Based on the methodology that was announced at the start of this chapter, every mechanism is described in terms of its impact on the influence and understanding, through which user participation impacts perceived relevance. In addition, each hypothesized mechanism has a specific type of relation with perceived relevance: a direct relation, a mediated relation or no relation (ignorable relation). The overview of hypothesized mechanisms is presented in Table 14 and incorporates both facets for every mechanism. It shows all dimensions and underlying aspects of user participation and their (mediated) relation with perceived relevance through the connecting concepts of influence and understanding.

Table 14: Anticipate relationship between participation on relevance

User participation aspects	Anticipated effect on perceived relevance	
Legend: **√ = Direct relation** **◊ = Indirect/Mediated relation (by "quality of participation")** **X = No/Ignorable relation**		
Dimensions & Aspects / Connecting concepts → ↓	**Influence**	**Understanding**
Type of participation		
Proportion of participants	◊	◊
Selection of participants	√	√
Preparation of participants	√	√
Degree of participation		
Degree of responsibility	√	X
Goal of participation	X	X
Content of participation		
Balance between technical and social design	√	√
Extend of participation		
Time expenditure of participants	◊	X
Planning of participation	X	X
Influence of participation		
Degree of influence	√	X
Treatment of participant input	√	X
Formality of participation		
Formality of participation	◊	X

Observing the complete set of hypothesized mechanisms, it is visible that all dimensions of user participation and the majority of underlying aspects have a hypothesized direct or indirect/mediated effect on perceived relevance (9 out of 11 aspects). In most cases, the direct mechanisms offer logical cause-and-effect chains, some of which might even be called evident (consult Appendix B for detailed description of each of the 11 mechanisms). The mediated mechanisms proved to be less transparent relationships. As mentioned before, the quality of participation is a special factor: it represents an indirect impact on the influence and understanding of participation and therefore allows for the expression of mediated effects on perceived relevance.

Finally, only two aspects of user participation seem to have no relation with perceived relevance, but this is not entirely true. During the assessment of the effects of the goal of participation and the planning of participation on perceived relevance in Appendix B, it was determined that both factors have already been taken into account by other aspects in their respective dimensions. While the goal of participation and the planning of participation are important in the assessment of the user participation process, it is assumed that their importance in relation to perceived relevance can be neglected, as other aspects in their respective dimensions already cover the impact on perceived relevance. As a result, their impact is not further discussed in the remainder of this research.

Process-oriented perspective

The project structure of ES implementations ensures an important role for the process-oriented perspective when reviewing the entire set of hypothesized mechanisms. As part of this investigation, every aspect of user participation that has a direct or mediated relation with perceived relevance has been assessed for the impact of timing (the ES implementation process). The ES implementation process has been described in section 3.2 of the literature study. Based on the extensive exploration of each mechanism, Figure 37 presents a more detailed view on the direct effects of user participation on perceived relevance over the course of ES implementation project, while Figure 38 shows the mediated effects of participation on relevance (mediated by the quality of participation). The figures are used to condense multiple elements of the assessed mechanisms into a single view. To prevent unclearness some additional clarifications are provided:

- **For both figures:** The height of each graph is used to expresses the sensitivity or strength of that particular mechanism. This can be interpreted as the degree of change that the particular aspect of participation can exert on perceived relevance, at a certain stage or phase during the implementation process, given the state of each of the aspects of participation. As can be seen in the figure, for all aspects of user participation the sensitivity changes over time. While these aspects are expressed in terms of the in Appendix B presented scale, the impact of each mechanism is based on the ordinal scale that was adopted in the design of the theoretical framework. The impact ranges from a strong positive effect to a strong negative effect and is expressed in terms of ++, +, =, -, -- (the line between the plus sign and the minus sign being the equal sign). The sensitivity of the mechanisms is also elaborated on in Appendix B.

- **Figure 38**: These graphs presents the aspects of user participation that are mediated by the "quality of participation". The proportion of participation, the time expenditure of participants and the formality of participation all exhibit a comparable mediated effect on perceived relevance. These aspects of participation impact perceived relevance the moment that they increase or decrease the quality of participation. The connecting concepts play a central role here, linking the quality of participation to perceived relevance. Due to the indirect nature of the relationship these three mechanisms can only be coupled to the project stage and it is difficult to determine in which phase these mechanisms have the most profound impact on perceived relevance.
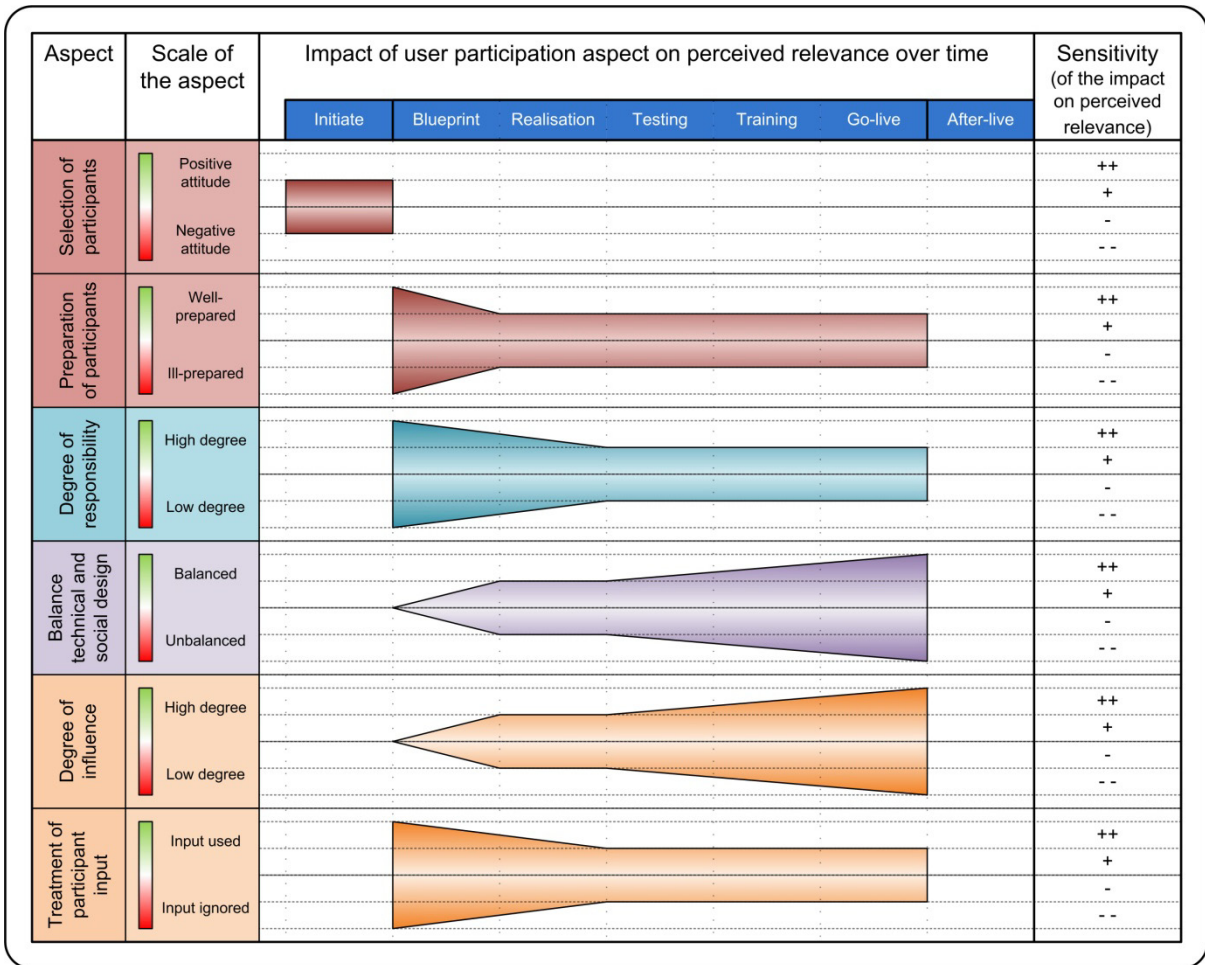
Figure 37: Anticipate direct effects of participation on relevance
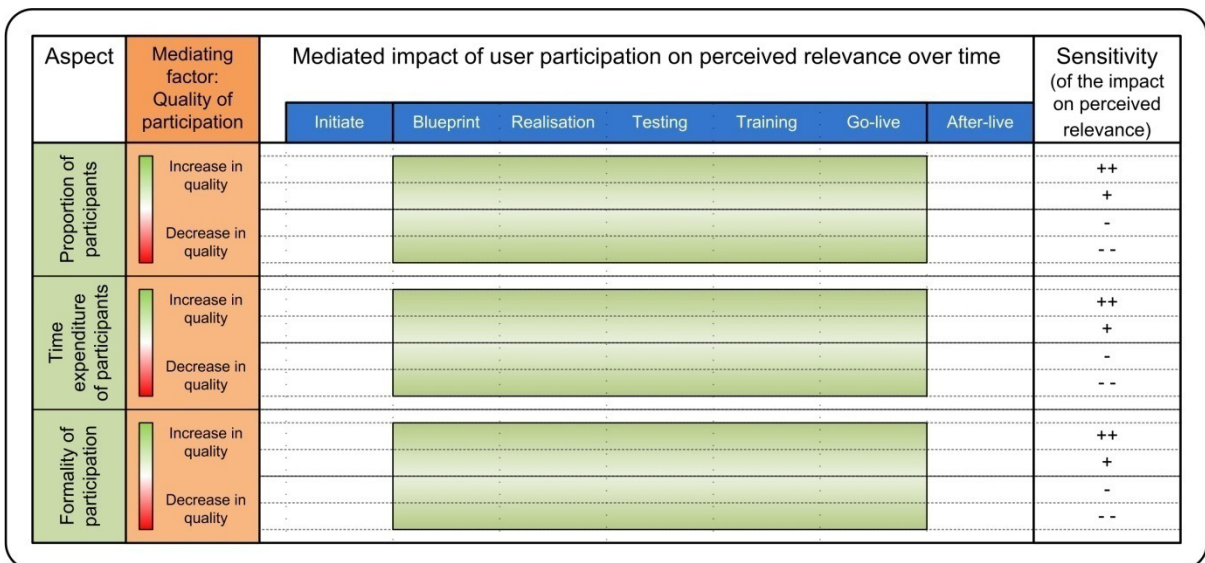
Figure 38: Anticipate mediated effects of participation on relevance
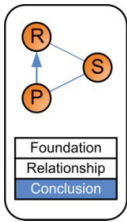
4.3.3 Preliminary conclusions

This section described the preliminary conclusions regarding the effects of user participation on perceived relevance. Based on a number of literature sources (see the theoretical foundation in section 4.3.1), supplemented with logical induction, the hypothesized mechanisms qualitatively define the effect of user participation on perceived relevance. The mechanisms should help to envision what characteristics of user participation translate into an effect on perceived relevance and its evolvement. During ES implementations in practice, this knowledge of the effects of user participation characteristics on perceived relevance can be used to:

1. ensure a positive change of perceived relevance, and/or
2. prevent a negative change of perceived relevance.

The assessment of the entire set of mechanisms makes it possible to determine overall patterns in the relationship between user participation and perceived relevance. The combination of hypothesized mechanisms, recognized patterns and observations can then be translated into a series of hypotheses. Eventually these hypotheses can then be (in)validated with the help of the case study research. Summarizing, the following elements will be discussed here:

- Identification of overall patterns in the relationship under investigation, based on individual mechanisms and the overview of the combined set of hypothesized mechanisms presented in Appendix B and section 4.3.2.
- Presentation of the overall hypotheses, with regard to the effect of user participation on perceived relevance, while acknowledging the identified individual mechanisms, the combined set of mechanisms, and the identified overall patterns.

Identification of overall patterns

A number of overall patterns are recognized, some of which are very specific for ES implementation projects. The following patterns are discussed here:

- Influence vs. Understanding
- The timing of impacts on perceived relevance
- The role of the quality of participation
- Participation to realize relevance

Influence vs. Understanding

In section 4.3.1 influence and understanding have been identified as important connecting concepts that can be used to define the relationship between user participation and perceived relevance. An important outcome of the analysis is the importance of the influence in relation to perceived relevance. All user participation dimensions and aspects affect perceived relevance due to their impact on the influence, either directly or indirectly through the quality of participation. Therefore, influence is a fundamental concept in the description of the impact of user participation on perceived relevance. Every identified mechanism that has a hypothesized effect on perceived relevance is at least expected to do so through their impact on the influence. Also an important role for understanding has been confirmed. Even though not associated with as much mechanisms as the other connecting concept, understanding is responsible for a significant part of the user-

participation-to-perceived-relevance relationship. In the cases both the influence and understanding are impacted by a single aspect of participation it has not been attempted to assign differences in weight of the effect to either one. It is possible that the case study findings will shed some light on the distribution of weight over the two connecting concepts as experienced by actual participants.

The timing and sensitivity of the impacts on perceived relevance

Looking at the process-oriented perspective of the individual hypothesized mechanisms and the combined set of mechanisms, a pattern is recognized. The majority of mechanisms can be split in two classes, exhibiting strong impacts either during the earlier phases of the project (during the blueprint and realisation phases) or during the later phases of the project (during the testing, training and go-live phases). All aspects of user participation that suggest influence (the *degree of responsibility* and the *treatment of participant input*) are especially important during the early phases of the implementation project. Preparation of participants is also most significant during the early phases of the implementation, while retaining importance during the entire user participation process. The aspects that demonstrate actual influence (the *degree of influence* and the *balance between technical and social design*) generally become important during later phases of the implementation project. The *selection of participants* mechanism and the mediated mechanisms form the exceptions to this process-oriented pattern. The selection of participants only has an initial effect on perceived relevance while the mediated mechanisms affect relevance during the entire process.

The role of the quality of participation

The *proportion of participants*, the *time expenditure of participants* and the *formality of participation* potentially play an important role during the participation process. The underlying mechanisms cannot be coupled directly to a specific moment in time of the implementation process. These mechanisms have a mediated effect on perceived relevance that is dependent on either the overall quality of participation or their impact on this mediating factor. Changes in the quality of participation, whether induced by the respective aspect of user participation or not, dictate the timing of the impact of these aspects of user participation on perceived relevance. Although no evidence was found to support an expectation, it is expected that these three mechanisms have a greater impact during high effort stages and phases of the ES implementation. However, their overall effect on perceived relevance should not be underestimated, especially because these mediated mechanisms are less apparent and can undermine the ES implementation without the involved parties noticing what kind of effect they have on the eventual success of project.

User participation to realize perceived relevance

Based on the review of literature and the formulation of hypothesized mechanisms, the notion that user participation is an important factor for the realization of the perceived relevance of a new system for its users is confirmed. The dominant and widespread link between user participation and perceived relevance, even though described with mainly hypothetical mechanisms, suggests an extensive role for user participation with regard to the realization of perceived relevance. Depending on the importance of perceived relevance and the actual weight and depth of the effect of participation on perceived relevance, this notion could well allow for a fundamental shift in the perception of user participation during common ES implementation methodologies. In accordance

with the general participation research by Pasmore & Fagans, this research emphasise the importance of participation as a means to establish, manage and manipulate the relevance of a new system and develop both the participating individuals and the surrounding organisation.

Hypotheses

All deliberations with regard to the effects of user participation on perceived relevance taken into consideration, an important goal of this chapter is to present qualitative hypotheses. These hypotheses have the potential to ensure or improve ES implementation success, in this case by controlling user participation. These hypotheses are aiming to improve and complement existing user participation methodologies. The selected order for the discussion of the mechanisms is the structure of an average ES implementation process. This way, the hypotheses can be more easily incorporated into the process-oriented management approaches that dominate the ES implementation domain. The identified patterns justify a variation of the ES implementation process as it was described in section 3.2. These hypotheses are organized according to the implementation time structure shown in Figure 39. This means that separate mechanisms for the initiate stage, the blueprint & realisation phases and the testing, training & go-live phases are discussed. Finally, some overall mechanisms will be presented that are less related to a specific stage or phase of the process. The after-live stage is deliberately not discussed, due to this research' focus on the initiate and project stages of the implementation process. During these stages and phases the interaction between perceived relevance and user participation is most diligent.
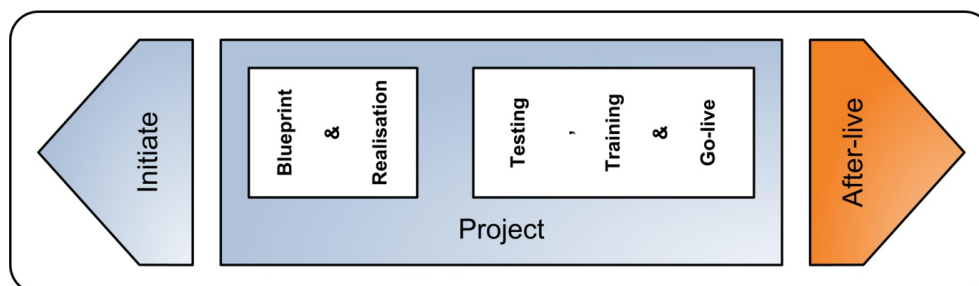
Figure 39: Timeline used to describe the effect of participation on relevance

Hypotheses for the initiate stage

During the initiate stage of an ES implementation many aspects of the ES implementation are established and planned. However, only the *selection of participants* is determined to have an important impact on perceived relevance during this initial stage of the implementation process.

- The **selection of participants** is planned during the initiate stage of the implementation, together with the proportion of participants. Depending on the proportion of participants only a selection of participants can participate in the user participation process. It is highly unlikely that all end users are able to play an active role in the participation process and this is probably not advisable either. Depending on a limited range of probable attitudes of end users towards selection, the selection for the participation process elicits an effect on perceived relevance as it determines the ability of end users to influence and understand the system, linking it to perceived relevance. In relation with perceived relevance only the end users with positive attitude towards selection for participation need to be recognized.

Selection of these individuals leads to an increase of perceived relevance. This is due to the fact that those users will be able to influence and understand the system as participants. Contrary, the rejection of these individuals for participation inhibits their influence and understanding, leading to a negative effect on perceived relevance.

Hypotheses for the blueprint & realisation phases

Of the blueprint and realisation phases especially the blueprint phase is very important phase for user participation. A large number of features and characteristics of the new system are determined in blueprint phase. The realisation phase is generally a period where implementation partners are busy setting up and configuring the system according to specifications. Participants are only approached if difficulties arise or deficiencies in the blueprint are discovered. This iterative element in the nature of ES implementation processes was already recognized in section 3.2. The hypotheses discussed here are founded on the mechanisms for the *preparation of participants*, the *degree of responsibility*, and the *treatment of participant input*. The effects of these aspects of user participation on perceived relevance have their centre of gravity during these early phases, especially the blueprint phase.

- The **preparation of participants** is basically important during all phases of user participation. The required mindset and requested effort asked from participants in relation to ES implementations is not self-evident and the accompanying process not self-explanatory. However, especially the blueprint phase is of great importance, because this specific phase requires the envisioning of an extensive transformation of the existing situation into the new situation, while having a large impact on the remaining phases. Therefore, preparation of participants has a strong impact on the perceived relevance during the blueprint phase and a reduced impact during the remaining phases of the project.

- The **degree of responsibility of participants** is a key indicator of the participants' influence on the new system. Based on the assigned mandate during the user participation process, participants can make a preliminary judgement of the influence they are able to exert on the end result. Due to the link of influence with perceived relevance, it is important for management to suggest influence during the early phases of the project by allowing participants a serious mandate. Failing to do so severely undermines the participants' expectation of influence, their effectiveness as participants and thus the perceived relevance of the system, especially during the earlier blueprint and realisation phases. From the testing phase on, the degree of responsibility loses importance because the degree of influence takes over as a more dependable measure for the actual influence of participants.

- The **treatment of participant input** has a very similar function and effect as the degree of responsibility mechanism. Based on the treatment of their input, participants can make a preliminary judgement of the influence they are able to exert on the end result. As long as participants are unable to assess their actual impact on the system, which is especially during blueprint and realisation phases, the treatment of participant input remains an important indicator for the influence they can exert on the system. During the early phases of the project, if the input of participants is ignored this decreases the participant's ability to

influence the system. As a result the perceived relevance of the system is strongly reduced. When the input is acknowledged and adopted, the implied influence results in the opposite situation. Then the participants' perceived relevance of the system is strongly improved. As the actual influence becomes visible the importance of this aspect of participation becomes smaller, even though it will remain some importance during the remainder of the project.

Hypotheses for the testing, training & go-live phases

The testing, training & go-live phases of the implementation process form the later phases of user participation. After the common relative calm of the realisation phase, the later phases again show an increase of the required effort of participants and other end users throughout the organisation. During the training and go-live phases the bulk of the non-participating end user also start to get acquainted with the new system. The hypotheses that are discussed here represent the following mechanisms: the *balance between technical and social design* and the *degree of influence.*

- The **balance of technological and social design** has an important effect on both the influence and understanding that arise from the participation process. It determines the design focus and therefore the parts of the implementation that can be influenced. On the other hand, for the purpose of gaining understanding only a complementing mix of both technical and social design focus will allow participants a complete overview of the organisational change. Due to their general unfamiliarity with ES implementations (which introduce a set of very complex changes), the majority of participants will start to notice discrepancies during the later phases of the project if the balance between technological and social design is missing. An unbalanced design focus leads to discrepancies (especially during the later phases of the project) that reduce the perceived relevance of the system. Contrary, a balanced design focus facilitates the process of the emerging bigger picture. This way, participants can see how and where the technological system fits within the social organisation, which leads to an improved perceived relevance among participants.

- The **degree of influence** is closely related to one of the central concepts that connect user participation to perceived relevance. As the ES implementation process advances, participants get an increasingly accurate view on their contribution and thus their influence on the project. Already during the blueprint phase participants get an initial outlook on their influence, even though in this phase it is still difficult for participants to extrapolate the blueprint towards the finished system. Especially during the later phases, when the system is tested, end users are trained and the system goes live, participants are able to recognize their contribution with a degree of certainty. The influence that participants perceive is very important for the perceived relevance of the system. A large degree of influence makes results in a higher perceived relevance, while a low degree of influence brings about an opposite effect on perceived relevance.

Overall hypotheses

A group of mediated mechanisms has been identified during the review of aspects of user participation. The mediated nature of these mechanisms makes it difficult to incorporate them in the process-oriented perspective. While their effect on perceived relevance is expected during the

project stage, the precise timing of their impact depends on the mediating factor: the quality of participation. Therefore, the discussion of the *proportion of participants*, the *time expenditure of participants* and the *formality of participation* is not directly coupled to a specific phase, but expected to occur during the project stage of the implementation timeline.

- The **proportion of participation** is planned during the initiation of an ES implementation but can change over the course of the implementation. It determines the scale of the user participation process during the participation process. Along the way, the implementation process also dictates changes in the proportion of participation, due to changing needs of the ES implementation project. The proportion of participants greatly influences how end users perceive the relevance of the new system. Involvement in the participation process determines to a large extent the perceived relevance of the system for participating end users. The (perceived) system quality determines the perceived relevance of the system for the remaining non-participating end users (likely to be the majority of end users). In addition, the proportion of participants should be high enough for the project team to have access to all the required information and knowledge of the organisation. The proportion should be kept under the level where it starts to reduce the quality of the participation process, while allowing influence and understanding to a maximum of end users. In this document the turning point is referred to as the "optimal proportion of participants" and indicates the point where a further increase in the proportion of participants is counterproductive.

- The **time expenditure of participants** is another aspect of participation with a mediated mechanism. During the participation process the required effort from participants fluctuates with the changing stages and phases. Concurrently, it is common for participants to maintain (some) responsibilities in the daily operations of the organisation. Whenever conflicts between participative and organisational responsibilities occur, the quality of the participation process suffers. If this is the case, the perceived relevance is negatively impacted. The lack of conflict does not make the system more relevant, so in those cases there is no impact on perceived relevance.

- The **formality of participation** is the final aspect of participation that is mediated by the quality of participation. A level of the formality of the participation process that does not match with important organisational characteristics, such as the organisational culture and the degree of autonomy of the participants, reduces the quality of the process. A good match with the level of formality will have an opposite effect and improves the quality of participation. Depending on the effect the formality of participation has on the quality of participation, the perceived relevance is impacted.

4.4   Effect of relevance on participation

The other of the key relations that is being studied in this research is the effect perceived relevance has on user participation. This is the relation and its position in the theoretical framework is shown in Figure 40. Based on theoretical consideration adopted from literature a set of hypothesized mechanisms is proposed. These mechanisms describe the impact of perceived relevance on user participation in a qualitative manner, breaking with the quantitative approach sought after by the main body of research in this domain (Barki & Hartwick, 1994; McGill & Klobas, 2008). Finally, an overview of recognized patterns and hypothetical implications is provided.
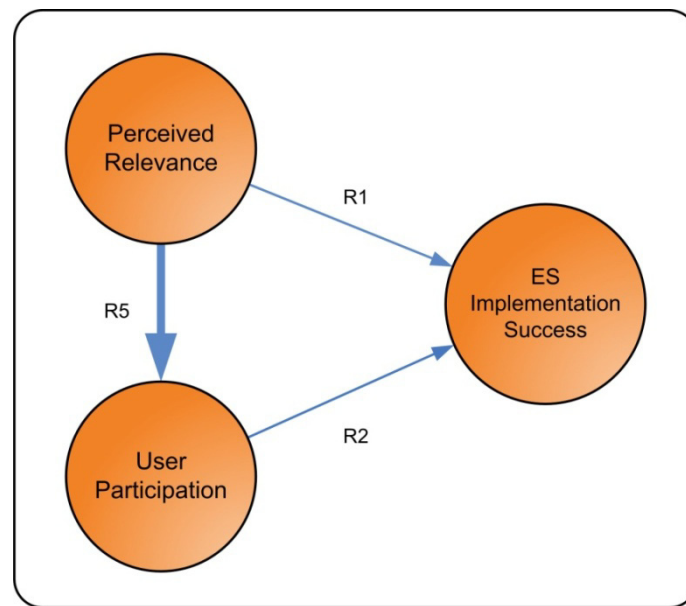
Figure 40: The effect of perceived relevance on user participation
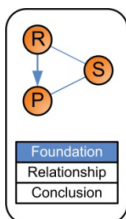
4.4.1   Foundation for line of reasoning

Based on the extensive literature study, it was found that the effect of perceived relevance on user participation is even less discussed in academic literature than the opposite relationship, discussed in the previous section. Also it seems that the available research into the effect of relevance on participation is described in an even more quantitative manner. In addition, it appears much more difficult to define the relationship between perceived relevance and user participation in terms of connecting concepts. As a result, the structure of the foundation for the line of reasoning differs from the one that discussed in 4.3.1. Nevertheless, based on the reviewed academic literature, some important general observation can be made for this relationship.

Psychological complexity of perceived relevance

After reviewing the available literature, it is observed that in-depth analysis of the impact of perceived relevance on user participation reveals an absence of quantitative and qualitative research findings. It seems that the main reason for the lack of explanations for this relationship originates from the fact that perceived relevance is a soft factor from the psychological domain (Lin & Shao, 2000). It appears that the researchers within the IS research domain need to overcome some obstacles when their research domain is broadened to include elements from the psychological domain. This is observation is in line with the perspective adopted by Barki & Hartwick

(1994), who were the first to bridge the user participation research domain with the psychology domain in order to provide a consistent definition of user involvement. While this psychological perspective is an important step in the process of understanding perceived relevance and its impact on related variables, it requires a more specific set of skills from IS researchers. As a result, it is probably easier for IS domain specialists to investigate how characteristics of user participation affect the perceived relevance of participants. This can be done in terms of higher or lower perceived relevance. The opposite relationship is harder to grasp: how the users' (psychological complex) perception of relevance impacts a multifaceted and complex process such as user participation during ES implementation. An important reason for this is assumed to be the multi dimensional characteristics of user participation in contrast with the more singular dimensionality of perceived relevance. Possible interference of user attitude with perceived relevance does not simplify the issue at hand. This observation helps to become aware of simple appearance of perceived relevance: a higher perceived relevance is an understandable statement, indicating a higher relevance or value of a system for its users. At the same time, this cannot be said for a higher user participation, which cannot be interpreted as easily. Summarizing, the psychological nature of perceived relevance, combined with the lack of a qualitative descriptions of the effect of perceived relevance on user participation, make the relationship more difficult to grasp in the IS literature.

The search for a connecting concept

The existence of the assumed effect of perceived relevance on user participation is debatable and not self-evident. Based on their quantitative analysis, Barki & Hartwick (1994) observed that user participation is not affected by the user involvement (perceived relevance). Barki & Hartwick believe that participants will not participate more if the system is more relevant or important for its users. There appears no reason to refute this statement. It seems likely that those participation activities are planned for, assigned to, and executed by appointed participants regardless of the perceived relevance they attribute to the system. Yet, the author recognizes a difference between the focus of Barki & Hartwick and the focus of this investigation into user participation. The perspective on user participation differs; Barki & Hartwick's behavioural and activity based perspective versus this research' more generic view. As a result, there is no need to dispute the validity of Barki & Hartwick's observation, even though a relationship is expected: it might well be that perceived relevance does not affect the participants' (level of) activities during the participation process. However, in the opinion of the author, this does not rule out that the other dimensions of user participation, and their underlying aspects, are not affected by perceived relevance.

Putting a more explicit focus on the relationship from perceived relevance to user participation from this research's multi-dimensional participation perspective, it is very interesting to review a remark made by Lin & Shao (2000). Even though not ES domain specific, Lin & Shao state that "management may want to foster an atmosphere that helps users perceive the importance of the system *(in this context interpreted as perceived relevance)* and enhances their favourable attitudes toward the system *(in this context interpreted as user attitude)*, in order to facilitate user participation in the development process". Lin & Shao add: "user participation should have more efficacies if the users' participation behaviours originate from the underlying favourable attitudes and spontaneous involvement, instead of from manager's forcible orders". Lin & Shao almost explicitly mention two important elements of the frequently cited Barki & Hartwick's (1994) research paper: user attitude

and user involvement. While user attitude falls outside the scope of this research, the perceived importance of the system is in effect the same concept as perceived relevance. The statements of Lin & Shao reinforce the anticipated relationship: it is expects that user participation is at least partially dependent on perceived relevance, through what Lin & Shao call spontaneous involvement.

Two additional sources can be referenced to support the statements of Lin & Shao. A role for perceived relevance in relation to participation is confirmed by its resemblance to a contingency factor of user participation: the willingness to participate. It seems that Cavaye (1995) already anticipated such a factor in her research, even though it was only defined in broad terms, without further specification of the relationship. The efficacy of user participation is expected to be partially dependent on this willingness to participate, which in turn is expected to rely on the relevance and importance users attribute to the system user are participating for. In the scarcely described academic literature, this relation between perceived relevance and user participation is the most conspicuous one. Furthermore, Katsma, et al. (2007) also confirm such a role for perceived relevance of in their research into the implementation and use of electronic health record systems. They expect that more relevance can help to motivate participation.

Overview and importance of the foundations

Assessing the discussion of existing academic literature on this topic, it proved difficult to identify literature sources that support the relationship between perceived relevance and user participation. Due to the psychological nature of perceived relevance, it seems to be a difficult concept in the more technical-oriented IS research domain. Barki & Hartwick even refuted the existence of a relationship. From their activity-oriented perspective on user participation there seemed to be no quantitative foundation to support such a relation. However, the current research adopts a different, more generalised participation perspective. Based on the assertions made by Lin & Shao (2000), it is a preliminary expectation that perceived relevance has at least a motivational effect on user participation, providing an important connecting concept. In the current investigation this connecting concept has been named "motivation". Figure 41 shows an overview of the dimensions of perceived relevance and the connecting concept in relation to user participation. At this moment only motivational impact on user participation is expected, but additional mediating factors and/or connecting concepts are not disregarded in advance and, if necessary, will be assessed during the formulation of the mechanisms.
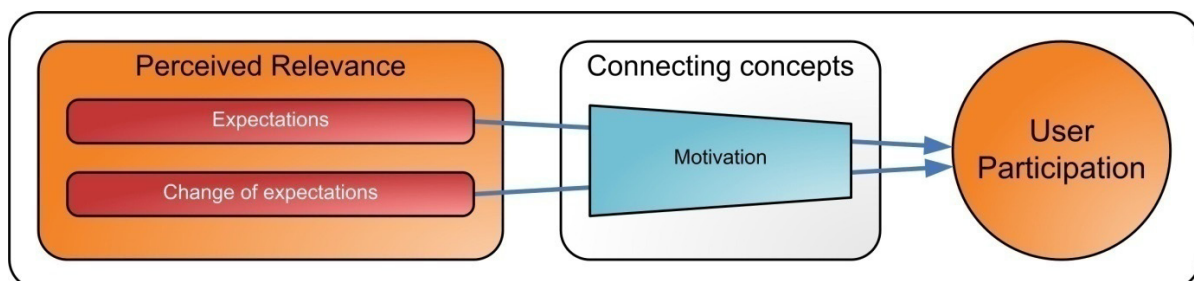
Figure 41: Overview of the dimensions of relevance in relation to participation
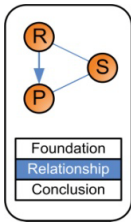
4.4.2 Relationship in detail

The review of the existing literature shows a high degree of uncertainty and a low level of detail in describing the effect of relevance on participation. Based on the available sources, only a single connecting concept could be identified: "motivation". As a result, it is hypothesized that a higher perceived relevance of the new system for the users will lead to a higher motivation to participate, which in turn leads to an increase in performance of participants and thus a higher quality of the participation efforts. Due to the focus on user participation, primarily the relevance as perceived by participants is taken into account. The perceived relevance of all end users is very important in a general sense of ES projects and in relation to the ES implementation success, but is less relevant in the context of the relationship under investigation here. Nevertheless, it is expected that the motivational effect of perceived relevance on participants can be generalized to non-participating end users as well. This indicates how important relevance is for all stakeholders.

So, while even a general description of the relationship in literature is lacking, it is no surprise that detailed (qualitative) mechanisms that couple perceived relevance to user participation are especially lacking. A detailed assessment of the two perceived relevance dimensions in relation to user participation is required in order to create a qualitative relational scheme. One by one, the two dimension of perceived relevance, and more specifically their underlying aspects are reviewed. If deemed necessary, the aspects are regrouped. Based on the literature study of perceived relevance, the identified dimensions provide the structure for the discussion and formulation of the hypothesized mechanisms (again see Figure 41). In order to maintain readability, only the overview of hypothesized mechanism is presented here, in the main body of this document. However, a more lengthy description of each of the individual mechanisms is provided for by this research and can be found in Appendix B.

Overview of mechanisms

The overview of mechanisms shows the hypothesized mechanisms of the relationship with the content-oriented and process-oriented perspectives in mind. First, the content-oriented perspective provides an overview of types of mechanisms that have been identified and that can be used to define the relationship between relevance and participation. From this perspective, the mechanisms can be coupled to user participation through the connecting concept "motivation", confirming the relationship. Secondly, the mechanisms are reviewed with the process-oriented perspective in mind. The importance of the process-oriented perspective is determined by the sequential nature of ES implementation projects and its impact on the expectations of participants.

Content-oriented perspective

Following the methodology that is presented at the start of chapter 4 and Appendix B, every mechanism is described in terms of its impact on the motivation of participants with which they participate in the ES implementation process. It was established that each hypothesized mechanism has one of the following types of relation with user participation: a direct relation, a mediated relation or no relation. The overview of mechanisms is presented in Table 15 and incorporates both elements for every mechanism. It shows the underlying aspects of perceived relevance and their (mediated) relation with user participation through the connecting concept "motivation".

Table 15: Anticipate relationship between relevance and participation

Perceived relevance aspects	Anticipated effect on user participation
Legend: **√ = Direct relation** **◊ = Indirect/Mediated relation (through "expectations")** **X = No/Ignorable relation**	
Dimensions & Aspects / Connecting concepts → ↓	**Motivation**
Expectations	
Expectations	√
Differentiation of expectations	◊
Change of expectations	
Change of expectations	◊
Susceptibility of expectations to change	◊

The presence of only a single connecting concept reduces the complexity of the impacts of different mechanisms on user participation. Assessing the complete set of hypothesized mechanisms, it is clear that all aspects that define perceived relevance are connected to the motivation of participants during the participation process, either directly or indirectly. While the expectations mechanism is anticipated to directly affect the motivation of participants, the other three mechanisms are expected to do so indirectly, through their impact on the participants' expectations. How these direct and indirect mechanisms impact user participation is clarified in Figure 42.
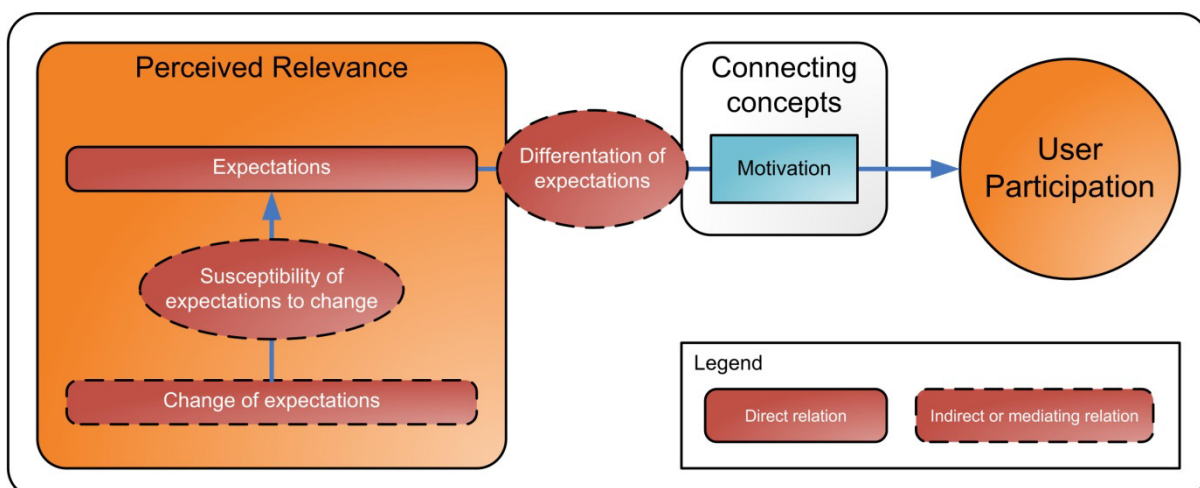
Figure 42: Overview of the aspects of perceived relevance in relation to user participation

Even though an extensive description for each aspect of perceived relevance is provided in Appendix B, a short explanation for the indirect/mediated relations is provided here:

- The first of the indirect mechanisms describes the *differentiation of expectations.* It anticipates a modified effect of the various types of possible improvements (economic, social, functional and time and effort saving, as described in section 3.3.1) on the participants' expectations and, consequently, their motivation to participate.
- The second of the indirect mechanisms describes the *change of expectations*. This mechanism anticipates that changes throughout the project impact the expectations of participants. As the expectations change, so does the effect of perceived relevance on the participants' motivation and the participation process.
- Based on observations of Wagner and Piccoli (2007), the third of the indirect mechanisms describes the *susceptibility of expectations to change.* It introduces another force that modifies the effect of the expectations on user participation. Especially this last mechanism recognizes the psychological nature of expectations that develop during a complex project as an ES implementation. It is not in the last place for this mechanism that the process-oriented perspective is important.

Process-oriented perspective

The assessment of the relation from a content-oriented perspective has resulted in the identification of four mechanisms. Each of these mechanisms has either a direct or an indirect effect on user participation. Through the process-oriented perspectives, the changing impact of perceived relevance on participation over time is made visible. However, it seems that the different mechanisms that describe the impact of relevance on participation are not as similar or homogenous as the mechanisms that were used to describe the opposite relationship. Therefore, a slightly different approach is selected and the mechanisms are discussed sequentially.

The first mechanism represents the impact of *expectations* of participants on user participation. It is the most important mechanism that exhibits a direct relation to the motivation of participants to participate. It is presented in Figure 43. The figure contains a complex graph and especially the sensitivity of the graph requires additional explaining. The height of the graph expresses the sensitivity of the mechanism. This can be interpreted as the impact that the expectations, that make up the perceived relevance, have on the motivation of participants to participate. More specifically, the graph shows the impact at a certain stage or phase during the implementation process and it is clear that the sensitivity of the impact changes over time. The impact is based on the same ordinal scale that was adopted in Appendix B. It has been used to express the impacts of all hypothesized mechanisms. The scale ranges from a strong positive effect to a strong negative effect and is expressed in terms of ++, +, =, -, -- (the line in the graph between the plus sign and the minus sign can be interpreted as the equal sign). A short example: when there are high expectations (high perceived relevance) of the new ES throughout the implementation, this leads to strong positive motivational effect on the participation process during the blueprint, testing and go-live phases. However, in our example, due to the changing intensity of participation activities, those same high expectations only lead to a positive motivational effect during the realisation and training phases.
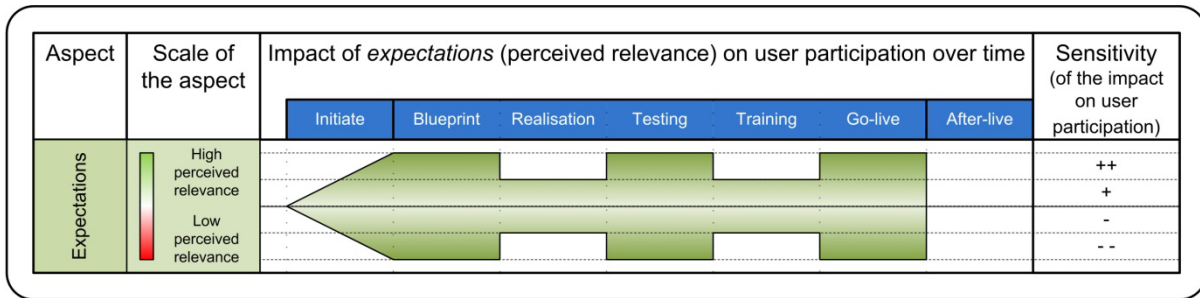
Figure 43: Anticipate impact of relevance on participation

Secondly, there is the *differentation of expectations* mechanism that has been identified. The differentation of expectations mechanism is anticipated to be important because of its mediating effect on the relation between the *expectations* mechanism and the motivation to participate. Figure 44 shows the effect of this mechanism on the relation. The expectations, which are based on anticipated improvements, that make up perceived relevance can be split in two categories, namely genuine improvements and artificial improvements. This distinction has been described in Appendix B. While both genuine and artificial improvements will have a positive impact, it is anticipated that genuine improvements have a stronger effect on the motivation to participate than artificial improvements. No negative impact on the motivation to participate is expected.
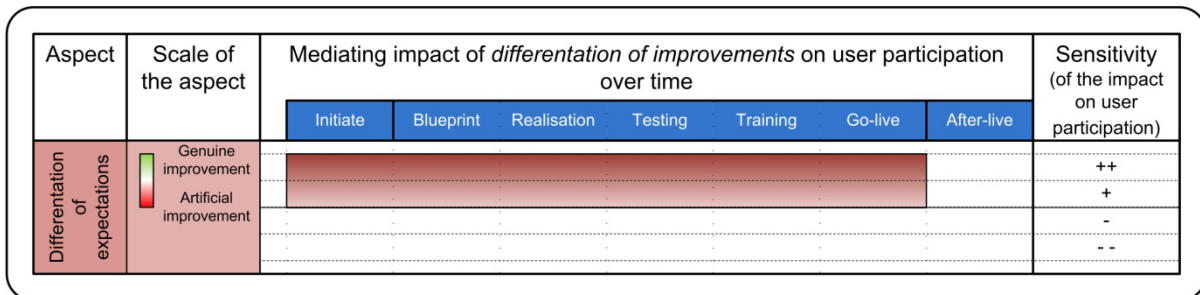
Figure 44: Anticipate impact of differentiation of improvements on relevance

Thirdly, the change of expecations mechanisms needs to be discussed from the process-oriented perspective. Figure 45 shows the graph that represents the impact of changing expectation on expectations. However, it seems that based on literature, the susceptibility of expectation to changes is an important factor that effects how the expectations of participants and other end users change over time. This leads us to the final mechanism, also presented in Figure 45: the *susceptibility of expectations to change.* It represents the susceptibility of the participants' expectations to possible change and modifies the effect of change of expectations on perceived relevance. So as it does not directly impact user participation, it does affect the way in the participants' expectations develop over time. The graph expresses the range of possible change given the stage or phase of the ES implementation project. As can be seen, the range of change diminishes as the project progresses. From the graph in the figure it becomes clear that the susceptibility of expectations to change has repercussions for the way perceived relevance and the participants' expectation need to be managed.

Aspect	Scale of the aspect	Impact of change of expectations on perceived relevance over time							Sensitivity (of the impact on perceived relevance)
		Initiate	Blueprint	Realisation	Testing	Training	Go-live	After-live	
Change of expectations	Positive change / Negative change								++
									+
									-
									--

Aspect	Mediating factor: Susceptibility to change	Mediated impact of change of expectations on perceived relevance over time (taking into account the susceptibility to change)							Sensitivity (of the impact on perceived relevance)
		Initiate	Blueprint	Realisation	Testing	Training	Go-live	After-live	
Change of expectations	High susceptibility / Low susceptibility								++
									+
									-
									--

Figure 45: Anticipate impact of change of expectations on relevance
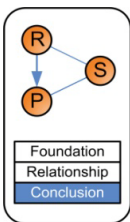
4.4.3 Preliminary conclusion

This section described the preliminary conclusions regarding the effects of perceived relevance on user participation. Based on a number of literature sources, supplemented with logical induction, the hypothesized mechanisms qualitatively define the other half of the relationship between user participation and perceived relevance. The mechanisms should help to envision what characteristics of perceived relevance translate into an effect on the participants' motivation to participate and user participation in general. During ES implementations in practice, this knowledge can be used to:

1. ensure a positive change in the participants' motivation to participate, and/or

2. prevent a negative change of the participants' motivation to participate.

The assessment of all the mechanisms makes it possible to determine high level patterns in the relationship between user participation and perceived relevance. The combination of hypothesized mechanisms, recognized patterns and observations can then be translated into a series of hypotheses. Eventually, these hypotheses can then be (in)validated with the help of the case study research. Summarizing, the following elements will be discussed here:

- Identification of overall patterns in the relationship under investigation, based on individual mechanisms and the overview of the combined set of hypothesized mechanisms presented in Appendix B and section 4.4.2.

- Presentation of the overall hypotheses, with regard to the effect of perceived relevance on user participation, while acknowledging the identified individual mechanisms, the combined set of mechanisms, and the identified overall patterns.

Identification of overall patterns

Only one important pattern is recognized. The pattern tries to explicate the dynamic relation between the expectations and their change. A tendency already discussed in academic literature is explained in more detail and made visible for this specific context.

Expectations and change

The effect of perceived relevance on user participation is liable to constantly changing expectations of improvements. Based on a large number of causes, including the participation process itself, the expectations of participants and end users are subjected to change. In the process-oriented overview, both the impact of expectations on (the motivation of participants to participate in) the user participation process and the changing susceptibility of expectations to change have been visualized. Combining the two graphs adds detail to the assessment of the impact of relevance on participation. Figure 46 shows three of these combined graphs, each illustrating the impact of a respectively positive expectations, medium expectations and negative expectation on user participation.
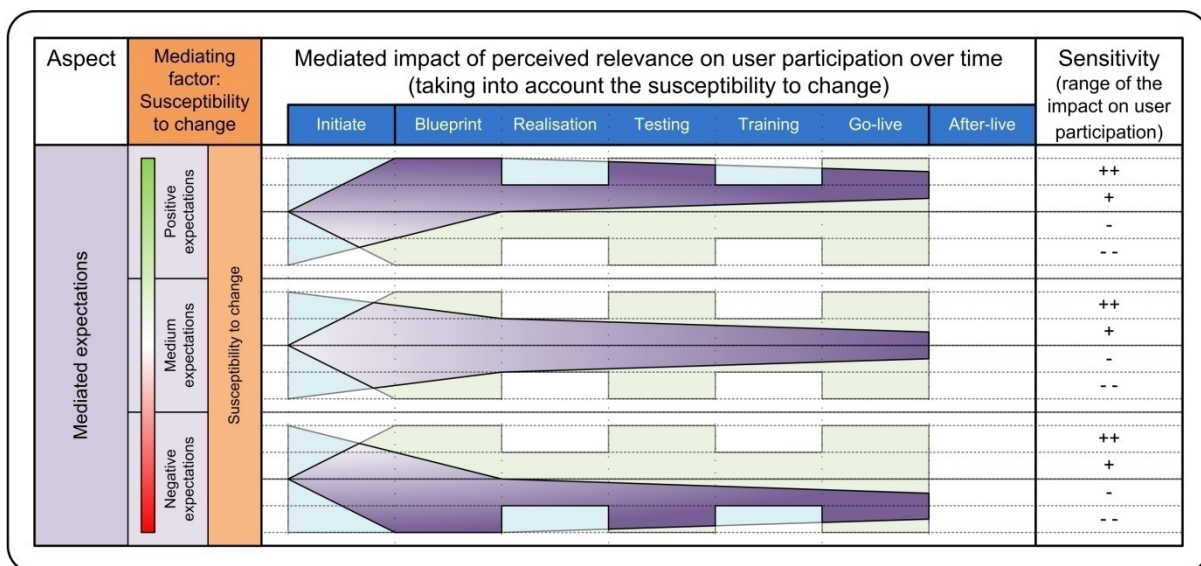
Figure 46: example of the effect of the combined mechanisms

These graphical examples in Figure 46 are supplemented with a short explanation of the graphs in the figure: given the positive expectations of participants (a high perceived relevance) during each stage and phase of the ES implementation, the range of the possible impact on user participation (more specifically on the motivation of participants, as it is the connecting concept) is limited to the indicated area in the graph. So while the different expectations of participants can still lead to the entire range of effects on user participation, it becomes increasingly difficult to change these expectations, with all its consequences for the participants' motivation and user participation.

Hypotheses

All deliberations with regard to the effects of perceived relevance on user participation taken into consideration, an important goal of this chapter is to present qualitative hypotheses. These hypotheses have the potential to ensure or improve ES implementation success, in this case by

controlling perceived relevance. These hypotheses are aiming to improve and complement existing ES implementation and user participation methodologies. Again, the selected order for the discussion of the mechanisms is the time structure of an average ES implementation process. Based on the identified patterns, the discussion of mechanisms is separated in the initiate stage & blueprint phase and the realisation, testing, training & go-live phases. The after-live stage is again deliberately not discussed, as this research focuses on the initiate and project stages of the implementation process. During these two stages the important differences in interaction between perceived relevance and user participation can be presented. Figure 47 shows how the stages and phases are used to formulate the hypotheses.
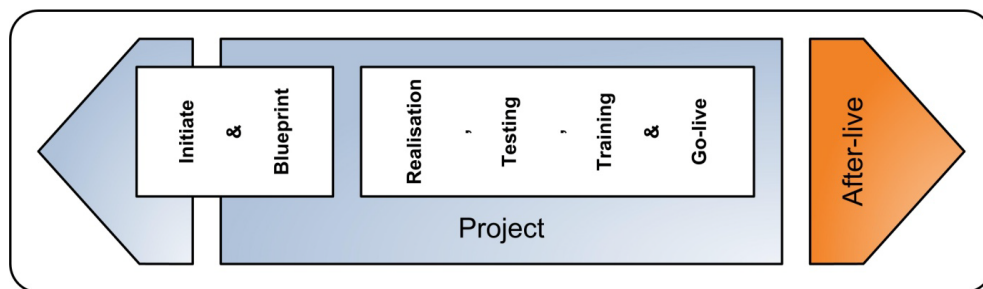
Figure 47: Timeline used to describe the effect of relevance on participation

Hypotheses for the initiate stage and blueprint phase

During the initiate stage of an ES implementation the high level elements of the ES implementation are planned. At this moment in time, only a very limited number of end users will be actively involved in the ES implementation. Still, most end users will already have started to assess the relevance of a new system, based on rumours and limited information that is generally available at this moment in the implementation. Then the project starts earnest and the blueprint phase takes off. This has proven to be a very important phase for user participation. A large number of features and characteristics of the new system are determined in this phase, translating into a far better defined perception of the relevance of the system for the participants. The hypotheses discussed here are founded on the mechanisms for the *expectations* and the *differentiation of expectations* and the *change of expectations*.

- The **expectations** of end users and participants regarding the new system form the basis of perceived relevance. These expectations affect the participants' motivation to put effort in the participation process and thus the quality of their participation efforts. The participants who are higher motivated have more perseverance, especially during the phases when the participation process takes the bulk of their time or the process is strained by their responsibilities in the daily operations. Lack of motivation leads to low commitment to the participation process, reducing the quality of participation efforts. In the case of low commitment, the responsibilities in the daily operations can especially undermine the participation process.

- The **differentiation of expectations** acknowledges an important difference between the different types of improvements. Expectations about genuine improvements, which stem from considerations aimed at transforming the old organisational situation into the new

one, will have a strong impact on the motivation of participants. These types of expectations relate to the daily working environment and the working process and genuinely improve the future situation of the end users. Genuine improvements are contrary to artificial improvements. Expectations of artificial improvements, which stem from considerations aimed at motivating participants, have less motivational potential. Even though artificial improvements still have a positive impact on the participants' motivation to participate, only the genuine improvements create spontaneous involvement and lead to a strong positive impact on their motivation to participate. While the difference does not affect the relevance as perceived by participants, it will mediate the motivational effect of their perceived relevance on the user participation process.

- The **change of expectations** confirms that during the ES implementation the expectations of end users change. There are a numerous reasons for these changed expectations, ranging from changing requirements, perceptions and opinions. As the expectations impact the motivation of participants to participate, changing expectations mediate this relation. If the overall expectations of the new system improve, so will the participants motivation to put effort in the participation process. Contrary, if the overall expectations decline, the participants become less inclined to put effort in the process.

Hypotheses for the testing, training & go-live phases

The realization, testing, training & go-live phases of the project form the later phases of ES implementation process. The mechanism described to be relevant during the initiate stage and blueprint phase remain impacting user participation undiminished. However, there is an important mechanism that predicts a different outcome of these mechanisms during the later phases of the project. As a result an alternative approach is required during these later phases, clarified by the mechanism *susceptibility of expectations to change*.

- The **susceptibility of expectations to change** indicates an important rift in the effect of relevance on the motivation of participant in the participation process. The effect of perceived relevance on user participation, as described during the initiate stage and blueprint phase, cannot be extrapolated to the later phases of the project. The experiences of participants to this point in the project have already created a strong foundation of perceived relevance that becomes ever harder to influence. A direct result of the changing susceptibility of the expectations is that it requires increasingly more (excessive) effort to motivate participants during these later phases if this has not yet been sufficiently assured. Combined with the knowledge of the differentiation of expectations, it can be concluded that the effect of certain improvements, especially in the form of personal rewards (also called artificial economic and/or social improvements), will fail to motivate the participation efforts of participants.

4.5   Effect of relevance and participation on success

The final two relationships in the theoretical framework that need to be discussed are the separate impacts of perceived relevance and user participation on ES implementation success. Exploring and explaining this part of the theoretical framework is fundamental for the assessment of the impact of the interaction between relevance and participation on success. Figure 48 shows the relationships under investigation. Based on theoretical consideration adopted from literature a set of hypothesized mechanisms is proposed. These qualitative mechanisms give a high level description of the impact of perceived relevance and user participation on ES implementation success. Finally, an overview of recognized patterns and hypothetical implications is provided.
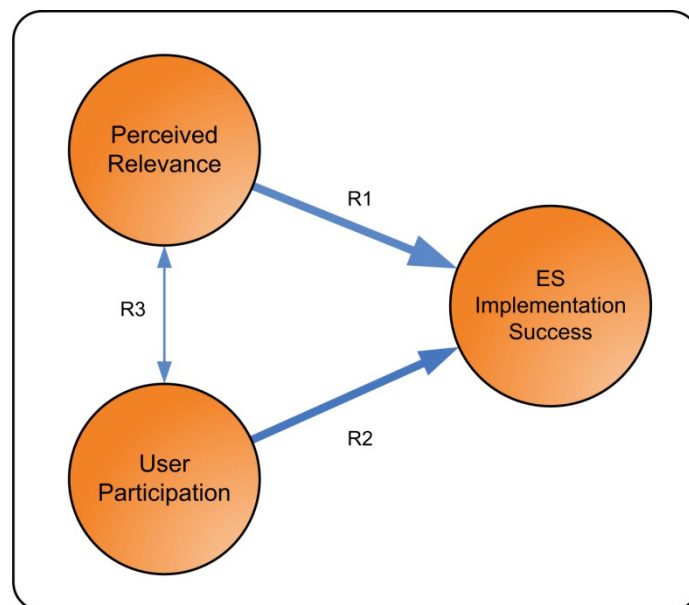
Figure 48: The effect of relevance and participation on ES implementation success
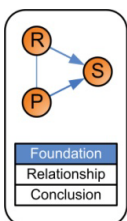
4.5.1   Foundation for line of reasoning

Like the extensive description of the interaction between perceived relevance and user participation (see section 4.3 and 4.4), the individual relationships between relevance and success, and participation and success are an important part of this investigation. These two relationships are instrumental for exploring the individual and combined effects of perceived relevance and user participation on ES implementation success. This foundation for the line of reasoning aims to provide the context for these complex interactions. The theoretical foundation discusses the available literature in two separate parts, each individual relationship on its own.

The two relations will be explored and discussed with a limited degree of detail: while the academic literature is reviewed, only high level hypothesized mechanisms are formulated. Synthesis of qualitative mechanisms of the same scale and with the same level of detail as the bidirectional relationship between relevance and participation. This is not possible within the scope of this research and certainly warrants investigations of their own.

Recap of ES implementation success

Due to the extensive focus on the interaction between relevance and participation in the previous two sections of chapter 4, a short and compact recap of the ES implementation success measures is deemed appropriate. The ES implementation success construct has been presented in section 3.5 and was defined as a multiform concept. The three separate measures of ES implementation success aim to offer a multifaceted view of ES implementation success. As a result, both perceived relevance and user participation are reviewed in relation to these three individual measures of ES implementation success and of course their ten underlying aspects. The measures and the underlying aspects are illustrated in Table 16.

Table 16: Recap of ES implementation success measures

ES implementation success	
Project metrics (Measure 1)	• Budget • Timeline • Functionalities
Enterprise system success (Measure 2)	• Information quality ⎫ • System quality ⎬ Future impact • Service quality ⎭ • Individual impact ⎫ Impact to date • Organisational impact ⎭
End user satisfaction (Measure 3)	• Satisfaction with the enterprise system (alternative measure for ES success) • Satisfaction with the implementation project (alternative measure for project metrics)

Interference between success measures

It is important to acknowledge that there is an unknown degree of overlap (redundancy) in these three measures and their underlying aspects. Based on literature sources (Gable, et al., 2003; McGill & Klobas, 2008) and logical reasoning, some degree of interaction or interference between the separate measures is to be expected. Especially ES success is expected to influence the project metrics and user satisfaction. The logic behind this is that the project metrics and end user satisfaction are both intended as independent measures, but still partially dependent on the overall success of the enterprise system, both in terms of the quality aspects of the system and the individual and organisational impact it creates. While the relation between ES success and project metrics is only expected, the relation between ES success and user satisfaction can be supported by Gable, et al., as they designated user satisfaction (for the system) an alternate measure for ES success. As a result, the overlap in that case is complete. Both internal links will be taken into account during the discussion of the effect of respectively perceived relevance and user participation on ES implementation success.
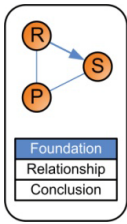
Perceived relevance and ES implementation success

Perceived relevance is only seldom related to ES implementation success measures in academic literature. Therefore, academic research cannot provide a conclusive answer that explicates a qualitative relationship between perceived relevance and ES implementation success. While this qualitative foundation for the relationship is unavailable, it seems that even a quantitative base is only scarcely available (Hwang & Thorn, 1999; McGill & Klobas, 2008). This means that there is a very limited amount of research to describe any foundation of this relationship. Looking at perceived relevance related research with a focus on ES implementations, the technology acceptance model (TAM) also assesses the effect of importance and relevance on ES implementation success. An important difference is that the TAM research domain does not assess ES implementation success directly, but instead focuses on the behavioural intention to use the enterprise system (Amoako-Gyampah & Salam, 2004). Even though behavioural intention is deemed important in the context of voluntary IS usage, it is less so in the ES context, due to the obligatory nature of these types of systems (Cavaye, 1995; Gable, et al., 2003). Still, some elements of these researches can be adopted for this investigation.

As announced, the link between perceived relevance and ES implementation success is discussed in four separate parts, split according to the three separate measures of ES implementation success and a discussion of confounding factors that potentially mediate the relationship. The links under investigation are presented in Table 17.

Table 17: Perceived relevance and the measures of ES implementation success

Relevance and ES implementation success			
1.	Perceived relevance	and	Project metrics
2.	Perceived relevance	and	ES success
3.	Perceived relevance	and	User satisfaction
4.	Relevance, Success	and	Mediating factors

Perceived relevance and project metrics

Intuitively, a connection between the perceived relevance of end users and project metrics (which is an indication of implementation project success) is expected. As demonstrated in section 4.4, a low perceived relevance is anticipated to affect the motivation of user to participate. This being highly likely also other mechanisms can be expected. However, this assumption cannot be founded on academic literature as it is nowhere discussed or even recognized as a possible mechanism. Critical success factor research does provide some support by recognize a number of adjacent and/or related issues that have been identified as critical success factors. These CSFs are for example expectation management, employee morale, and open and honest communication with end users (Ngai, et al., 2008), all of which are at least related to perceived relevance. Most of these CSFs are deemed important because of their relation with employee retention, for example. Employee retention on itself has the potential to have a big impact on the project metrics (Finney & Corbett, 2007). This view is mainly based on quantitative research results. As a result, when taking into

account literature sources the support for the impact of perceived relevance on the project metrics is indirect at best. Even though perceived relevance can probably impact the implementation costs, the project duration and the planned vs. implemented functionalities, a direct and concrete qualitative mechanism is to this moment lacking.

Perceived relevance in relation to project metrics does lend itself for quantitative research, providing statistical information about the chances of budget or timeline overruns depending on the perceived relevance of the end users. Also planned vs. implemented functionalities could be quantitatively investigated in relation to perceived relevance. However, within the scope of this investigation it is anticipated that a qualitative mechanism that describe a detailed relation between perceived relevance and the project metrics are a step too far. Therefore, this research chooses to adopts a black box approach and does expects an relationship between perceived relevance and the ES project metrics.

Perceived relevance and ES success

The relation between perceived relevance and ES success is better described in literature as the previous relation between relevance and project metrics, even though sources are still scarce. As mentioned in section 3.5, this research differentiates between the success of the process and that of the product, which applied to ES implementation success this translates into a distinction between project metrics and ES success. When reviewing relevance in relation to ES success a similar division is observed in literature: differentiating in a relation between perceived relevance and the future impact (here operationalized through system quality, service quality and information quality measures) and perceived relevance and the impact to date (individual and organisational impact). McGill & Klobas (2008) even go so far as to disregard a possible link between perceived relevance and the quality of the system up front, concluding that the quality of the system is responsible for the perceived relevance, overlooking a possible opposite relationship . At the same time, McGill and Klobas do acknowledge an indirect relation between perceived relevance and the individual impact of the system. This differences between McGill & Klobas and this research are mainly attributed to variations in conceptualization of the constructs.

While Gable, et al. (2003). chose to combine the impacts to date and the future impacts in a single model, there seems to be a valid argument to investigate the impact of perceived relevance on ES success separately (McGill & Klobas, 2008). As a result, the assessment of the relation between perceived relevance and enterprise system success is performed separately, first assessing the relation with the quality aspects of the ES, followed by the individual and organisational impacts afterwards.

- **Relevance and the future impact.** A direct effect of perceived relevance on the information quality, system quality, and service quality aspects of enterprise system success is not really recognized in literature. Although the author intuitively expects at least indirect effects, these expectations are not easily supported in academic literature or demonstrated in practice. The author's expectations of at least an indirect relationship are founded on the outcomes of the hypothesized effect of perceived relevance on user participation, which was described in an earlier section of this chapter. Through user participation, perceived

relevance can impact the quality aspects of enterprise system success. However, researchers such as McGill & Klobas (2008) do not acknowledge this view and apparently do not expect that perceived relevance can have a potential impact on the system's quality. In their model, McGill & Klobas only showed the opposite relationship: instead of letting perceived relevance have an influence on the quality of the ES, they show that the quality of the system impacts its perceived relevance. They do acknowledge a different but related link: McGill & Klobas have ascertained that the perceived relevance of a new system for its end users has a significant influence on their perception of the quality of the new system. In this research, with its case study setup, it will be especially difficult to differentiate between the actual quality of the system and the perceived quality of the system.

- **Relevance and the impact to date.** With respect to the individual and organisational impact of a new system, McGill & Klobas (2008) observed an effect of perceived relevance on the perceived individual impact and (al-be-it weakly) on the "actual" individual impact. It seems that a high perceived relevance makes end users think more positively about the individual impact the change has brought them, but to a lesser extent improves the "actual" individual impact of the new system. McGill & Klobas have not been the only researchers to relate perceived relevance to individual impact. Amoako-Gyampah (2007) states that end users' perception of the usefulness and personal relevance of the enterprise system will contribute to the implementation success. Amoako-Gyampah defines implementation success as the effectual usage of the technology, which relates to a number of the measures of the individual impact (job performance) and to a lesser extend the organisational impact (overall productivity gains) The individual measures of ES success that have been devised for this thesis can be found in section 3.5.2. Rephrased, as Amoako-Gyampah concludes and supports that a positive perceived relevance will improve the individual impact of the new system, this research takes it a step further and poses that effectual usage is a factor that is also indirectly related to the organisational impact through it link with overall productivity gains.

Perceived relevance and user satisfaction

The link between perceived relevance and user satisfaction has received some attention in academic literature. The review of literature is used to support this research's expectation that perceived relevance is anticipated to increase the eventual satisfaction of user regarding the developed enterprise system.

According to McGill & Klobas (2008), there seems to be a different impact of perceived relevance on user satisfaction depending on whether the end user participated in the participation process or not. This also seems to be related to the differentiation that is made by McGill & Klobas in terms of quality of the system and perceived quality of the system. The results of their investigation suggest that the relevance as perceived by non-participating end users has a direct quantitative relation with user satisfaction. In the case of participants on the other hand, perceived relevance has only an indirect quantitative relation with user satisfaction. While both of McGill & Klobas' observations consistently couple perceived relevance to user satisfaction, a more complex relation between relevance and ES implementation success is to be expected.

Relevance, success and mediating factors

In their research, McGill & Klobas (2008) identify major differences between perceived relevance and success (even though in their investigation success is represented by perceived system quality individual impact and user satisfaction), depending on the participatory status of a user. Therefore, participatory status is included in the further discussion of the relation between relevance and success. The presence of such a mediating instance should not come as a surprise, since the previous sections of chapter 4 provide an extensive background for it. In a sense the presence of such a mediating variable should not come as a surprise (see section 4.3).
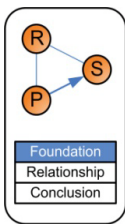
User participation and ES implementation success

The overall goal of user participation in general (not IS or ES specific) is twofold: to develop the people in the organisation and the organisation itself (Pasmore & Fagans, 1992). How does this goal of participation relate to ES implementation success? Similar to the link between relevance and success, also this relation lacks conclusive answers, even though it is better researched. Cavaye (1995) and Hwang & Thorn (1999) have reviewed the academic literature that describes the relation between participation and success. They all seem to have ambivalent outcomes. Even though engaging end users through user participation makes intuitive sense and has some academic support, its benefits have not been consistently demonstrated by empirical data (Cavaye; Hwang & Thorn). Cavaye (1995, p. 319) has identified the main reasons for these inconsistencies among individual studies:

1. "Incomplete and inconsistent operationalization of variables."
2. "Absence of repeated use of the same research instrument."
3. "Lack of attention to important contingencies."

In response to these observations, Hwang & Thorn have provided a meta-analysis of the available literature and found a positive correlation between system success and user participation. However, their meta-analysis exemplifies the quantitative and statistical approaches that have been taken to observe the relationship between participation and success. Even with qualitative research mostly lacking, a number of researchers have made interesting observations regarding user participation and implementation success that help to define the relationship in the ES context of this research. The link between user participation and ES implementation success is discussed in four separate parts, split according to the three measures of ES implementation success and a discussion of the confounding factors that potentially mediate the relationship (see Table 18).

Table 18: User participation and the measures of ES implementation success

User participation and ES implementation success			
1.	User participation	and	Project metrics
2.	User participation	and	ES success
3.	User participation	and	User satisfaction
4.	Participation, Success	and	Mediating factors

Participation and project metrics

The quantitative and abstract focus on project metrics stresses a set of three factors: whether the project stays within budget, is delivered in time, and is implemented with the planned functionalities. Those three factors provide an indication of the success of the ES implementation process. However, a direct and concrete link with user participation is little discussed in literature. Even though it is deemed likely that user participation prolongs the ES implementation project, and consequently costs money, it is expected to make up these costs in other implementation success aspects: the success of the system, the provided functionalities and the satisfaction of end users. This area of participation in relation to project metrics does lend itself for quantitative research, providing statistical information about the chances of budget or timeline overruns depending on the perceived relevance of the end users. Also functional characteristics could be quantitatively investigated in relation to user participation. However, it is anticipated that qualitative mechanisms that describe a direct relation between user participation and the project metrics are a step too far.

Participation and enterprise system success

This research assumes that user participation will increase the enterprise system success through the improvement of the various forms of ES quality (information, system and service quality). In addition, user participation is expected to increase both the individual and organisational impact of the new system. Both expectations are confirmed by literature: there is proof that supports a relationship between user participation and enterprise system success. McGill, et al. (2008) determined that participating end users regard the system they co-developed as being of higher system quality. Esteves, et al. (2005) provide some high level qualitative explanations for this relationship, stating that user participation can improve system quality by "providing a more complete assessment of user (information) requirements, providing expertise about the organisation the system is to support, avoiding development of unacceptable or unimportant features, and improving user understanding of the system." Finally, participants also evaluated the individual impact more highly. This higher evaluation of the individual impact was confirmed later on, as participants performed better when using the new system (McGill & Klobas, 2008).

Participation and user satisfaction

The link between user participation and user satisfaction is relatively well researched. This research is used to support this research's expectation that user participation during the ES implementation is anticipated to increase the eventual satisfaction of user regarding the developed enterprise system. Academic sources support the relationship.

McKeen & Guimaraes (1997) already showed such an outcome in their research, demonstrating that the more end users participated in the implementation project, the greater their level of user satisfaction. McKeen & Guimaraes were even able to quantitatively identify a number of specific participation activities or behaviours that increased user satisfaction, suggesting a basic core of participative activities in which end users should be actively be engaged. These specific participation activities in which end users should participate during projects with high task and/or system complexity are presented in Table 19. An ES specific perspective has been adopted while summarizing the participative activities.

Table 19: Participation activities that increase end user satisfaction (McKeen & Guimaraes, 1997)

Implementation Stage/Phase	Participation activities that increase end user satisfaction
Initiate	• Be responsible for the project definition • Be included in the feasibility analysis
Project	• Lead the project team • Develop and approve project management schedules and progress reports
Blueprint	• Define the (information) requirements • Define the I/O forms, screens, and report formats
Realisation	
Testing	• Conduct the system testing
Training	
Go-live	• Be included in team that orchestrates the system's installation

The fact that there are no specific activities linked to the realisation and training phases of ES implementation process is not an indication that these phases can be neglected. The activities that are presented in Table 19 only included McKeen & Guimaraes (1997) selection of most significant activities that impact user satisfaction during projects with a high complexity. Another conclusion of their research was that participation activities never lead to dissatisfaction, irrespective of the need of the end users to participate. This is important to know. Apparently, user participation does not have negative effects on user satisfaction, even in the case where user participation is considered relatively unnecessary.

Other researchers that corroborate the findings of McKeen & Guimaraes (1997) are Esteves, et al. (2005) and McGill & Klobas (2008). They also found that user participation has a positive relationship with user satisfaction. Participation increased the end users' satisfaction of the eventual use of a new system, revealing a significant impact of participation on the participants' sense of user satisfaction. As this research focuses on the implementation process, it is also anticipated that the satisfaction of participants with the implementation process itself manifests a comparable effect.

Participation, success and mediating factors
Some of the observations made by researchers even describe some high level mediating factors, defining the link between participation and ES implementation success more in-depth. Especially Cavaye (1995) has identified three mediating factors in the relationship between user participation and success, of which especially the last mediating factor will not surprise:

• *Perceived control.* This mediating mechanism acknowledges the importance of the end users' perception of control over their overall working environment. If this sense of control as experienced by end users is lacking, the participation process will have a reduced impact

on the end user satisfaction and consequently the implementation success. When the end users feel like they are in control this increasing the likelihood of user participation contributing to the end users' satisfaction and acceptation of the new system.

- *Desired level of participation.* This mediating mechanism refers to a faulty assumption that is frequently made in participation research: end users are involved in the process to a degree that they actually wish. This is in line with Pasmore & Fagans (1992), who also warned that not all end users have a need to be involved in a participation process. A mismatch between the level of participation and the desired level of participation can have detrimental effects on impact of user participation on end user satisfaction. Any positive effect of participation on ES implementation success can be easily undermined by this notion.

- *Perceived importance and relevance.* This concept is identical to the perceived relevance key variable of this research. Its effect on user participation has been extensively studied and discussed in section 4.4. Corresponding to the assessment there, Cavaye acknowledges its motivational impact on user participation. Since this effect occurs on the interface of the three key variables and is part of the central point of focus of this research, it will be further discussed in the next section (Relevance and Participation → Success).

Besides the perceived importance and relevance mediating factor, the other two mediating factors are also previously discussed representing aspects of user participation that have been defined at least partially in relation to perceived relevance. *Perceived control* is related to the *degree of influence* mechanism, while the *desired level of participation* is related to the *selection of participants* mechanism. Because the relationship between user participation and ES implementation success on itself is of limited importance for this investigation, these two mediating factors will not be assessed specifically unless large deficiencies are detected in the assessment of the two related mechanisms that were mentioned.

Overview of foundations

The assessment of the literature foundations for the impacts of perceived relevance and user participation on ES implementation success have been presented. A combined high level overview of the relations is presented in Figure 49. It shows if and how both relevance and participation impact the three individual measures of success. The figure also shows broadly which links are (at least partially) supported by literature and which are merely expected by the author. In addition, the overlapping qualities of the three ES implementation success measures are indicated by the small arrows between them, suggesting a central role for the ES success (Gable, et al., 2003; McGill & Klobas, 2008). In addition to investigating the interaction between relevance, participation and success, a number of mediating factors have been identified.
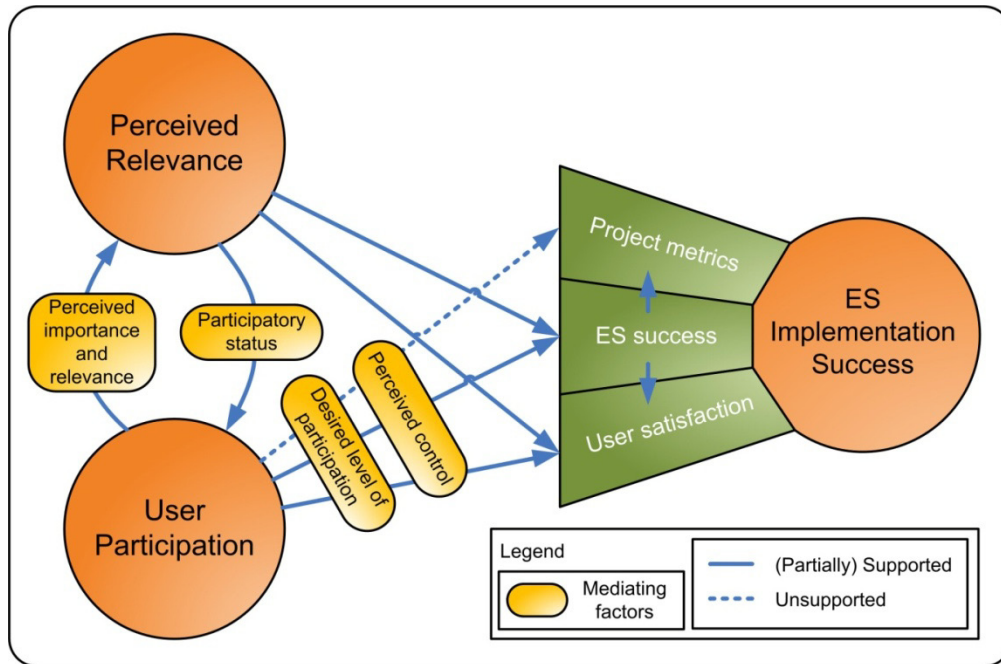
<div align="center">Figure 49: Overview of relevance and participation in relation to success</div>

Mediating factors

Figure 49 also includes a number of mediating factors in relation to the key variables of this thesis. It is interesting to see that the interaction between perceived relevance and user participation is already acknowledged by two of these mediating factors: perceived importance and relevance, and participatory status. These have been identified by respectively Cavaye (1995) and McGill & Klobas (2008), albeit with a level of detail that is dwarfed by the attention this topic receives during the earlier parts of this chapter. These two mediating factors are actually the dynamics that this research tries to describe in terms of qualitative mechanisms. The other two mediated factors, identified by Cavaye, are also shown in the figure. Even though these are not expected to play an important role in the overall relationships, they have been included for the completeness of this investigation.
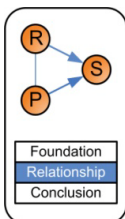
4.5.2 Relationships in detail

After reviewing the academic foundation that describe the effects of perceived relevance and user participation on ES implementation success, this section aims to formulate qualitative mechanisms that describe these effects. As mentioned before, the level of detail with which these last two relationships are described, contrasts with the investigation of the relationships between participation and relevance. The earlier two relationships have been formulated with low level logically induced mechanisms, instead of only the high level mechanisms that are used for this part of the theoretical framework.

Again, in order to maintain readability, only an overview of hypothesized mechanism is presented here, in the main body of this document. A lengthy description of each of the six individual mechanisms is included in the appendix and can be found in Appendix B. After the overview of mechanisms, an encompassing interpretation of the mechanisms, consisting of the identification of overall patterns and the hypotheses, is presented in the preliminary conclusions in section 4.5.3.

Overview of mechanisms

All hypothesized mechanisms have been described in terms of both the content-oriented and process-oriented perspective (as stipulated in section 4.2.2). These two perspectives are essential for the development of an encompassing overview that incorporates each of the identified mechanisms. First, the content-oriented perspective is used to provide an ES specific overview of the different types of mechanisms that have been found. The relation between relevance and success is separately presented from the relation between participation and success. Secondly, the process-oriented perspective helps to envisage the impact of the hypothesized mechanisms on ES implementation success over time. Although all hypothesized mechanisms have been described thoroughly in Appendix B, only those mechanisms that are expected to have an effect on perceived relevance are focussed upon.

Content-oriented perspective

From a content perspective, the hypothesized effects of perceived relevance and user participation on the individual measures of ES implementation success are discussed. Slightly deviating for the methodology that was announced at the start of this chapter, relevance and participation are described in terms of their impact on all underlying aspects of the three individual but related measures of ES implementation success. This approach is contrary of that of the two relationships that have been described previously. Also the types of relations deviate slightly. Each hypothesized mechanism has one of the following types of relationship with success: a supported direct relation, a expected direct relation or no direct relation. The reason for omitting indirect relationships of relevance and participation with success is because the interference and overlap this would introduce with regard to the previously described relationship between relevance and participation. The two overviews of hypothesized mechanisms are presented in Table 20 (the effect of relevance on success) and Table 21 (the effect of participation on success). More specifically, it shows what type of relation relevance and participation have with the underlying aspects/measures of ES implementation success.

Table 20: Anticipated relationship between relevance and success

Detailed relationship between Perceived relevance and ES implementation success					
Independent variable		**Type of relationship**			**Dependent variable**
		Detailed dependencies			
Perceived relevance (Possible mediation by : Participatory status)	X	Planned vs. actual budget	**Budget**	**Project metrics**	**ES implementation success**
	X	Planned vs. actual timeline	**Timeline**		
	X	Planned vs. actual functionalities	**Functionalities**		
		⌃			
	X ⟫	Ease-of-use, Functionality, Reliability, Flexibility Data quality & Integration.	**System quality**	Future impact	
	X ⟫	Responsiveness, Assurance & Empathy.	**Service quality**		**ES success**
	X ⟫	Accuracy, Availability, Timeliness & Relevance.	**Information quality**		
	→	Job performance, Decision-making performance & Quality of work	**Individual impact**	Impact to date	
	⟫	Operating cost reduction, Overall productivity gains, Staff reduction & Return on investment	**Organisational impact**		
		↓			
	→	Overall satisfaction, Information satisfaction & Enjoyment	**Satisfaction with the system**	**User satisfaction**	
	⟫	Overall satisfaction	**Satisfaction with the process**		

Legend	Direct relation supported	→	Direct relation expected	⟫	No direct relation expected	X	No direct relation with actual quality - direct relation with perceived quality	X ⟫

Table 21: Anticipated relationship between participation and success

Detailed relationship between User participation and ES implementation success					
Independent variable	**Type of relationship**				**Dependent variable**
		Detailed dependencies			
User participation (Possible mediation by : perceived control, desired level of participation, and perceived importance and relevance)	»	Planned vs. actual budget	**Budget**	**Project metrics**	**ES implementation success**
	»	Planned vs. actual timeline	**Timeline**		
	»	Planned vs. actual functionalities	**Functionalities**		
	⌃				
	→	Ease-of-use, Functionality, Reliability, Flexibility Data quality & Integration.	**System quality**	Future impact	
	→	Responsiveness, Assurance & Empathy.	**Service quality**		**ES success**
	→	Accuracy, Availability, Timeliness & Relevance.	**Information quality**		
	→	Job performance, Decision-making performance & Quality of work	**Individual impact**	Impact to date	
	»	Operating cost reduction, Overall productivity gains, Staff reduction & Return on investment	**Organisational impact**		
	↓				
	→	Overall satisfaction, Information satisfaction & Enjoyment	**Satisfaction with the system**	**User satisfaction**	
	»	Overall satisfaction	**Satisfaction with the process**		
Legend	Direct relation supported: →		Direct relation expected: »		No direct relation expected: **X**

Process-oriented perspective

The process-oriented perspective describes how perceived relevance and user participation impacts ES implementation success over time, as the ES implementation project progresses. During this process, relevance, participation, and their interaction have an incremental effect on the eventual success of the system and the implementation. As the project progresses the project metrics, quality aspects, the individual and organisational impacts, and the eventual satisfaction of the users will be constantly subjected to change, depending on the ES implementation efforts and also additional critical success factors, which have already been discussed in section 3.6.3. Though lacking the level of detail with which the relationship between relevance and participation has been described, Figure 50 illustrates the anticipated impact of both perceived relevance and user participation on ES implementation success.
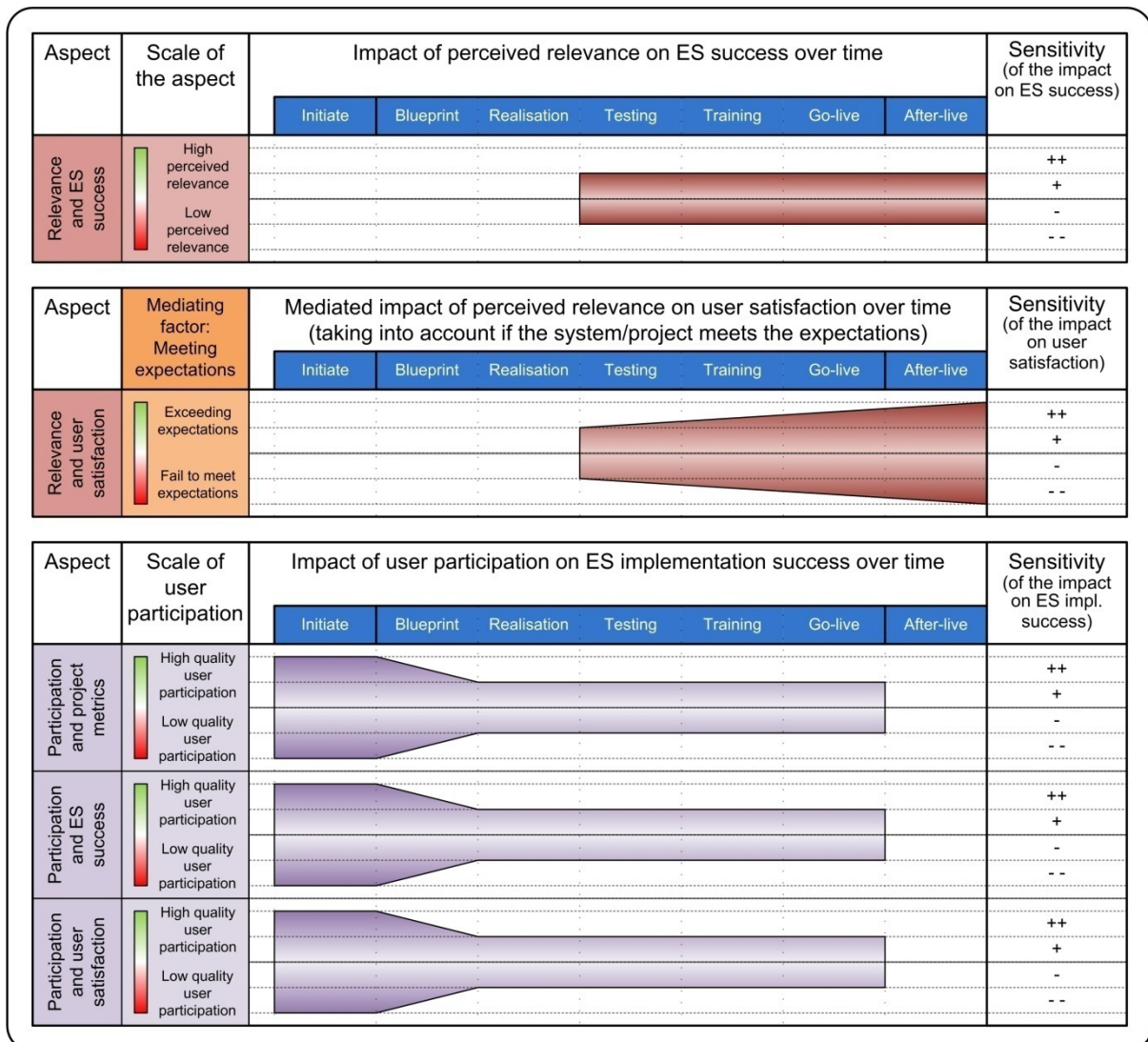
Figure 50: Anticipate effect of relevance and participation on success
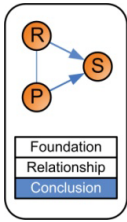
4.5.3 Preliminary conclusion

The preliminary conclusions describe the results of the investigation into the effect of perceived relevance and user participation on ES implementation success. Based on a foundation of academic sources, extended with logical induction, the hypothesized mechanisms qualitatively define the impact of relevance and participation on success. During ES implementations in practice, the underlying knowledge can be used to:

1. ensure a positive change of ES implementation success, and/or
2. prevent a negative change of ES implementation success.

The preliminary conclusions consist of two parts. The first part describes the identified patterns in the two investigated relationships. These patterns are based on the foundations for the line of reasoning, the individual hypothesized mechanisms and the overview of the combined set of mechanisms, respectively presented in section 4.5.1, Appendix B and section 4.5.2. The second part is used to present the overall hypotheses with regard to the impact of perceived relevance and user participation on ES implementation success. These hypotheses take into account the hypothesized mechanisms and identified patterns.

Identification of overall patterns

Two important patterns are recognized. One of the patterns that is focused upon aims to explicate the dynamics of the impact of relevance and participation on success. Logically, the discussion of the patterns is divided in two parts, the first elaborating on the distinctive features of relationship between relevance and success, and the second describing the distinctive features of the relation between participation and success. Additionally, an important pattern about an difference in overall mechanics between relevance and participation is discussed.

One critical remark concerning the low number of mechanisms per relation is deemed appropriate: the low number might makes it easier to discern patterns (one mechanism could be interpreted as a mechanisms), though it may be less reliable as faulty assumption would have a bigger impact on the result. Therefore, the discussion of patterns is kept to a minimum.

Dynamics: relevance and success

When reviewing the two mechanisms that define the relation between perceived relevance and ES implementation success, especially the timing of the interaction is worth mentioning. Independent of how the perception of relevance evolves over time and becomes less susceptible to change (see section 3.3.2), it seems that its effect on the success of the implementation is only becoming important during the later phases of the project, when the users start to have their first experiences with the actual system. The testing phase offers the first real feedback on all activities up until then, so this is the phase onwards perceived relevance impacts success.

Additionally, the type of impact is as different as the two proposed mechanisms are. From the moment the end users get confronted with the first real impressions of the system (testing phase), the effect of perceived relevance on ES success is expected to be continuous but not very strong. While starting at the same moment in time, the impact of perceived relevance for the user satisfaction on the other hand continually increases in strength.

Dynamics: participation and success

In case of the relationship between user participation and ES implementation success the pattern that is supported by all three mechanisms is also primarily related to the timing of the interaction. Even though participation during all phases of the project are important for the outcome of the project, the initiate stage and blueprint phase seem to be especially important. This is not really a surprise, as the planning of the entire project and also the participative efforts take place in the initiate stage and the blueprint is arguably the most important deliverable of the participation process. This does not imply that the other phases are unimportant, only that special attention during the early stages is warranted.

Important differences between the relationships

The extend of the interaction relevance and participation on success also seems to be of different types. User participation truly has a large impact on the properties of the system, while the impact of perceived relevance is much more related to the mindset end users will have regarding the system. This does not make perceived relevance less important, but does indicate that its effects determine not so much the real product but more how it is perceived and received by its future users.

Hypotheses

An important goal of this chapter is to present qualitative hypotheses. However, the deviating setup of this section makes it difficult to provide the same level of detail in the hypotheses as has been attempted in sections 4.3 and 4.4. Although these hypotheses should have the potential to ensure or improve ES implementation success through controlling both perceived relevance and user participation, this is not easily managed. Therefore these hypotheses will be aiming to explain how relevance and participation impact success, instead of suggesting alternate ways to manage of relevance and participation.

ES implementation Success

The presumed goal of any ES implementations is to be successful. ES implementation success has a considerable number of dimensions, represented by the adopted definition and underlying measures of success. In addition, a multitude of factors affect the outcome. From a research stand point, an ES implementation is successful when the three selected measure of success indicate success. This is when:

1. The project metrics reveal minimal overruns of budget and timeline, and only a small difference between planned and actual functionalities.
2. The system, service and information quality are high.
3. The individual and organisational impacts of the system and the related change are positive.
4. The satisfaction of users with both the system and project are high.

Perceived relevance and success

The relevance that users attribute to the ES under development is based on their expectations regarding the system. A new ES bring with it both good changes and bad changes in the working conditions of the adopting organisation. Though not exclusively, these improvements and deteriorations can be of an: economic nature, social nature, functional nature, and time and effort

saving nature. The combined effect of these expectations defines the individual mindset of users towards the system. To ensure implementation success, it is important to manage these expectations. The acceptation of the system depends at least partially on the mindset of the stakeholders. In relation to ES implementation success, perceived relevance becomes exceedingly important as the project progresses, having little effect during the initiate stage and the blueprint and realisation phase. As the project advances and the users start to be confronted with the system, from the testing phase onwards, their expectations (and thus perceived relevance) will become increasingly important for:

- their perception of the system, service and information quality aspects of the system,
- their motivation to adopt the change, resulting in an effect on the individual and organisational impact of the system, and
- their satisfaction with the system and the implementation process.

User participation and success
User participation is a means to improve the chances of ES implementation success. Participation is recognized as a key factor among the numerous critical success factors that have been identified in relation to ES implementations. Through participation, users are able to contribute to the development of the system, enabling them to: assist in the formulation of requirements, provide expertise about the organisation the system needs to support, avoid unacceptable or unimportant functionality, and improve their understanding of the system. Even though user participation is highly relevant during the entire implementation process, it is especially important during the early phases of the implementation process, as many aspects of the new system and the implementation process are planned at those moments in time. Participation is of key importance during the blueprint phase, as all requirement are formulated, all functionalities of the system are planned and the new organisational processes are defined. Throughout the remainder of the project user participation remains important, but with a smaller impact on ES implementation success. User participation during:

- the realisation phase allows participants to clarify particular requirements and functionalities.
- the testing phase allows participants to expose and resolve issues and problems with the new system and the accompanying business processes.
- the training phase allows participants to assist in the formulation of training manuals and the training of their co-workers. At this moment in time all end users are confronted with the new ES.
- the go-live phase allows participants to assist in getting the system up and running, able to detecting all sort of problems and issues with system quality, service quality, and information quality, identifying unwanted individual and organisational impacts.

4.6   Summary of theoretical framework

Chapter 4 is concluded with a summary that combines all the research findings that have been presented during the investigation of the relationships in the theoretical framework. The goal of this summary is to present a short overview of the anticipated interactions and its dynamics, which are both founded on the academic literature and extended by logical induction in the previous sections of this chapter. The summary describes the overall relationships and interactions, as illustrated in Figure 51.
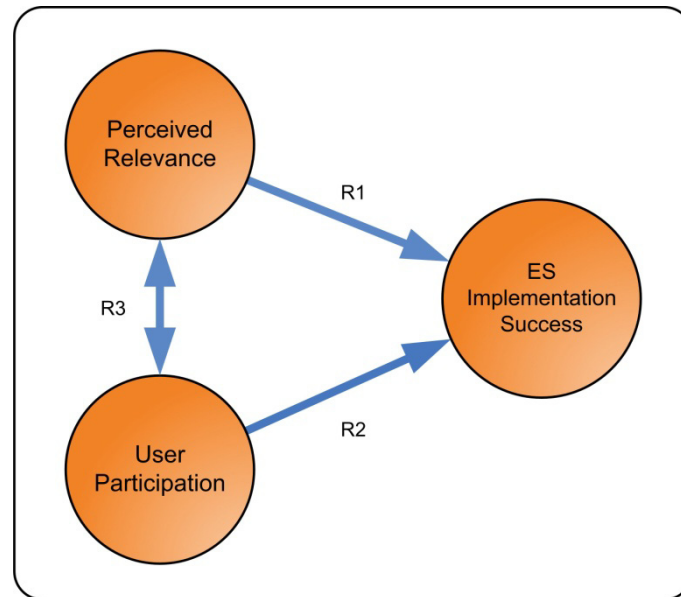
Figure 51: The effect of the interaction of relevance and participation on success

Based on the research findings, a synergetic effect of both relevance and participation on ES implementation success is certainly expected. During the investigation of the relationships in the theoretical framework, the academic sources combined with the anticipated qualitative mechanisms, support the existence of a substantial number of connections between the key variables. From these connections the essential relationships and their dynamics are distilled. This summary is divided in three parts:

- First, a high level overview of the relationships in the theoretical model is presented. This overview focuses on the relationship between relevance and participation, and its effect on success. While adopting a conceptual perspective, also the practical value of the interaction is viewed.

- Second, the high level interaction of all three relationships over time are combined in a single overview and visually represented. From this perspective, it is possible to identify the overall dynamics of the relationships as they interact over time.

- Finally, a short discussion of the link between the investigation of the theoretical framework and the subsequent research steps is included. The subsequent steps are the case study and the practical recommendations that are incorporated in this research.
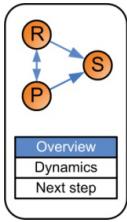
4.6.1 Key interaction within the theoretical framework

Systematically and step by step all key variables and their relationships, thus interactions, are discussed. Because ES implementation success is the goal of every ES implementation, it is taken as starting point and basic principle for the discussion of all three relationships. As this investigation has to present practical recommendations, a practical mindset is adopted from this point onward. Since ES implementation success is the leading key variable, especially in a practical setting, it is adopted as starting point. Reasoned from a practical ES implementation context, perceived relevance and user participation are important concepts through their impact on ES implementation success. It is the benefits that count and perceived relevance and user participation are never goals on their selves. Section 4.5 shows that relevance and participation are of significant importance for the success of the implementation. But beside the notable impacts of user participation and perceived relevance on success, both concepts also revealed a complex dynamic between themselves. Knowledge and understanding of these dynamics has the potential to greatly improve the overall chances of eventual implementation success.

Managing participation through relevance

Management needs to be aware of an important difference in the mindset of users/participants that are involved in the participation process. Perceived relevance plays an essential role in defining that mindset, as it makes the difference between actual commitment, sometimes also referred to as spontaneous involvement, and mere involvement in the participation process, without any real commitment from the users. A high perceived relevance of the system will really motivate participants to commit to the participation process. The difference between actual commitment to participation and mere involvement in participation can result in respectively success or failure of the entire implementation. Therefore, managing perceived relevance is important from the moment the decision to implement an ES is made.

Managing relevance through participation

All the while, user participation provides the structure that allows users to influence the outcome of the ES implementation and to gain a better understanding the (often large scale) change in IT, daily working routines, and organisational processes. The ability to influence the project and to understand the new system and related working methods is essential for leveraging the importance and relevance of the new system. While a number of measures can be applied to influence and manage the perceived relevance of the system, user participation is one of the more substantial and effective tools for leveraging those expectations of end users, both directly in the case of participants and more indirectly in the case of their co-workers. Throughout the implementation project a large number of user participation aspects must be managed in order to ensure that the enterprise system is perceived as being highly relevant.
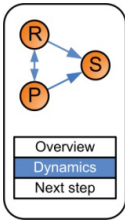
4.6.2 Identifying important stages and phases

All four discussed relationships in the theoretical framework have also been reviewed in terms of their impacts over time. This focus on impacts over time is essential for providing qualitative insights into the relationships and for the identification of key moments in the ES implementation. The dynamics between key variables, which have been identified with the help of the process-oriented perspective (see section 4.2.2), indicate the timing of all interactions. The process of identifying and combining the dynamics is done without linkage of the interactions with specific mechanisms, but aims to provide a high level view.

Overview of dynamics over time

The intensity of the individual relationships between the key variables during all stages and phases of the ES implementation is shown in Figure 52. Combining all these interactions, their intensities and the changes over time into a single figure provides essential insights into the dynamics of the relationships in the theoretical framework. This insight is of importance, as it indicates when the key variables manipulate each other and, more importantly, when perceived relevance and user participation should be planned and managed. When reviewing the relationships dynamics in Figure 52, a number of statements can be made:

- The interactions between participation and relevance are strongest during the initiate stage and the blueprint phase. The effect of participation on success displays a similar picture.
- As the implementation process progresses, the impact of participation on relevance and success changes with the magnitude of the participative activities.
- The strength of the effect of perceived relevance on user participation correlates with the opposite relationship. It is strongest during the initiate stage and the blueprint phase. The magnitude of the participative process responsible for the intensity of the effect.
- The impact of relevance on success starts to come into play during the testing phase and becomes increasingly stronger, reaching its height during the go-live phase and after-live stage.
- Due to the scoping of this research, and slightly contrary to the relationship between relevance and success, the impact of participation on relevance and participation during the after-live stage is not reviewed.

Additional intermediate impact

During the investigation of the relationships in the theoretical framework and the formulation of qualitative mechanisms, two degrees of impacts have been described: an "effect" and a "strong effect" (see Appendix B). Figure 52 uses these two degrees of impacts to describe the overall dynamic relationships between perceived relevance, user participation and ES implementation success. However, to increase the explanatory power of the figure, an intermediate effect has been added, which describes an intermediate impact (stronger than an "effect", but not so strong as a "strong effect"). With the addition of this intermediate effect/impact, the dynamic relationships between key variables can be illustrated with more detail, while giving a clearer indication of the tendency of the impacts to change over time.
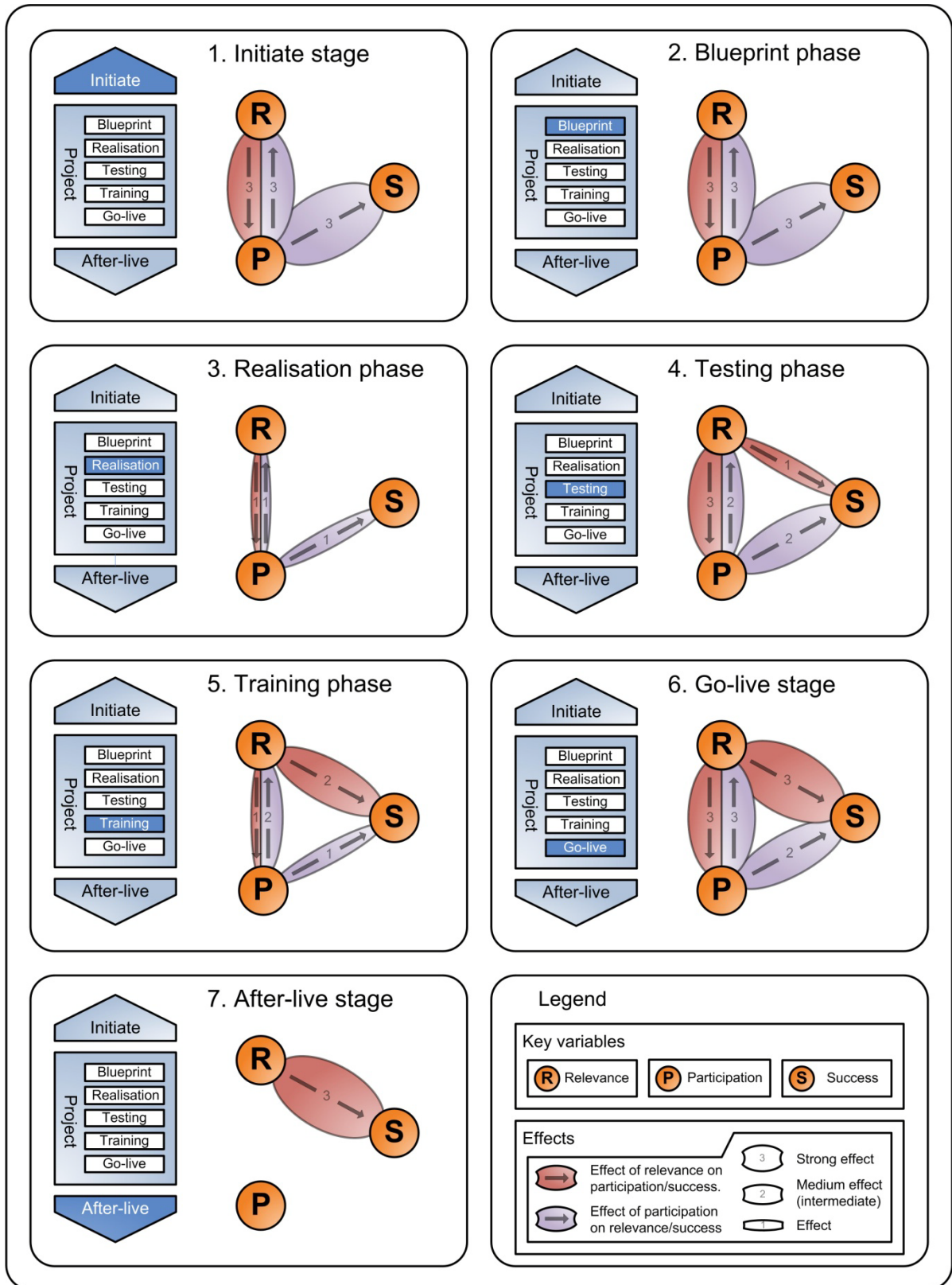
Figure 52: Effects of key variables over time

Summary of the dynamics

The overall dynamics of the interactions between perceived relevance, user participation and ES implementation success determine the importance of the specific stages and phases during the implementation process. Based on these dynamics, it is advisable to ensure perceived relevance from the moment the ES project is initiated. Careful consideration and planning of all user participation aspects is also advised during this time. After the initiate stage and blueprint phase, project management should put additional focus on user participation during the more influential and intense participative phases, such as the testing and go-live phases. As ES implementations are often lengthy processes, it is necessary to maintain the relevance of the systems as the project advances through the phases. Perceived relevance only starts to impact ES implementation success when the users start to experience the system and the related change during the testing phase. It would be unfortunate if the stakeholders were aware of the relevance of the system at the start of the project, but lost that feeling of relevance as the project progressed, because information about its benefits was not effectively communicated.
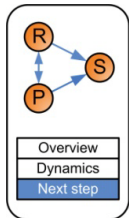
4.6.3 The next step

The investigation of the relationships in the theoretical framework reveals a central role for perceived relevance and user participation in relation to ES implementation success. While this comes as no surprise within the context of this research, it does confirm the importance and value of this investigation. The theoretical framework successfully describes the underlying complexities between perceived relevance and user participation, in addition to the relation of relevance and participation with ES implementation success. One of the important goals of this research is contribute the key outcomes of the investigation into the framework to both the academic community and the practical business arena. The final stage of this research (from chapter 5 and onward) is an attempt to transform all the mechanisms and resulting hypotheses into practical recommendations.

5   Case study

The case study research has two major goals: to familiarize the author with real life ES implementations and to establish how real-life ES implementation projects acknowledge perceived relevance and user participation in the professional domain. Through assessment of current ES implementation approaches, it will be possible to formulate practical recommendations that fill the gap between what is done in practice and what should be done according to the mechanisms in the theoretical framework (see chapter 4 for the framework). The practical recommendations are intended to provide the ES implementing organisations (both the adopting organisation and implementation partners, such as KPMG) with useful guidelines that improve the success rate of ES implementation projects.

Large parts of the setup of this case study research have already been defined and specified in section 2.2 of the research design chapter. The way the case study research is incorporated into this thesis deviates from its original purpose. Originally, the case study research was intended to validate the relationships that have been discussed in the theoretical framework. However, with the limited resources that were available for this study, it was not possible to provide an extensive validation. Therefore, an ulterior goal was formulated: to investigate how the elements of the theoretical framework were currently embedded in ES implementations in practice.

The literature study and the investigated theoretical framework specify a set of measures that need to be assessed through interviews with stakeholders. These measures are translated into a set of data requirements, which are the foundation for the semi-structured interview protocols. The interview protocol ensures a consistent description of every case study organisation. Whenever possible, the interview sources are corroborated with the relevant paper trails that are commonly created throughout the organisation during such radical and extensive processes. However, in this specific practical research setting, interviews are the most important means to collect qualitative data. This chapter starts with an overview of the cooperating organisations.

5.1   The cooperating organisations

Through contacts of KPMG, the author has approached a number of organisations that recently completed, or were in the process of completing, an ES implementation. These companies needed to comply with the selection criteria that were put forth in the previous chapters. Unfortunately, the majority of ES related projects are in the domain of performance improvement of existing enterprise systems and lack suitability for this specific implementation research. Even when the organisations had the right ES characteristics, they were not always willing to cooperate with the research, further reducing the availability of case study organisation. After a thorough search, four organisations were found willing to provide the author with (limited) access to its staff. The different organisations, including a short description of their activities and the brand of the implemented enterprise system, are presented in Table 22.

As announced in the research design chapter (chapter 2), the first two case studies, consisting of three interviews, have been used as pilot studies. The goal of the pilot studies is threefold: to familiarize the author with the ES implementation domain, to test the data requirements and to

refine the initial versions of the structured interview protocol. Besides these three purposes of the pilot studies, some practical limitation also constrained the access to these two organisations.

Table 22: Cases with a short individual description

Case	Short description	Enterprise system
1	This organisation is a do-it-yourself (DIY) chain with a large number of stores in the Netherlands. The entire organisation recently adopted a new SAP system to replace the existing tailor made solution. The entire implementation is reviewed for this research.	SAP
2	This organisation is a large paper trading multinational. The European organisation consists of a large number of subsidiary companies. In order to consolidate many different enterprise systems, a new IBS system is being implemented. The German implementation is reviewed for this research.	IBS
3	This is a multinational engages in developing, sourcing, producing, marketing and distributing organic, natural, and specialty food products. The European branch is in the process of implementing SAP. Split in regional implementations, the Dutch implementation is reviewed for this research.	SAP
4	This organisation provides maintenance, advice, and service for operators of public transport. The company currently has a wide variety of enterprise systems that need to be consolidated. The SAP FI/CO implementation in the financial department is reviewed for this research.	SAP

5.2 Data requirements

The data requirements make explicit what data is sought after during the actual case study research. Naturally, it is very important to determine what data needs to be extracted out of the four cooperating and ES implementing organisations. The literature study and the theoretical framework provide the necessary focus, since it is the ultimate goal of the case study research is to support, reject and validate the main relationships that have been qualitatively defined in the theoretical framework (see chapter 4). Recollect that the investigation into the framework describes 1) the bidirectional relationship between perceived relevance and user participation and 2) the effect of this relationship on ES implementation success. Furthermore, it is important to note that the required data to test and validate the literature study and the theoretical framework is not limited to the interaction between the key variables of this investigation. In order to do a qualitative assessment of the unique circumstances in each of the cooperating organisations, it is also necessary to have at least a basic understanding of the overall business and ES implementation. The data requirements are presented in Table 23.

Table 23: Data requirements for case study research

In order to measure/determine ...	Ask questions about:
Perceived relevance	
• **Expectations**	Overall expectations & Issues with the old work processes
o Economic improvements	Terms of employment & economic stimuli
o Social improvements	Hierarchal position, social network & Status
o Functional improvement	Job description & Daily activities
o "Saving time and effort" improvements	Efficiency gains and losses
• **Change of expectations**	Change of expectations over time & Susceptibility of expectations to change over time
User participation	
• **Type of participation**	Proportion of participants, Selection of participants & Preparation of participants
• **Degree of participation**	Responsibilities of participants (on the scale of Pasmore & Fagans) & Goal of user participation
• **Content of participation**	Design approach, Technical design of IT & Social design of organisational change
• **Extent of participation**	Time expenditure of participants & Planning of user participation
• **Influence of participation**	Influence of participants (on the scale of Pasmore & Fagans) & Treatment of participant input
• **Formality of participation**	Degree of formality of meetings, communications and interactions of the implementation project
ES implementation success	
• **Project metrics**	
o Budget	Planned budget vs. Actual budget
o Timeline	Planned timeline vs. Actual timeline
o Functionality	Planned functionalities vs. Actual functionalities
• **ES success**	
o System quality	Ease of use, Functionality, Reliability, Flexibility, Data quality & Integration (of the system)
o Service quality	Responsiveness and Assurance (of IT support)
o Information quality	Accuracy, Availability, Timeliness & Relevance (of the information provision)
o Individual impact	Job performance, Decision-making performance & Quality of work

In order to measure/determine ...	Ask questions about:
o Organisational impact	Operating cost reduction, Overall productivity gains, Staff reduction & Return on investment
• **User satisfaction**	
o Satisfaction with the implementation process	Overall satisfaction & Enjoyment
o Satisfaction with the ES system	Overall satisfaction, Information satisfaction & Enjoyment
Confounding variables	
• **Distortion of perceived relevance**	Preconceptions, Previous experiences (including indirect experiences), Interest in IT & Knowledge of IT
• **User participation contingency factors**	
o Organisational	n/a
o Project-related	n/a
o User-related	Willingness to participate, Ability to participate & User characteristics and attitudes
• **Critical success factors**	Critical and remarkable incidents
User participation & Perceived relevance	
• **Participation → Relevance**	The relation between participatory influence and perceived relevance & Participatory role and the perceived relevance of other users
• **Relevance → Participation**	The relation between perceived relevance and the execution of user participation & Motivation for participation
Participation, Relevance & Success	
• **Participation → Success**	Effect of participation on success
• **Relevance → Success**	Effect of relevance on success
Background information	
• **Background of the new ES**	Short description of the new system, most important arguments for adopting the new system & Fazing of the implementation project
• **The role of the interviewee**	Operational role in the organisation & role in the implementation project

Due to the adapted purpose of the case study research, not all data requirements will be used during this investigation. However, the list provides a high-quality starting point for validating the measures for the individual key variables and the relationships in the theoretical framework.

Limitations to empirical data gathering

Gathering empirical data to support the theoretical claims made in the earlier parts of this documents is not self-evident, either because of practical limitations, methodological limitations, or other issues that are incurred during the investigation. One important aspect that limits this investigation is described below.

It essential to make a clear distinction between the theoretical interaction of the three key variables of this research and the way these interactions can be measured with the help of case study research. Especially in the case of ES implementation success key variable, it is important to note that in the current research setting, the variable can only be determined at a moment in time after the ES implementation has been completed and the system is live. It is practically impossible for the involved stakeholders, such as the participants and other end users, to make an assessment of the quality of the ES, its future business benefits, and the successfulness of the implementation project as long the project itself is not finished and still progressing. As a result, it is possible to assess the change in specifically ES success (as one out of three individual measures for ES implementation success) from the go-live moment and onwards, but not its development before the go-live moment. So while perceived relevance, user participation and their interaction incrementally and continually influence ES implementation success, the current measures for ES implementation success do not support an incremental and continual assessment of all these interactions.

Summarizing, empirical support and validation for all the hypotheses is impeded by the ability to assess these concepts in a business setting in real time. The research design and the developed measures for the key variables limit the ability to map the events in a practical situation, especially within the bounds of the current research investigation, with its limited access to relevant case study organisations.

5.3   Structured interviews

In order to gain insight into the four case study organisations through interviews, a structured interview protocol is needed. Based on the information requirements, this protocol has the goal to help the author collect the specific information within each of the cooperating case study organisations. At the same time, the protocol has to take into account the different perspectives that stem from the distinct roles of the various stakeholders in the organisation. In addition, a supplemental protocol for the introduction and finalization of the interviews is formulated to guide the data collection process. This supplemental protocol formalizes the circumstances under which the relevant data is collected and includes for example: an introduction of the author, an introduction of the research, a number of formal agreements, and some other practical aspects. The combined protocol, consisting of a structured interview protocol and the supplemental protocol, ensures that each of the interviews is consistently handled.

5.3.1   Interview perspectives

The diversity in organisational perspectives of the requested stakeholders on the ES implementation results in different data requirements for every role, as each role has specific view on and knowledge of the ES implementation. As a result, three versions of (resembling and overlapping) structured

interview protocols have been devised. The three interview perspectives can be differentiated as follows:

- The management perspective
- The key user perspective
- The end user perspective

5.3.2 Structured interview protocol

Three different structured interview protocols are needed to provide the author with a means to interview each of the three stakeholder groups. The data requirements, discussed above, provide the raw elements that need to be assessed, while the protocol determines a logical order for their discussion and formulates the specific questions that are presented to the interviewees. Based on the experiences in the pilot studies, the structured interview protocol has been divided in five sections.

1. **The introduction, consisting of:**

   a. An introduction of the author.
   b. A short description of the research.
   c. A short description of the case study setup.
   d. An assurance with respect to the confidentiality of the individual interview results.
   e. A request for permission to record the interview for processing purposes.

2. **The actual structured interview protocols.**

   a. Questions regarding general background and some high level confounding variables.
   b. Questions regarding perceived relevance.
   c. Questions regarding user participation.
   d. Questions regarding relevance and participation dynamics.
   e. Questions regarding enterprise system implementation success.

3. **The closing, consisting of:**

   a. An explanation about the processing of the results
   b. A request for the permission to contact the interviewee in case of additional question or a lack of clarity.
   c. A request for access to documentation
   d. An expression of gratitude for the cooperation of the interviewee

Each structured interview protocol is designed and formulated to appropriately examine the ES implementation from the specified hierarchical perspectives, taking into account the educational background and expected level of knowledge of the interviewees, which the pilot cases also helped to ascertain. The final structured interview protocols have been used to interview a total of seven individual stakeholders, distributed over third and fourth case.

5.4   Case study results

The goal of the case studies is identify the current implementation approaches in practice. More specifically, how the recent implementations handled the implementation aspects that have been defined in the theoretical framework. Each of the case studies generated a considerable amount of data and from this data the information needs to be extracted. Due to limited time, this is done by addressing the most notable aspects of the implementations. The focal point is the management of perceived relevance and user participation.

The findings are split in a number of parts. First, a notable discord in the research sample is identified and discussed. The second case, in comparison to the other three cases, shows a major deviation the implementation approach, which is caused by a different (national) business culture. While these findings are interesting, the profound differences between the second case and the other three cases disqualify it from further use. Secondly, based on the three remaining cases, the management of perceived relevance in a practical setting is reviewed, followed by a similar assessment of the management of user participation. The hypothesized mechanisms, identified in section 4.3.2 and 4.4.2 provide the structure for the discussion of both parts. Frequently, the influence and understanding that participants experience trough participation are discussed. Influence and understanding refer to the concepts that have been defined in section 4.3.1. Finally, a short summary of the research findings is discussed.

Cultural differences: German vs. Dutch business culture

When reviewing the four implementation projects in the case study sample, the first thing to note is an important cultural distinction between the four implementations. One of the implementations (Case 2: the IBS implementation) took place in Germany. Germany is a country with a significantly different business culture compared to that of the Netherlands. The German implementation skipped the topic of user participation altogether, even though it turned out that the new system was developed with the input from middle management. They defined all the new organisational processes for the new situation. While this research defines user participation to include efforts of middle management, it is important to underline the fact that the actual end users of the system were not involved in this implementation. As actual user participation is viewed as unnecessary, the necessity for perceived relevance was even less important.

The reason for this difference is the fact that the German business culture is far more hierarchical and top down oriented, especially compared the Dutch business culture, in which the other three implementations took place. While it is probable that perceived relevance and user participation will have a less profound impact on the overall implementation success in a more hierarchical business culture, the author is convinced that both relevance and participation could also be of value under those circumstances. Nevertheless, this major difference with the Dutch implementations makes the German implementation a stranger in the case study sample. Therefore, it will not be included in the further assessment of the case studies.

5.4.1 Management of perceived relevance

The mechanisms regarding the impact of perceived on user participation, which are checked in the case study sample, are: expectations, differentiation of expectations, change of expectations, and susceptibility of expectations to change. For each of these, the circumstances in the case study sample are discussed.

- **Expectations / change of expectations**

  All three implementations used newsletters and periodical meetings to discuss the progress of the ES implementation with the involved stakeholders. Even though all three cases have periodical communication with all stakeholders, the communication is primarily aimed on providing the organisation a status reports. This way progress all users are aware of the project. Even while management really intended to involve the majority of users in the project, it seems that the effectiveness of these sessions was not always sufficient. However, these types of large scale communication are not really intended to manage the individual expectations. This requires focused communication, aimed at informing individual user groups of the specific relevance of the new system and related change for them.

  When asked, it also seems that project management was not aware of the potential role of user participation to leverage the perceived relevance of the system and the related change. While good intentions were responsible for incorporate user participation into the implementation project, it is clear that user participation is not yet exploited to the fullest and there is room for improvement.

- **Differentiation of expectations**

  None of the case study organisation consciously distinguish between genuine and artificial improvements or incentives, as either is used during the implementation. As no distinction is made, conscious thought about the type of improvements the system should entail could lead to easier means to motivate user and participants.

- **Susceptibility of expectations to change**

  The tendency of expectations (perceived relevance) to become increasingly less susceptible to change is recognized by the majority of interviewees, including management. However, since these expectations do not receive the attention that this study advocates, there is also little attention for this recognized dynamic in practice. Thus, better planning of the management of expectations over time has the potential to improve perceived relevance and reduce the effort of doing so.

5.4.2 Management of user participation

The mechanisms regarding the impact of user participation on perceived relevance, which are checked in the case study sample, are: the proportion of participants, the selection of participants, the preparation of participants, the degree of responsibility of participants, the balance between technical and social design, the time expenditure of participants, the treatment of participant input, and the formality of participation. For each of these, the circumstances in the case study sample are discussed.

- **The proportion of participants**

  The proportion of participants greatly varies among the three cases, from 5 percent of users in the first case to more than 50 percent in the fourth case. The most important observation is that one should be very careful not to let a high proportion of participants result in an inversely proportional effect on the influence a individual participants can wield. It would be wise to find an optimal proportion, which ensures that maximum number of stakeholders is involved in user participation, while the loss of the experienced influence and understanding is minimised.

- **The selection of participants**

  Regarding the selection of participants, a number of different practices are recognized in the cases. In one case no criteria have been used to select the participants and selection was done by appointing a small number of users that have a natural overview over processes, combined with a known interest in IT and involvement in earlier IT projects. In another case, selection criteria have been regarded more consciously, having essentially the same effect on the composition of participants. Still, in most of the implementation this seems to be a natural process to which little attention is paid. Especially the dissipation of influence and understanding require a more attention.

- **The preparation of participants**

  Although preparation of participants is acknowledged in all three cases, a more explicit perspective on the influence and understanding that is enabled by user participation could be helpful. The preparation should not only ensure users understand what a requirement is, and how it fits in a blueprint, but participants should also be prepared to make decisions regarding the organisational change.

- **The degree of responsibility of participants**

  In all cases, the participants were able to determine their mandate and responsibilities when presented with an overview of the scale of low responsibility to high responsibility. However, these responsibilities had not been explicitly communicated at the start of the user participation. While in most cases deliverables per phase had been defined, the degree of responsibility had not been.

- **The balance between technical and social design**

  All ready shortly referred to during the discussion of the preparation of participants, the balance between technical and social design is deemed essential. A very important

observation is that most case in the sample failed to acknowledge the importance of user participation in relation to the socio-technical design. Even though in some instances this shortcoming was recognized afterwards, the participants had not been included in the design of the organisational change and they had not been empowered to make decisions on this front.

- **The balanced time expenditure of participants**
  In all cases the time expenditure of participants was irregular. This is dictated by the phasing of the participation and therefore difficult to prevent. In some cases temporary staff was hired to compensate for the loss of capacity that was the result of participation activities. In all cases participants were officially relieved of (part of) their responsibilities in the daily operations, although practically this mend that some activities still needed to be done because no other people in the organisation could replace the participants. At some moments in time, during the peaks of the participation process, this led to very high work pressure and long work days. So even though the intention is to manage the time expenditure of the participants, this seemed to fail regularly.

- **The treatment of participant input**
  In some cases, participants experience the way their input was handled as frustrating, though in most instances, participants understood that not all their suggestions could be incorporated into the new system. The way input is handled was clearly an important issue for participants, but not so explicitly managed by project management.

- **The formality of participation**
  The formality of participation is another aspect of the participation process that is not explicitly managed in most cases. Most organisation have a way of working and just extend this existing approach to the implementation project. Though this does not mean there is by definition a mismatch, it might be worthwhile to explicitly adopt a way of working based on a deliberate assessment of the characteristics of the organisation.

5.4.3 Summary

All four cases provided valuable information regarding ES implementations. Out of four cases, three could be used to review how perceived relevance and user participation are managed in a practical implementation setting. The bottom line is that non of these cases shows a comparable focus on perceived relevance, as is suggested by the investigation of the relationships in the theoretical framework. In each of the cases, relevance of the system and related organisational change is acknowledged as a desirable feature of the implementation, as it makes intuitive sense and sounds logical to project managers. However, management does not view it with the high priority it should hold according to this study, which appoints it as being essential for the motivation of both end users and participants. The potential role of user participation to leverage the perceived relevance is also not explicitly recognized in practice.

6 Practical recommendations

This part of the thesis describes the practical value that can be derived from the predominantly theoretical considerations regarding ES implementations and the areas in need of attention, identified with the case study research. These theoretical and empirical findings and considerations have been discussed in the preceding chapters of this thesis.

Before formulating recommendations, it is important to review the practical goals of this investigation, besides furthering the state of academic research in the ES implementation domain. The investigation has been performed in a business environment, and the initial problem statement has been provided by the principal of this investigation, namely KPMG IT Advisory. During the consultancy activities of KPMG ITA, frequent issues with the adoption of ES are encountered. While an encompassing solution for this highly complex and variable problem cannot realistically be realised within the scope of this investigation, this chapter aims to provide practical insights into this complex topic. As a result, the practical purpose of this research is defined as twofold, namely to:

- **Create awareness among enterprise system professionals.** This research explicates the importance of perceived relevance and user participation during ES implementations. It offers qualitative descriptions of how these two elements influence the outcome of ES implementation projects. As a result, ES professionals will be better able to understand the complex dynamics that occur during ES implementations.

- **Support ES professionals in their decision making process.** By offering concrete and prioritized recommendations, this research allows ES professionals to make better informed and more rational decisions regarding these sorts of complex implementation projects. With these recommendations in mind, it will be easier to assure eventual ES implementation success. The recommendations are especially of value to those ES professionals that are responsible for the planning and management of ES implementation projects. It is important to note that many of the proposed recommendations will also holds value for the broader change management community, as certain aspects of this research are also suitability to large scale organisational change processes in general.

In order to achieve these practical purposes, the chapter is divided into three parts. The first part explains the key considerations that provide the foundation for the recommendations. This foundation is followed by a discussion about how the recommendations can be best formulated. The second part presents the actual recommendations. These recommendations are aiming to improve and secure the ES implementation success. The recommendations are presented in two groups: recommendations for managing perceived relevance and recommendations for managing user participation. Finally, in the third and final part, a short overview of the recommendations is provided. Also the limitations of the recommendations are acknowledged. The scale and complexity of the ES implementations suggests a conservative attitude toward any recommendations. While this research is certainly of value for the practical ES community, non of the recommendations should be followed blindly.
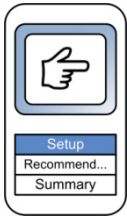
6.1   Setting up recommendations

Before the actual recommendations are outlined and discussed in detail, first two important aspects need to be addressed: the theoretical and empirical foundations that provide the rational for the selection and formulation of the recommendations, and a discussion about the actual formatting that will be used to present them.

- First, a number of important, high-level considerations about ES implementation projects, user participation, and perceived relevance are used to identify recommendations. These key considerations actually summarize the most important findings and dynamics that have been recognized over the course of this investigation and provide the rational for the selection of the proposed recommendations.

- Secondly, the considerations, which are essential for identifying recommendations, do not suggest the most effective way to formulate them. Defining an approach for the formulation of recommendations is important because they need to cater to the information needs of professionals in the ES implementation domain. In addition, it ensures consistency in the formulation of entire set of recommendations.

6.1.1   Key considerations

The key considerations provide a summarized overview of the most important findings of this research: the dynamics between expectations (perceived relevance), user participation and implementation success. Logically, these considerations, combined with the findings of the case studies, are used to select the recommendations. Based on the conclusions of the theoretical framework (described in section 4.6), the key considerations indicate on which aspect the recommendations should focus and when they are most relevant. Finally, the findings from the case study research (in chapter 5.4) will be used to assess which aspects of the current implementation approaches need improvement.

Key considerations about user participation

Focus. While user participation is frequently cited as a critical success factor for ES implementation success and is included in most ES implementation projects, it is certainly not treated as a way to leverage the perceived relevance of the system. According to this research, the participation process should enable participants to:

1. **influence the new system and the related organisational change.** The participants' ability to make the system and the organisational change more fitting to their business needs greatly enhances the relevance of the system.

2. **understand the new system and the related organisational change.** Being actively involved in for example design, testing and training activities greatly enhances their understanding of the new system.

Through the participants' influence and understanding, they are also better equipped for the detection and prevention of problems or issues. Therefore, measures that enable participants to influence and understand the ES implementations should be recommended.

Timing. The participative process consists of a number of phases, each of which have well-defined goals and deliverables. As these phases build upon another, failures in preceding phases will have considerable consequences in subsequent phases. Solving issues from earlier phases also becomes increasingly expensive, both in terms of time and other project resources (A. Davis, 1993). The participative activities during the initiate stage and the blueprint stage of user participation are deemed especially important. Failures during these crucial stages cannot easily be compensated during later phases of the project. As a results, hands on management and planning of the participative efforts is stressed during the early phases.

Key considerations about perceived relevance

Focus. In comparison to user participation, perceived relevance receives significantly less attention in ES implementation literature. Apparently, its potential during ES implementations is not as clearly recognized in the academic and practical ES community. According to this research, perceived relevance plays an important role for motivating user participation and the reception of the new system and related change into the organisation. Therefore, measures that improve the relevance of the system and the related change should be recommended.

Timing. The perceived relevance of the system is determined from an early stage of the ES implementation onwards. But as time progresses it is becoming increasingly difficult manage or control. When perceived relevance is selected as a aspect that needs to managed, it should be strongly recommended to ensure it from an early stage onwards.

Impact of the case study results

The case studies provide insight in the current ES implementation approaches of organisations. It is important to focus the recommendations on those aspects of the implementation that are currently not recognized or acknowledged. The case study result indicate that some elements of what will be recommended here are already receiving attention, for example aspects of participation, such as participant preparation and work load balance. However, the bigger picture of how relevance and participation relate to one another and ES implementation success is not explicitly recognized in practice. This should not come as a surprise, the relationship is barely discussed in academic literature.

Summarizing key considerations

Focus. The priority of any recommendation should be to ensure ES implementation success. With the above consideration in mind, the high level recommendation would be to focus on creating an upward spiral between participation and relevance. This is done by selecting those low level recommendations that most effectively ensure these upward dynamics between relevance and participation.

Timing. Regarding the timing of the recommendations, the most prominent advice is to gear the recommendations towards a common goal: preventing complications and problems. In software development, preventing issues is many times less costly as correcting them at a later point in time. Consequently, the focus of the recommendations will be on the early stages of the ES implementation project. However, some corrective recommendations should also be included, as it will not always be possible to ensure the entire picture upfront.

6.1.2 How to formulate recommendations

This investigation has led to a substantial set of mechanisms that describe the relationships in the theoretical framework. Combined with the finding from the case studies, all this information needs to be translated into a compact set of important recommendations. As discussed in the key considerations, the recommendations are aimed at the management and control of the perceived relevance of the system and the participative process that accompanies the ES implementation. While some recommendations may seem logical or even commonsensical, they have been selected because the case study results indicate these aspects of the implementation are neither acknowledged or fully exploited in the currently encountered implementation practices. Looking at the case study results, neither the expectations of stakeholders and the user participation are managed in an optimal fashion. This section describes how recommendations can best be formulated.

Recommendations

Recommendations describes "does" and "don'ts" for project management during the ES implementation process. As each stage and phase of the ES implementation has its unique characteristics, recommendations need to be prescribed for these specific stages or phases. Of course, some recommendations can also be valuable for the duration of the ES implementation. The format of a recommendation needs to be formalized for consistency. Therefore, each recommendation needs to answer five questions, see Table 24. The table also shows the type of information that each of the questions aims to generate. All recommendations are illustrated with the following symbol: ☞.

Table 24: Five questions and their intended answer

Question:	Intended answer:
What to do?	Provides the actual recommendation, which is an action that needs to be performed in order to improve the successfulness of the ES implementation.
Why to do it?	Provides the argumentation for the recommendation(s) and gives a demonstration of and reference to the underlying logic and mechanisms.
When to do it?	Tells during which phase or stage of the project the recommendation is relevant.
Who is to do it?	Tells which stakeholder has to perform what activities.
How to do it?	Provides an explanation of how the recommendation can be realized.

Even though these questions are central to each recommendation, they are grouped according to shared goals, underlying rational and/or similarity in involved stakeholders. As a result, not all questions are explicitly answered for every recommendation.

Recommended checks in addition to recommendations

Finally, a separate category of recommendations is suggested. Beside recommendations, a number of checks are also deemed valuable. Called recommended checks, these actually aim to implement a sort of plan-do-check-act (PDCA) cycles and therefore can be used to improve the control of

management over the ES implementation as the process progresses. The recommended checks are related to the recommendations, as the checks act as a sort of review. Like the process for identifying recommendations, the encountered implementation practises also offer the rational for the recommended checks: the feedback loops to check the respective aspects of the implementation are currently not or not sufficiently deployed. The need for these recommended checks might even reveal one of the most important high level recommendations of this investigation, namely to continuously manage and control perceived relevance and user participation. In essence, all recommended checks also need to answer roughly the same five questions as a recommendation (see again Table 24, even though the intended answers will differ slightly). Also the recommended checks are illustrated, but with a distinct symbol, namely: ✓ **.**

Stakeholder groups

A notable point in the discussion of the recommendations is that the term stakeholders is frequently used, while most of this research focussed on end users. Without wishing to deviate from the terminology of the theoretical part of this investigation, described in earlier chapters, the term stakeholder was selected in order to make the reader aware that all involved parties in an ES implementation must be examined and tended to. Besides differentiating between end users, participants, middle management, and top management, stakeholder groups refer to an even finer divide. Within the end user stakeholder group, a multitude of sub divisions can be identified. As a result, this study recommends that attention is paid these differences in organisational divisions, departments and sections.

6.2   Recommendations for practice

This research investigates the interaction between perceived relevance and user participation, and the effect of this relation on ES implementation success. As the research focuses on two key variables that can be managed as the project progresses, the recommendations and recommended checks are divided into these two main categories:

- Recommendations for managing perceived relevance
- Recommendations for managing user participation

For every recommendation, one or more arguments is provided, which present the rationale behind the recommendation. The arguments are only concisely noted with every recommendation, while a more extensive explanation is provided at the end of each of the two set of recommendations. There, each of the arguments is discussed in its entirety , including a reference to its foundation in the theoretical framework.

Finally, it is important to note that these suggestions are not aiming to provide a complete guide for managing respectively relevance or participation, but only stress a number of critical aspects management should be aware of. Therefore, the recommendations presented in this research should be used as an "add-on" for more general and encompassing ES implementation methodologies. This also explains the, at times, conceptual level on which these recommendations are described.

6.2.1   Recommendations for managing perceived relevance

The recommendations for managing perceived relevance aim to increase the chances of ES implementation success directly, or indirectly through a positive effect on user participation. According to this research, perceived relevance should:

- motivate participants during the participation process, and
- create the right mindset for stakeholders to accept the new system and related organisational change.

As a result, the recommendations regarding perceived relevance are aiming to improve both the user participation process and the success of the ES implementation through motivation and the proper mindset.

☞ **1**. **Make sure the new ES implementation is relevant for the stakeholders.**

Why?:   Relevance motivates participants (a),
Relevance facilitates change (b), and
Relevance increase user satisfaction (c).

How?:   ***In the business case, establish the detailed benefits for each stakeholder group.***
During the initiate stage. Chart the impact of the new system and the related organisational change. Determine the benefits for every stakeholder group. If this is to be accomplished, a complete overview of the organisation and the related change is required. As practically every ES implementation is already preceded by a business

case, management should try to individualize the outcomes of this business case for the different stakeholder groups. The more tangible the benefits are, the easier it will be to assure the stakeholders of the system's relevance. Admittedly, it will be difficult to describe all impacts in detail during the initiate stage, as detailed system characteristics and organisational impacts might only become known as the project advances. Still, this attention for the system and impacts is required at this moment in time, if the goal is to convince the stakeholders of the perceived relevance and necessity of the upcoming change. An additional gain of the recommended approach is that poorly motivated enterprise system implementations are recognized during this early stage. If the benefits for an individual stakeholder group cannot be defined, it will be very hard to convince them of the relevance of the system, as it simply will not hold relevance for them.

☞ **2. Inform all stakeholders of the ES implementation's relevance and do so as early as possible.**

Why?: Changing expectations becomes increasingly difficult over time (d).

How?: ***Select mediums for discussing benefits.***
From the initiate stage onwards. There are numerous mediums that can be used to reach all stakeholders in the organisation. Examples of possible mediums are: meetings (from small scale to large scale), interventions, emails, letters, video messages, etc. For an optimal effect, personal contact is recommended, as questions about uncertainties can be answered directly. An anonymous means for posing questions about uncertainty could also lower the threshold for submitting critical questions. Critical questions are bound to exist during such an invasive and large scale change process and should be answered.

Communicate the benefits with the ES success aspects in mind.
From the initiate stage onwards. The communication of the benefits should be done with the ES success aspects in mind. Discuss what will happen to the system, service and information quality, but also show how the change will affect stakeholders on an individual, as well as on an organisation level (see section 3.5.2 of the literature study for the ES success aspects). Once news of the enterprise system implementation start to spread, the systematic discussion of the pro's and con's of the new system and related organisational change will ensure a balanced and complete view of the implementation. This will provide assurance for the individual stakeholder groups.

Adapt communication to the expectation of stakeholders.
From the initiate stage onwards. While informing stakeholders, take care not to announce benefits that will not be interpreted as benefits. To ensure this, establish a dialogue with representatives of each stakeholder group. This dialogue can be an appropriate means to get an elementary view of the attitudes of the different

stakeholder groups toward their work and the organisational change process. This way it is possible to check what types of benefits are expected by which stakeholders. These findings can then be taken into account when informing all the individual stakeholder groups of the enterprise system's relevance.

See how communication is perceived by a small cross-section of stakeholders.
From the initiate stage onwards. Arranging the dialogue with a small cross-section of the stakeholders could also be a beneficiary method for obtaining a preview of the reaction towards the benefits that project management plans to communicate. Of course, an existing participation process could prove useful in this context, as it is supposed to provide project management with such a cross-section of the organisation. However, a deliberately chosen alternative cross-section of the stakeholders would also have its merits, as it would provide an independent and alternate view.

☞ **3**. **Make sure the expectations of the stakeholders are founded on genuine improvements.**

Why?: Genuine improvements are more effective than artificial improvements (e).

How?: ***Focus on genuine improvements.***
From the initiate stage onwards. The type of benefits that are most effective are the genuine improvements. Examples of genuine improvements are: efficiency gains (time and effort saving), increased understanding of the process and operations (functional), and clearer and more transparent responsibilities (social). On the contrary, artificial improvements will have a reduced effect. Examples of these artificial improvements are: financial compensations (financial), promotions (social), status through participation (social), or other incentives (frequently aimed at the individual). When motivating stakeholders, try to focus and capitalize on the genuine improvements, while keeping the artificial improvements, based on individual incentives, to a minimum.

☞ **4**. **Only communicate benefits of the ES implementation to the stakeholders if they are realistic and achievable.**

Why?: Failure to meet expectations has severe repercussions (f).

How?: ***Ensure that the communicated benefits are realistic and achievable.***
From the initiate stage onwards. Failure to deliver even well intended benefits or other promises regarding the new system will have a strong averse effect on its perceived relevance. Also take care not to announce benefits that will not be interpreted as such (already mentioned under recommendation 2). A thorough and realistic planning is essential for defining achievable goals. While it is preferable to inform the stakeholders of the relevance as soon as possible, this constraint should always be taken into account. If there are uncertainties about aspects of the system, communicate them truthfully and honestly: put the emphasis on reassuring the

stakeholders whenever necessary. Doubts and uncertainty are a major threat to the perceived relevance of the implementation.

✓ **5. Check to see how the stakeholders perceive the relevance of the enterprise system and use this information to keep them informed as the implementation progresses.**

<u>Why?:</u> Expectations need to be maintained (g).

<u>How?:</u> ***Be aware of the perceived relevance.***
At the end of each stage or phase. The only way to manage the perceived relevance of the system is to be constantly aware of it. Without this awareness, it cannot be controlled during the ES implementation. At regular intervals during the project check how the new system and the organisational change is perceived by the different stakeholder groups. In the description of recommendation 2, already suggestions are made about the means to monitor aspects such as perceived relevance. This is accomplished by using the participation process or preferably another forum, which can give an indication of how the system is perceived. If the system is perceived as relevant, change nothing to a working formula and keep informing the stakeholders as more information becomes available.

When required, improve the perceived relevance as the project progresses.
When certain stakeholders fail to see the relevance of the system, it is very important to find out why. There must be a explanation for their perception. This explanation is also the key to changing the perception of relevance and the mindset of the stakeholders. Independent of the phase, recommendation 1, 2, 3, and 4 can help to reassert the relevance of the enterprise system and the related organisational change.

Manage participation in order to leverage the relevance of the implementation.
Finally, low relevance could also indicate problems with the influence and understanding, which is enabled by, and a desired effect of, the participation process. In addition, also the quality of the participation process could be insufficient. This research has demonstrated the relationship between relevance and participation, so in making the system more relevant for stakeholders, the recommendations regarding user participation should be followed. These are discussed in the next section that describes the recommendations for managing user participation.

Argumentation

The arguments for each recommendation have already been briefly presented above. Here they are explained in more detail. Also the theoretical foundation in the framework, on which the argument is based, is referred to.

a. ***Relevance motivates participants.***

The expectations (perceived relevance) of the participants helps to motivate participants during participation activities in which they are involved. By motivating them, the quality of their participation efforts is improved. This is especially true during the phases of the project in which participants have both operational and participation responsibilities and the amount of work is beyond their full capacity.

Based on: Perceived relevance → User participation.

Mechanism in play: *Expectations*.

Moment of impact: From the blueprint phase onwards.

b. ***Relevance facilitates change.***

Regarding the success of the system, perceived relevance has an important effect on the individual and organisational impact of an ES implementation. The individual and organisational impact consists of changes in work routines, the decision-making processes and flow of organisational processes. These changes impact the entire organisation, and only for a minority of employees these changes will pass by unnoticed. Perceived relevance influences the mindset of all these stakeholders regarding the broad array of changes. A high relevance will certainly increases their willingness to adopt these changes in the short term.

Based on: Perceived relevance → ES implementation success.

Mechanism in play: *Relevance and ES success*.

Moment of impact: From the testing phase onwards.

c. ***Relevance increases user satisfaction.***

The satisfaction of the stakeholders can be split in two separate elements, namely satisfaction with the system and the related change, and the satisfaction with the implementation process. Both types of satisfaction are expected to dependent to a large degree on the perceived relevance. This satisfaction starts to form the moment users start to experience the system and the organisational change.

Based on: Perceived relevance → ES implementation success.

Mechanism in play: *Relevance and user satisfaction*.

Moment of impact: From the testing phase onwards.

d. ***Changing expectations becomes increasingly difficult over time.***

The initial expectations of the stakeholder are persistent and become less susceptible to change as the project progresses. When there is an aim to control the expectations of stakeholders, it is best to start managing expectations from an early stage. It will require increasing efforts to change the perceived relevance during the later phases of the project,

as already the expectations are being checked with the reality, which the ES and the related change is quickly becoming.

> Based on: Perceived relevance.
> Mechanism in play: *Change of expectations.*
> Moment of impact: From the initiate stage onwards.

e. ***Genuine improvements are more effective than artificial improvements.***
The expectations of stakeholders, involved in user participation or not, are depending on at least four types of possible improvements: economic, social, functional and time and effort saving. All improvements can be divided into two categories: genuine and artificial improvements. Genuine improvements are improvements that are directly resulting from the new system and the related organisational change. However, sometimes the improvements that are offered to the stakeholder are not a result of the new system: it is an improvement that is designed to motivate the stakeholder to accept the new system and related change. These are termed artificial improvements. Even though (in some scenarios) artificial improvements can be warranted in order to ensure or smoothen adoption, genuine improvements should always be preferred, as they are a far more effective means to ensure relevance for the majority of stakeholders.

> Based on: Perceived relevance → User participation.
> Mechanism in play: *Differentiation of expectations*.
> Moment of impact: During the entire ES implementation.

f. ***Failure to meet expectations has severe repercussions.***
When a system fails to meet the expectations of (part of) the stakeholders, it will have a considerable negative effect on their attitude towards the system. Failing to meet expectations will negatively impact the of success of the system as it will have strong negative effect on the user satisfaction.

> Based on: Perceived relevance → ES implementation success.
> Mechanism in play: *Relevance and user satisfaction*.
> Moment of impact: From the testing phase onwards.

g. ***Expectations need to be maintained.***
It will be difficult to describe all impacts in detail during the initiate stage, while detailed impacts might only become known as the project advances. In addition, ES implementation processes are often long term projects, which can last up to two years. It is important to maintain a perception of relevance, especially during the phases that require little participation from the key users. Therefore, as the project progresses, it is essential to keep communicating the benefits.

> Based on: Perceived relevance → ES implementation success.
> Mechanism in play: *Expectations*
> Moment of impact: During the entire ES implementation.

6.2.2 Recommendations for managing user participation

The recommendations for managing user participation aim to increase the chances of ES implementation success directly, or indirectly through a positive effect on the perceived relevance. In addition to the commonly accepted goals of user participation, it should enable participants to:

- influence the new system and the related organisational change.
- understand the new system and the related organisational change.

A small warning, a seemingly unnatural division is made in two of the recommendation. As the mechanisms, identified in section 4.3.2 and Table 14, impact either the influence and understand, or only the influence, this distinction is also made in recommendation 7 and 8.

☞ **6**. **Ensure a high quality of the participation process.**

> Why?: High quality participation process improves the influence and understanding (h),
> User participation improves ES success (k), and
> User participation greatly improves the user satisfaction (l).

> How?: ***Let all stakeholder groups participate, but do not let all stakeholders participate.***
> *During the initiate stage.* User participation has a considerable positive effects on both ES implementation success as perceived relevance. As an invitation for the participation process equals influence and understanding, it is beneficial to have a substantial group of stakeholders participate. However, there is a point that there are too many participants. Above this proportion, the effectiveness of the participation process, and thus the quality, will degrade. This is caused by the organisational difficulties that will arise with a large number of participants. It will become increasingly difficult to manage all the input and provide the participants with a participation experience. While all stakeholder groups should be represented in the participation process, it is advisable to limit the number of active participants to 25% of all involved stakeholders. This way, there are sufficient people available for the daily operations, while enough participants can disseminate their participation experiences (influence and understanding) to the remaining stakeholders. The 25% number is not founded on theoretical findings, but is an estimate by the author.

> Careful consideration regarding the selection of participants is also advised. A set of selection criteria should be determined to guide the selection of participants. Beside selecting those users that are capable to envision and formulate the requirements and future process of the organisation, a deliberate cross-section should ensure an experience of influence and understanding for all stakeholder groups. This way, no stakeholder group is neglected.

> ***Align the formality of the participative activities with the organisational culture.***
> *From the initiate stage onwards.* Match the degree of formality of the participation process with the organisational culture and the level of education of the participants. If voluntary assignments will not be carried out, make them obligatory

and closely monitor progress. If the stakeholders are more easily committed, provide them with some freedom in the execution of their tasks and activities, as this will help motivate them with an appeal on their feeling of responsibility. The right level of formality will differ in each organisation, but when the formality of the participation is aligned with the organisational culture, this will improve the quality of the participation and vice versa.

☞ **7**. **Make sure participants can influence and understand the new system and the related organisational change.**

Why?: Influence improves perceived relevance (i),
Understanding improves perceived relevance (j),
User participation greatly improves the user satisfaction (l).

How?: ***Prepare users for all participative activities they are involved in.***
From the initiate stage onwards. The mindset and effort that is required from participants in relation to an ES implementation is not self-evident and the accompanying process not self-explanatory. It is not a part of their daily routines to participate in the implementation of an ES and it is very difficult to envision the workings of the new system during the implementation process. The appropriate preparation will make the difference between enabling a participant to influence and understand the system and the related organisational change, or failing to do so. Depending on the mandate and responsibilities of the participants, ensure participants have the required knowledge to participate in each phase. For a complete view of the implementation, especially do not forget to inform the participants of the organisational change.

Involve participants in the planning and design of the organisational change.
During the blueprint phase. Modern socio technical systems theory states that the design of all information systems needs to be preceded by the development of the corporate strategy and the design of production structures. Too often, the focus of participation is put only on the technical development of the new system and disregards the organisational change. However, the development of the organisational change is also of great importance to both the individual and organisational impact of the implementation. The bottom line is that the demand for technology should be guided by the organisational needs, leading to a mix of technical and social considerations. Inform the participants of the organisational changes and include them in the planning and design.

☞ **8**. **Make sure participants can influence the new system and the related organisational change.**

Why?: Influence improves perceived relevance (h).

How?: ***Involve participants in the formulation of their mandate and their responsibilities.***
During the blueprint phase. The mandate and responsibilities of stakeholders during the participation process defines the roles of all involved stakeholders. The higher the level of responsibility that is enjoyed by participants, the more likely it is they will be able to exert influence on the implementation through the participation process. Sharing the mandate and responsibilities explicitly with the participants ensures they are well informed and aware of their responsibilities. It also is of great help for the participants to become aware their expectations regarding user participation and, more specifically, the influence they expect to wield. The mandate of the participants will determine to a large extend the eventual influence they are able to exert. If the eventual influence is smaller than the anticipated influence, a strong negative effect is to be expected.

Acknowledge all user input and do not dismiss without proper argumentation.
From the initiate stage onwards. All user input should be acknowledged, even if comments, suggestions, and ideas of the participants are not incorporated in the eventual system or applicable to the current situation. The reason for considering the treatment of participant input is because of its importance for the participants' perception of influence. When input is rejected, it is crucial to explain why it is not adopted and another approach or idea is preferred. Independent of the fact if user input is incorporated in the project, all input must be acknowledged and equally rewarded. When their input is ignored without explanation, it will seems unlikely for the participants that they are able to exert the desired influence on the system, reducing their ability to incorporate their needs and requirements into the system.

✓ **9. Check if the participation process enables participants to influence and understand the ES project and the related organisational change.**

Why?: Influence improves perceived relevance (h),
Understanding improves perceived relevance (i).

How?: ***Monitor how participants perceive the influence they wield through participation.***
At the end of each stage or phase. To see if the participation process is successful, it is necessary to monitor the influence the participants wield through the participation process. The degree of influence describes the transition of the participants' efforts in representing their needs and requirements into tangible outcomes; the incorporation of those needs and requirements into the new system. While it will be tremendously difficult to assess the actual influence of the participants during the participation process, the perceived influence can be used as a substitute. The participation process already offers a forum for discovering the participants'

experience of influence on the new system and the related change. Incorporate the monitoring of the perceived influence in the participation process.

Monitor how participants perceive the understanding they have gained through participation.

At the end of each stage or phase. To see if the participation process is successful, it is necessary to monitor the understanding that is gained through the participation process. While it will be tremendously difficult to assess the actual influence of the participants, the perceived influence can be used as a substitute. The participation process already offers a forum for discovering the participants' understanding of the new system and the related change. Incorporate the monitoring of understanding in the participation process.

When required, improve the participants' influence and understanding of the system as the project progresses.

When certain stakeholders regard their influence as small, or fail to understand the system, it is very important to find out why. There must be a explanation for their perception. This explanation is also the key to changing the perception of relevance and the mindset of the stakeholders. The suggestions that are described in recommendation 6 to 8 can help to reassert the influence and understanding that is desired from the participation process. In addition, depending on the phase, the participation activities, presented in Table 25, may also help to reassert the participants perceived relevance and satisfaction in the user participation process (McKeen & Guimaraes, 1997):

Table 25: Recommended activities to improve user participation

During the …	… let the participants …
Initiate stage	- be responsible for the project definition - be included in the feasibility analysis
Blueprint phase	- define the (information) requirements - define the I/O forms, screens, and report formats
Realisation phase	
Testing phase	conduct the system testing
Training phase	
Go-live phase	be included in team that orchestrates the system's installation
All stages / phases	- lead the project team - develop and approve project management schedules and progress reports

Argumentation

The reason(s) for a recommendation are briefly presented directly with the recommendation. Here they are explained in more detail.

h. High quality participation process improves the influence and understanding.

There are a large number of aspects that impact the quality of the user participation. In turn, the quality of participation affects the user participation's influence and understanding that the participation efforts are intended to accomplish. As a result, the quality of participation is very important with regard to the envisioned effect on ES implementation success.

Based on:	User participation → Perceived relevance.
Mechanism in play:	*Mechanisms mediated by the quality of participation.*
Moment of Impact:	From the initiate stage onwards.

i. Influence improves perceived relevance.

User participation provides a means for users to influence the system under development. This influence affects their perceived relevance of the system. The effect on perceived relevance results from the principle that the incorporation of the users' needs, requirements, and preferences into the new system and the related organisational change will increase the relevance of the implementation, as perceived by those participants. In addition, the notion that perceived relevance is at least partially realized by user participation is of great importance.

Based on:	User participation → Perceived relevance.
Mechanism in play:	*Mechanisms that impact the influence*. (see Table 14)
Moment of Impact:	From the initiate stage onwards.

j. Understanding improves perceived relevance.

A better understanding of the system and its inner workings is will improve the quality of the participation process and have a positive impact on the perceived relevance of the ES and the related change. Understanding means the future way of working is more tangible and transparent for the participants, resulting in an improve the accuracy of their perceived relevance. In addition, an improved understanding of the overall enterprise system, opposed to understanding of only a specific domain of the system, helps to ease any negative effects that the unavoidable compromises will have on the quality of participation and the individual's perceived relevance.

Based on:	User participation → Perceived relevance.
Mechanism in play:	*Mechanisms that impact the understanding*. (see Table 14)
Moment of Impact:	From the initiate stage onwards.

k. User participation improves ES success.

User participation improves the quality of the new system and both the individual and organisational impact of the system. First, the better assessment of user (information) requirements improves both the system and information quality of the ES. Secondly,

providing expertise of the existing organisation and avoiding development of unnecessary features (either because they are unimportant or unacceptable) improves the individual and organisational impact, as well as the quality aspects. Finally, the key users' improved understanding of the system makes them aware of the individual and organisational impact, while they are better able to support their non-participating colleagues, impacting the service quality of the system. In addition, participants perceived the quality of the system as higher.

Based on:	User participation → ES implementation success.
Mechanism in play:	*Participation and ES success*.
Moment of Impact:	From the initiate stage onwards.

I. **User participation greatly improves the user satisfaction.**
There is a strong link between user participation and user satisfaction. The satisfaction of participants is primarily dependent on their role in the participation process. Participation directly leads to a higher level of user satisfaction. In addition, regardless of the users need for participation, no negative effect of participation on user satisfaction has been observed.

Based on:	User participation → ES implementation success.
Mechanism in play:	*Participation and user satisfaction*.
Moment of Impact:	From the testing phase onwards.

6.3 Summary of the recommendations, limitations and final remarks

Now that all recommendations for practice have been presented, a graphical representation of the recommendations is used to provide an overview. In addition, the limitations of the recommendations for practice are discussed. Finally, some important final remarks regarding the recommendations for practice are presented.

6.3.1 Overview of recommendations

The overview of recommendations literally illustrates the recommendations that have been discussed in the preceding section. This overview does not aim to precisely represent all discussed recommendations for practice, but shows them from a process-oriented perspective. It also focuses on the more low-level recommendations. For a complete view on the recommendations, follow references R1 to R9, which link to the recommendations that have been formulated in section 6.2.

The overview is divided into two parts, the first in Figure 53 presenting the recommendations for the initiate stage and blueprint phase. Figure 54 presents the remaining recommendations for the entire project stage and the recommended checks to monitor the perceived relevance and user participation process.

Recommendations during the initiate stage

Chart benefits based on the business case (R1)
What?:**Establish the detailed benefits of the system for each individual stakeholder group.**
Why?: The more tangible the benefits, the easier it is to convince stakeholders of its relevance.

Start communicating benefits (R2)
What?: **Select an appropriate medium for communicating the benefits, allow critical questions, and see how the benefits are received by stakeholders and adapt communication.**
Why?: *Helps to take control of the stakeholders' perception of the ES and eliminates uncertainty.*

Deliberate selection of participants (R6)
What?: **Let all stakeholder groups participate, but do not let all stakeholders participate.**
Why?: *Allows a optimal effectivity of the participation process.*

Recommendations during the blueprint phase

Clear mandate (R8)
What?: **Involve participants in the formulation of their mandate (and their responsibilities).**
Why?: *Defines the roles of all stakeholders and defines their expectations of influence.*

Promote sociotechnical design (R7)
What?: **Involve participants in the planning of the organisational change.**
Why?: *Increases understanding and commits the participants to the organisational change.*

Figure 53: Recommendations for the initiate stage and blueprint phase

Recommendations during all implementation stages and phases

Genuine improvements (R3)
What?: **Make sure the relevance of the system is founded on genuine improvements.**
Why?: *Puts the focus on genuine improvements instead of less effective artificial improvements.*

Realistic and achievable benefits (R4)
What?: **Ensure that the communicated benefits are realistic and achievable.**
Why?: *Failure to deliver promised benefits has a strong averse effect on perceived relevance.*

Well-prepared users (R7)
What?: **Prepare users for all participative activities they are involved in.**
Why?: *Ensuring participants are well-prepared improves their influence and understanding.*

Acknowledge user input (R8)
What?: **Acknowledge all user input and do not dismiss input without proper argumentation.**
Why?: *Makes users feel appreciated, even when their suggestions are not incorporated.*

Right degree of formality (R6)
What?: **Align the formality of participative activities with the business culture.**
Why?: *Ensures the quality of participation by providing a fit with the organisational culture.*

Checks at the end of each stage and phase

Check the stakeholders' perceived relevance (R5)
What?: **Check if the appointed mandate lives up to the expectations of participants.**
Why?: *The only way to manage the perceived relevance is to be constantly aware of it.*

Check the participants' influence (R9)
What?: **Check if participation enables participants to influence the system and change.**
Why?: *Helps to correct the influence participants will experience through participation.*

Check the participants' understanding (R9)
What?: **Check if participation enables participants to understanding the system and change.**
Why?: *Helps to correct the understanding participants will experience through participation.*

Figure 54: Recommendations and checks during all stages and phases

6.3.2 Limitations of the recommendations for practice

It is important to note that the recommendations presented in this chapter cannot be followed blindly. Every ES implementation project is subject to specific conditions, many of which are uniquely related to the organisational and business context of the implementing company. Project management has to acknowledge a large number of changing, interfering and confounding factors, the combination of which make the ES implementation domain a notoriously complex environment, both socially and technologically. Consequently, it would not be realistic to expect success just by observing the recommendations presented here.

The best these recommendations can do is to elucidate and explicate a specific set of aspects that have a high probability to impact ES implementation success. To offer project management

additional handles or points of focus for the successful conclusion of these types of complex projects. As a result, project management should not just adopt these recommendations blindly, but management should seriously assess the applicability of the recommendations in the unique organisational circumstances they find their selves in.

With these limitations in the back of project management's minds, these recommendations offer valuable advice that has the potential to improve the ES implementation process, the resulting system, the end user satisfaction, and thus overall ES implementation success.

6.3.3   Final remarks

Finally, two remarks regarding the recommendations for practice are discussed.

Advisory perspective vs. assurance perspective

KPMG can be involved in ES implementations from two distinct perspectives, namely in an advisory capacity and in a quality assurance/audit capacity. These different perspectives require a different approach when interpreting these recommendations. Most of recommendations for practice are written from the advisory perspective, and do not need changes if they are used in that role. The assurance perspective requires a slightly different focus, which is explained briefly.

When KPMG is involved in an ES implementation in the role of quality assurer or implementation auditor, the focus should lie on the recommended checks. This research poses that both perceived relevance and user participation are crucial elements of an implementation and therefore warrant deliberate attention during the process. Both can act as indicators for the current state of the implementation. Perceived relevance is an indicator for the commitment and motivation of users towards the ES implementation and the participation process. User participation is an excellent tool to create and promote the relevance of the new system. The indicators of user participation that should be monitored are influence and understanding. The quality of the participation process and the perceived relevance depend to a large extend on the influence the users can exert on the process. In addition, the understanding of the system and related change, which the participation process also brings to the users, is essential in order to establish the relevance. Therefore, these three aspects, perceived relevance, influence through participation, and understanding through participation should be monitored carefully. A periodical check at the end of each phase or stage would probably suffice.

Invitation for the extension of the recommendations for practice

Extensions for these recommendations for practice are invited. The author only has a limited experience with actual ES implementations, which results in rather conceptual recommendations, which would benefit from a more intimate and practical ES implementation perspective. Especially the "how" questions for all recommendation should be refined further. However, this might not be so easy, as ES implementation differ considerably from case to case. Still, the author is confident that the recommendations that have been presented here open a new perspective on relevance and participation during ES implementations.

7   Conclusions, limitations and recommendations

After the discussion of practical recommendations, this final chapter discusses the academic conclusions. The conclusion provides an integral answer to the research questions that were posed in section 2.3. The investigation is then critically reviewed, leading to a discussion of its limitations. Concurrently, the limitations are translated in recommendations for the academic community. The recommendations help to overcome the limitations of this investigation and offer suggestions for carrying forward the academic research in the field of ES implementations and change management in general.

7.1   Conclusions

Enterprise system (ES) implementations are highly complex projects, requiring specialised expertise and involving large amounts of money, time, and manpower. Despite the rising overall success rate of IT implementations over the years, the majority of ES implementation projects still incur setbacks along the way and, when finally completed, fail to deliver the promised benefits. In order to improve the implementation process, the academic research community has researched the critical success factors of such projects extensively. Even though the identified factors indicate which aspects are important, most of these academic investigations fail to elucidate the underlying mechanisms that are at play. This lack of profundity is the logical result of the high complexity of the ES domain. While the predominantly quantitative research does provide ES professionals with some guidance, it is inadequate for the detailed conception of hands-on recommendations for practice.

In the professional experience of KPMG's IT Advisory services, it turns out that the actual adoption of the new ES by the end users and the related organisational change efforts, which are requirements for a successful implementation, are frequently managed poorly. The resulting neglect of organisational aspects is especially striking when compared to the attention that is paid to the technical implementation of the ES. Therefore, this research has focussed on the dynamics between user expectation and user participation, which proved to be decisive elements in relation to the adoption of ES. It is the purpose of this research to improve the current implementations practices with the help of theoretical findings regarding relevance and participation. The current state of implementation practices are reviewed with the help of case study research.

Through an extensive literature study, this thesis successfully defines three key variables: perceived relevance, user participation and ES implementation success. Based on these definitions, an individual set of measures for each of the key variables is proposed. In addition to these three key variables, this research also indentifies and defines a number of confounding contextual factors. The most important reason for taking into account these confounding factors is because they have the potential to compromise the measures for the key variables and distort the assessment of qualitative relationships between them. Even though the confounding factors are not reviewed exhaustively, the most important compromises or distortions of the measures for the key variables and their relationships are acknowledged.

The most important contribution of this research is the theoretical framework that qualitatively explores and defines the impacts of perceived relevance, user participation, and ES implementation

success on each other. Supported by academic literature and with the help of induction, a substantial set of hypothesized mechanisms is proposed. These mechanisms provide insight into the complex dynamics that occur during ES implementation processes. The key findings of the qualitative exploration of the relationships in the theoretical framework are:

- The perceived relevance of the ES is of major importance for the motivation of the users to participate in its implementation and adopt a new enterprise system. As a result, perceived relevance has both a direct and indirect impact on the successfulness of the ES implementation. A high perceived relevance leads to motivated users who are not merely involved, but committed to the process.

- The participation of users in the implementation of ES is a fundamental means to ensure users are in a position to influence the implementation and understand the new system and the related organisational changes. The resulting influence and understanding increase the quality of participation and makes it an excellent tool for leveraging the perceived relevance of the system and the related organisational change.

- An improvement of either perceived relevance or user participation has a dual effect on ES implementation success, directly and indirectly through respectively participation or relevance. By careful management of both perceived relevance and user participation it is possible to greatly enhance the quality of the product (the enterprise system) and the process (the implementation). While a synergetic effect is not yet supported by empirical validation, it is expected by the author.

While large parts of this research are of an academic nature and focus on literature sources and induction, this study also provides practical recommendations for ES professionals. The case study research plays an important role in the formulation of the practical recommendations. In addition to enhancing the practical knowledge of the author with respect to actual ES implementations, the case study research indicates that many of the mechanisms that are recognized in this thesis are not yet recognized or incorporated into the implementation methodologies used in practice. In this respect, the qualitative research perspective and case study results guide the formulation of the recommendations for practice. The resulting practical recommendations support managers in developing more successful strategies for ES implementation projects. They also provide indicators that can be monitored during the implementation process, enabling management to react to averse and unwanted developments in perceived relevance and user participation as the project progresses.

Finally, through its focus on the ES domain, the current study differentiates itself from the general IS research in this field. It adopted a contrastive qualitative approach in a predominantly quantitative research domain. The focus on large scale change processes also makes this research applicable for change management in general. Even though ES implementations are largely technology driven, the author poses that perceived relevance, user participation and their interactions are as important during other types of large scale change processes.

7.2 Limitations and recommendations

Every research project and research design has its limitations. These sorts of limitations should not be viewed as a threat to the value of research, but rather as opportunities for future research. This project is certainly no exception to this premise. The current limitations of this thesis are discussed and acknowledged in a step by step fashion and turned into recommendations for future research.

- While this research adopted a strict methodology for formulating the hypothesized mechanisms, a critical review of the relationships in the theoretical framework is advised. As the scale of this investigation did not provide the opportunity to truly validate all proposed constructs and relationships, future research is needed to do so. In this process, the author deems it likely that certain aspects of the hypothesized mechanisms will need to be refined, though the complexity of the ES domain makes this practically unavoidable. This research should be viewed as a first step or conceptual proposal for the qualitative definition of the relationships in the selected theoretical framework. The validation of the proposed measures and relationships is highly recommended.

- Due to the large number of identified confounding variables, on all level of this investigation, it would be wise to review the key and contextual variables of this research with more detail for interfering and confounding factors. Even though this research lays a substantial foundation in this respect, the scope did only allow for a limited approach in accounting for and nullifying these confounding and contextual factors. The key concepts and their confounding variables revealed a substantial level of convergence, which needs to be explored in more detail and with improved and more extensive validation. This way, the dynamics between research variables and the organisational context of ES implementations can be better understood and controlled for.

- The generality of the case study research is limited by the sample size. Only four organisations and thus ES implementations were found willing to participate in this research. Also the homogeneousness of the organisation types and the kinds of encountered enterprise systems results in a low generality of the results. The research focused on large organisations, operating predominantly in a retail environment and SAP has been strongly represented in the research sample. Because of these methodological limitations, it is advisable that readers interpret this research's findings with the necessary care when apply it to their own organisation. This limitation leads to the recommendation that the theoretical framework and research setup need to be tested in different organisation settings and implementation circumstances, for example:

  o in small and medium enterprises (SMEs),
  o in other business sectors besides retail,
  o with other types of enterprise systems besides SAP, and
  o with other large scale organisational change processes.

  However, it needs to be said that a narrow research focus also translates into a number of strengths, as data from similar sources allow for the control of the numerous exogenous

variables that may confound results in multi-sector and/or multi-vendor case study setups. Consequently, the reliability of this research is improved as it has more explanatory power within these specific organisational circumstances.

On a side note, the cultural distinctions between the individual cases were prominently visible. Differences in hierarchical relations are expected to influence the role of perceived relevance and user participation significantly. While the reliability of this observation is limited, it does suggest a new research direction. It is recommended to investigate the role of (national) business cultures on relevance and participation during ES implementations.

Finally, ES implementations are large scale organisational changes with a central role for IT. This research promotes perceived relevance and user participation with regard to the organisational changes that occur during an ES implementation. So beside the strong technical focus caused by the ES implementation, the author strongly anticipates that the findings regarding organisational change aspects can relatively easily be translated to a more general change management perspective. An investigation to check the validity of the discovered principles in other types of large organisational change processes is therefore recommended.

- The ex-post nature of the case study research, which relies heavily on the interviews with stakeholders, appears to introduce difficulties for interviewees to accurately recollect the development of the relevance they perceive over time (perceived relevance). While the interviewees seem to be able to reproduce their overall perceived relevance at certain point in time ex-post, it proved much more difficult for them to allot their perception of relevance to the four identified types of improvement on which their perceived relevance is based. To overcome this issue, it is recommended to devise an extended method for monitoring perceived relevance at distinct moments in time during the implementation process. While this will have significant consequences for the duration of such an investigation, it will most likely improve the reliability of the findings with regard to perceived relevance and enable its division in the sub-determinants.

Ultimately, the provided results and conclusions of this research contributes to the refinement of the theory on enterprise system implementation dynamics and the understanding of successful technology implementation.

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Appendix A. User participation contingencies

Appendix A presents the assessment of user participation contingencies. Based on Cavaye's (1995) collection of contingency this assessment investigates the influence of the individual contingencies on user participation in a specific ES context. Cavaye's contingency factors are divided in three main categories: organisational factors, project related factors, and user related factors. Based on this assessment, the implications of these contingencies are first explored and then selected or rejected for their relevance in the ES research context.

A1. Organisational factors

Time for development
General description: This factor refers to the available time for the IT implementation. User participation takes up time and if time is a key constraint this could seriously impede user participation. (Cavaye, 1995)

Implications: Most ES projects at least run for over a year and therefore offer the possibility for user participation. Even though the available time for development is different for every ES implementation project, this factor would only become an issue if the ES project needs to be finished within a exceptionally short timeframe or with unusual circumstances in relation to the project planning. Therefore, it is appropriate to investigate the timeframe and planning aspect of every case.

Financial resources available
General description: When more people in the organisation are involved in an IS project, the amount of financial resources required also increases. Financial constraints therefore limit the scale and involvement of users in the participation process. (Cavaye, 1995)

Implications: In most medium to large organisations, ES implementations have multimillion price tags and thus considerable resources at their disposal. Even though the availability of financial resources is different for every ES implementation case, only unrealistically small project budgets or large budget overruns can indicate a likely influence on the participation process. Therefore, it is appropriate to investigate the availability of financial resources and budget related issues for every case.

Top management commitment
General description: Top management's commitment both influences the available time and resources for ES project. Without top management support, a project stands a large chance to fail. Even though it is not necessary for top management to be personally involved in the participation process, their support is very important to create commitment for the users. (Cavaye, 1995)

Implications: Uninterested top management and inadequate support can indicate difficulties with the project and elicits commitment issues throughout the organisation and the participation process. Top management support is different for every ES implementation case and should be assessed.

A2. Project related factors

Degree of task-structure

General description: When user requirements need to be captured in the new IS, user participation is appropriate. Highly structured and well-defined IS do not require user participation to improve the quality or technical content of the system. (Cavaye, 1995)

Implications: Stating the requirements of an ES upfront is one of the larger difficulties of these kind of projects. The scale of the project and the large number of involved stakeholders results in a very large set of requirements and needs. Since no ES implementation is the same, these kinds of projects are neither highly structured nor well-defined. This factor makes user participation appropriate for all ES projects and will not really differ between ES implementations. This eliminates the need to specifically assess this factor during the case studies.

Project complexity

General description: The complexity of an IS project is related to the need for user participation. Project that have a low (technical and/or organisational) complexity have less need for user participation. User participation is important for technically complex, cross-functional IS projects with a high degree of task interdependence. (Cavaye, 1995)

Implications: In line with the above criteria for project complexity, ES implementations are always of high complexity. Due to the technological and organisational complexity of ES implementations, this factor is more or less constant for these kinds of projects. It doesn't have to be included in the assessment of the ES implementation circumstances.

Initiator of the project

General description: User participation is especially appropriate when the need for the new IS originates from a non-user. It seems user participation can be used to compensate for a lack of user initiation. (Cavaye, 1995)

Implications: Because of the project scale and the large impact on financial and organisational resources, an ES is practically always initiated from the (top) management layer of the organisation. As a result, this factor will not recommend a different user participation approach for the different cases. It does not have to be included in the investigation for confounding variables.

Technology available

General description: Some types of IS allow for the use of design tools or application generators that can greatly assist users in the design and implementation of new systems. Through these tools and application generators user can play a larger role in the participation process. (Cavaye, 1995)

Implications: The current practice of ES implementation does not use tools or application generators that assist end-users to directly configure ES modules. The available technology will not differ between ES implementation cases and as a result this factor is not relevant in the ES context.

Expected change brought about by the system

General description: Some new systems change jobs, interpersonal relationships, and the organisational structure. Unexpected change can lead to user resistance. Through user participation, user commitment can be created which can alleviate user resistance. Cavaye (1995, p. 315) states

that "projects that are likely to lead to significant change will benefit from user participation, even if the task to be automated is relatively structured and straight-forward".

Implications: New ES systems always introduce large changes to jobs, interpersonal relationships, and organisational structures. User participations is a method that helps to optimize the new system's fit with the organisation as well as raising awareness for the coming changes. Even though there are always differences in the degree of change that is introduced by ES systems, it is not necessary to distinguish between ES implementations for this aspect.

A3. User related factors

Willingness to participate

General description: Through user participation, users are offered the opportunity to influence the design of the new system with their needs and wishes. Ideally, users have an intrinsic desire to participate in projects. In reality this is not always the case. Their desire to participate is dependent on the perceived relevance of the system. Non-participation of users that are given the opportunity to participate can be interpreted as resistance to the new system. (Cavaye, 1995)

Implications: A user's willingness to participate is possibly closely related to the key concept of perceived relevance. In this research perceived relevance is hypothesised to play an important role in the motivation of users to participate in the ES implementation process. Therefore it is clear that this confounding variable requires a more detailed assessment.

Ability to participate

General description: A desire to participate does not automatically translate in an ability to participate. Participating users can only contribute to the process in a meaningful way if they understand the technology, the tasks involved and the environment within the system will operate. (Cavaye, 1995)

Implications: In order to assess the suitability of users to be included in the participation process, it is important to look at the selection criteria that were used. In case of an ES implementation, it seems logical that participating user understand the primary process of the organisation, have detailed process knowledge of their domains of expertise and roughly understand the technical aspects of such a system. The users' ability to participate can differ between ES implementation cases and should be assessed.

User characteristics and attitudes

General description: This factor represents the quality of the relationship between participating users and (external) specialists. If the cooperation in the project team is difficult, this could hamper the participative effort. However, according to Cavaye (1995, p. 315), "users who are interested in the new system are likely to want to participate regardless of potential conflict within the project team". (Cavaye)

Implications: Because of the far-reaching and long-lasting nature of ES projects, the cooperation between users and (external) specialist in the project team is important. Therefore, this factor should be taken into account when assessing for confounding variables.

Appendix B. Hypothesized mechanisms

This appendix contains the hypothesized mechanisms and the procedure that is used to identify, formulate and structure them. The hypothesized mechanisms describe the qualitative relationships between the three key variables of this research: perceived relevance, user participation and ES implementation success. First the methodology is discussed, after which the mechanisms are presented in the order that has been determined in section 4.1, as can be seen in Table 26.

Table 26: Overview of discussed relationships

Appendix	Content	Foundation
B1.	**Methodology** to formulate and structure hypothesized mechanisms	Section 4.2
B2.	**Mechanisms:** User participation → Perceived relevance	Section 4.3
B3.	**Mechanisms:** Perceived relevance → User participation	Section 4.4
B4.	**Mechanisms:** Relevance & Participation → ES implementation success	Section 4.5

B1. Procedure to identify, formulate and structure mechanisms

This section provides a procedure and methodology for identifying, formulating and structuring hypothesized mechanisms. First the identification of the mechanisms is presented, after which the methodology for formulating and structuring them is discussed.

Identification of mechanisms

The identification of hypothesized mechanisms during the assessment of each of the three unidirectional relationships is based on the definition and conceptualization of the key variables in the literature study in chapter 3. In that chapter, a number of specific dimensions and their underlying aspects have been attributed to each of the three key variables. These dimensions and underlying aspects describe the complete set of characteristics that have been coupled to each of the key variables. The structure of these dimensions (and their underlying aspects) is reused to provide the structure for the identification of hypothesized mechanisms. This is illustrated in Figure 55. Each of the arrows in the figure shows a potential effect of the respective aspect of the independent variable on the dependent variable. Each arrow is systematically assessed and in case of an expected relation a hypothesized mechanism is formulated. Aspects of the independent variable can also impact the confounding factors of the dependent variable. This is why the confounding factors of the dependent variable are included.

The discussion of the effect of perceived relevance and user participation on ES implementation success deviates from the above described approach for the identification of mechanisms. The nature of ES implementation success and the scope of this investigation make it more logical to related relevance or participation in general terms to the three underlying measures of success, resulting in a selection of 2x3 mechanisms.
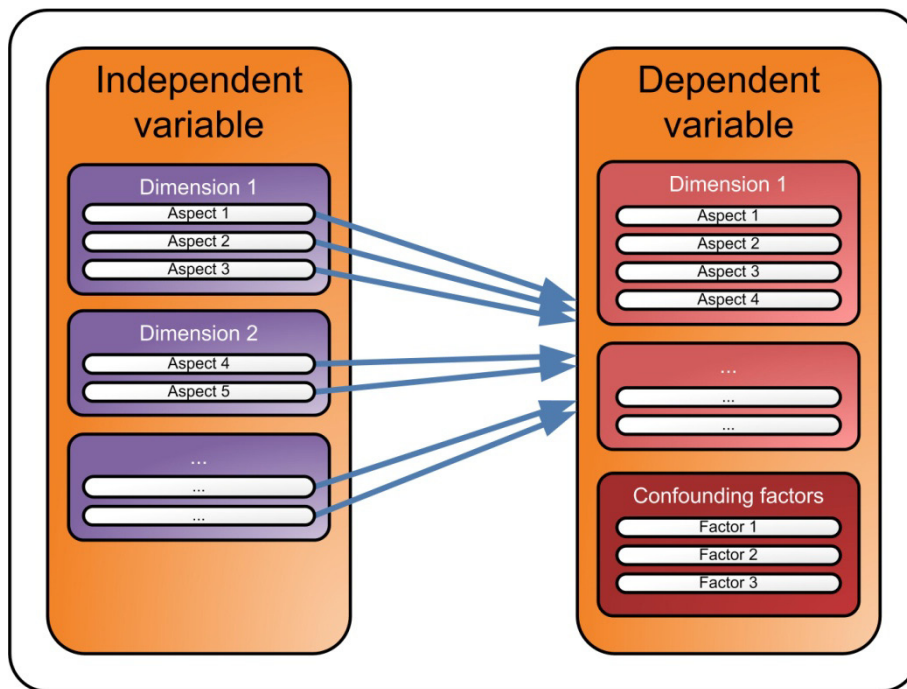
Figure 55: Identified mechanisms in the relation between key variables

Methodology for formulating and structuring mechanisms

Even though the expected effects of hypothesized mechanisms can take many forms and depend on a multitude of factors, a uniform approach to discuss each identified mechanism is required. Therefore, each mechanism is discussed and demonstrated in terms of the steps shown in Table 27. The content and process-oriented perspectives can be found in section 4.2.2.

Table 27: Steps for setting up hypothesized mechanisms

Steps for describing hypothesized mechanisms	
1.	Description (Content-oriented perspective)
2.	Timing (Process-oriented perspective)
3.	Scale
4.	Sensitivity
5.	Hypothesis
6.	Visual representation of the mechanism

Description

Based on academic literature and logical induction, first a general relation between the aspect of the independent variable and the dependent variable is established. The content-oriented perspective is used to identify and establish the relationship. Three types of relationship can be discovered:

- A direct relation**:** The aspect of the independent variable directly affects one of the identified connecting concepts that make up the relationship with the dependent variable.

- An indirect/mediated relation: Mediated by circumstantial factors related to the variables, the aspect of the independent variable can indirectly affect one of the identified connecting concepts that make up the relationship with the dependent variable.
- No/Ignorable relation: The aspect of the independent variable does not affect the dependent variable, or the effect can be neglected.

Timing

When a direct or mediated relation has been identified, the next step is to explore the relation from a process-oriented perspective. This way the effect of timing on the hypothesized mechanism can be incorporated. Due to the staging and phasing that is very specific and typical for ES implementations, it is anticipated that the effects of many mechanisms are highly likely to change over time. The general implementation project setup, identified in section 3.2, plays an important role in the construction of these ES specific mechanisms. The identified ES implementations staging and phasing is used to express the role of timing in relation to the mechanism. In the specific case of a mediated relationship, it is important to note that the mechanism is mediated by a specific factor during the implementation process, which can overrule the function and importance of timing. The occurrence of these changes of the mediating factor then dictates the timing of an effect.

Scale

The effect of the reviewed aspect of the independent variable on the dependent variable needs to be made operational in a qualitative manner. It is therefore not a goal of this research to provide an exact and precisely measurable effect on the dependent variable for every value of the aspect of the independent variable. A rough ordinal scales which gives a broad overview of the spectrum is sufficient to describe the qualitative mechanisms between variables. These ordinal scales of the individual aspects of key variables are already discussed in the literature study (Chapter 3). For example, based on the literature study, the spectrum of the user participation aspect "degree of influence" ranges from a "low degree of influence" to a "high degree of influence". The effect of intermediate values of the "degree of influence" can be deduced from these outer margins. Only when an intermediate value is required to correctly express a mechanism, additional values are added. In these cases the mechanism apparently does not have a linear effect on the dependent variable.

Sensitivity

The sensitivity (or strength) of an effect actuated by a hypothesized mechanism also requires some attention. While retaining the qualitative character of the investigation, both positive and negative anticipated effects can be expressed with a limited degree of nuance:

- strong positive,
- positive,
- neutral (or ignorable),
- negative, and
- strong negative.

This way it is possible to make a rough ordinal distinction in the relative strength of the anticipated effects. The main goal of these indicators is to illustrate the qualitative effect of the hypothesized mechanisms and not an absolute (quantitative) assessment of the respective effect.

Hypothesis.

Every mechanism is concluded with a plainly stated hypothesis that describes the anticipated effect of the aspect of the independent variable on the dependent variable. The hypothesis is clarified with a visual representation of the expected mechanism.

Visual representation of hypothesized mechanism.

The effects of the independent variable on the dependent variable are expressed visually, with the help of a set of tables. Each table addresses a hypothesized mechanism. In such a table, the different implementation process characteristics related to the independent variable are represented. As discussed above, this is attained with the help of an ordinal scale, which defines the spectrum. The relationship between the dimensions and aspects of the independent variable and the dependent variable is expressed symbolically. This is achieved by attributing green plus signs, red minus signs and neutral equal signs to the hypothesized relationships, as can be seen in Table 28. The mechanisms are presented rather simplistic, expressing (mediating) variables in high or low and negative or positive. This way, it is possible to assign a qualitative indication of the effects of certain combinations of implementation characteristics on the dependent variable. The sensitivity of the mechanism is expressed by assigning single and double plus/minus signs to the hypothesized effect.

Table 28: Representation of a hypothesized effect on a key variable

Hypothesized effect	Representation of the effect
Strong positive effect	+ +
Positive effect	+
Neutral / ignorable effect	=
Negative effect	-
Strong negative effect	- -

B2. User participation → Perceived relevance

This part of the appendix discusses the effects of user participation on perceived relevance. The user participation dimensions defined by Cavaye (1995) provide the structure for the assessment of hypothesized mechanisms (see section 3.4 and Figure 56).
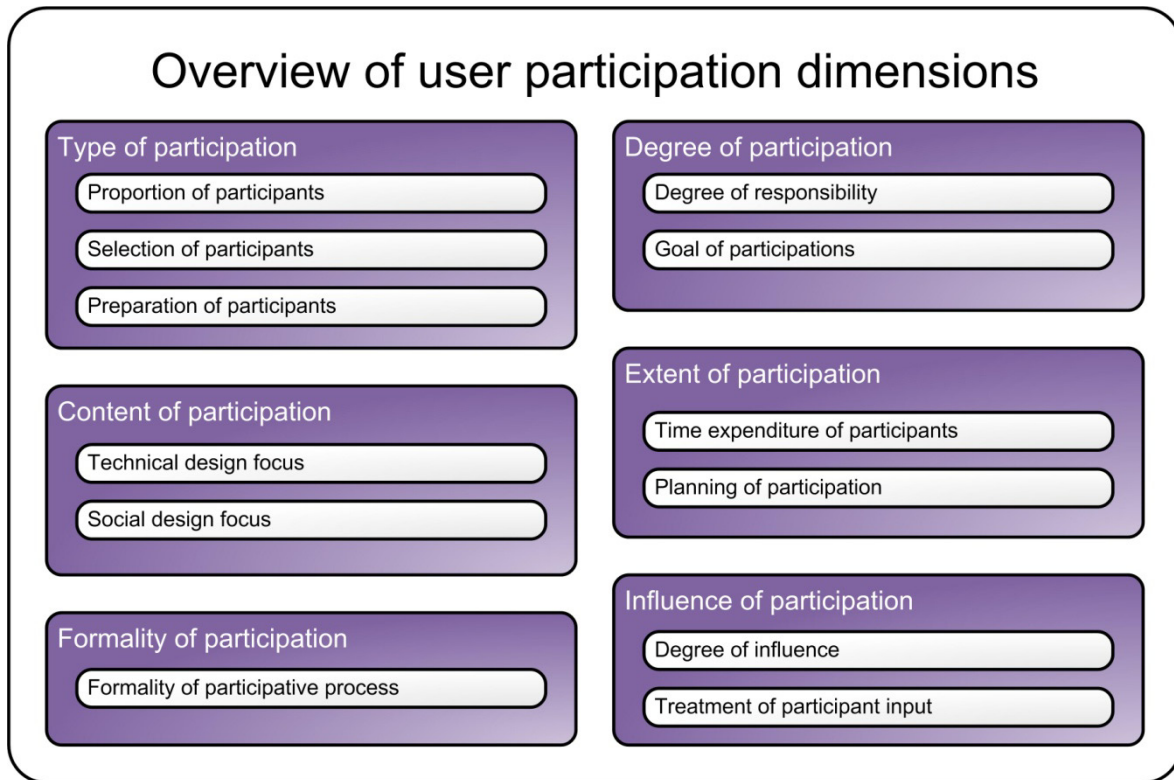
Figure 56: Overview of participation dimensions and underlying aspects

Type of participation

Type of participation refers to the proportion of user actively involved in the participation process relative to the number of total end users, the selection that precedes the participation process, and the preparation of involved users for their specific tasks during the process. These three aspects are shown in Figure 57.
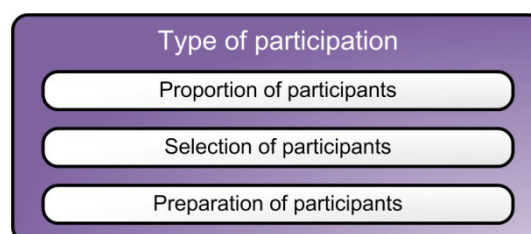
Figure 57: Aspects related to the type of participation

Proportion of participants

Description: Literature sources concur that user participation affects the perceived relevance of end users (Barki & Hartwick, 1994; McGill & Klobas, 2008). Although literature sources withhold to mention any specific effect of the proportion of participants on perceived relevance, the author

expects a mediated relationship. The proportion of participation is expected to have an indirect effect on perceived relevance due to the following two considerations:

1. The first consideration is based on research by McGill and Klobas (2008). They observed that non-participants base their perceived relevance on the (perceived) system quality, while the participants base their perceived relevance on their involvement in the participation process. Assuming McGill and Klobas' observation holds in the ES implementation context, this leads to the following hypothetical mechanism: the overall effect of user participation on perceived relevance grows with an increase in the proportion of participants and vice versa. The proportion of participants does not directly affect perceived relevance, but is able to amplify the existing effect of user participation on perceived relevance, depending on the quality of participation. Based on this rationale, large scale participation has a smaller tolerance for mistakes, mismanagement or other issues, because of the extensive damage this would do to the perceived relevance and vice versa.

2. The second consideration deals with the "optimal" proportion of participants. The literature review shows that user participation empowers users to express their needs and incorporate them into the new system (increasing their influence and understanding). However it is unlikely that an ever larger proportion of participants will by definition lead to improved quality of the participation process. Even though an increase of the proportion of participants in effect amplifies the overall impact of user participation on perceived relevance, an increase in the proportion of participants above a certain threshold is expected to severely reduce the quality of participation, having detrimental effect on the influence and understanding of participants.

Timing: The proportion of participants is not expected to affect the participation process differently during different phases. It just amplifies the existing overall effect of user participation on perceived relevance during all stages and phases of the process.

Scale: In the case of a participation process, at least a *low proportion* of end users is participating in the implementation project, establishing one side of the spectrum. The other side of the spectrum is defined by a *high proportion* of participating end users (and is demarcated by the situation where all end user are participating). The optimal proportion for participation cannot be determined with a static calculation and thus cannot be placed as a static value on this scale. It is expected to be dependent on a number of contextual factors, such as: organisation size, ES complexity, managerial competence, and increasing differences in knowledge level between participants. These could lead to: increasing difficulties managing the participation process, increased difficulty to reaching agreements, slow down of the participation process, etc.

Sensitivity: A low proportion of users in the participation process will have a positive to negative effect, depending on the quality of participation. A high proportion of users in the participation process will have a strong positive or strong negative effect depending on the quality of participation. The strong negative effect is also the case when an above optimal proportion of participants negatively affects the quality of participation.

Hypothesis: Effect of *proportion of participants* on *perceived relevance:*

- A low proportion of participants has a positive effect on the perceived relevance of participants as long as the quality of participation is high. It provides a relative small group of end users the opportunity to influence the implementation and gain an improved understanding of the system. When there is a low proportion of participants and the quality of participation is low, the reduced influence and decreased understanding bring about a negative effect on the perceived relevance of participants.

- A high proportion of participants has a strong positive effect on the participants' perceived relevance as long as the quality of participation is high. It provides a relative large group of end users the opportunity to influence the implementation and gain an improved understanding of the system. When there is a high proportion of participants and a low quality of participation, the reduced influence and decreased understanding bring about a strong negative effect on the participants' perceived relevance.

- When the quality of participation is compromised by large number of participants the above optimal proportion of participants results in a strong negative effect on perceived relevance. The loss of quality deteriorates the opportunity of a large group of end users to influence and understand the implementation.

The hypothesized relationship between *proportion of participants* and *perceived relevance* is presented in Table 29.

Table 29: Anticipated effect of proportion of participants on relevance

	Perceived relevance
Low proportion	
High quality of participation	+
Low quality of participation	-
High proportion	
High quality of participation	+ +
Low quality of participation	- -

Selection of participants

Description: It is very unlikely that every future user plays a role in the participation process (that the proportion of participation is 100%). Almost always there is a selection of users actively involved in the participation process. Even though no literature sources reveal an effect of participant selection on perceived relevance, it is expected by the author. Selection of participants directly impacts the time user participation claims from the end users and the prospect of influence and understanding. The significant impact of the change, which is induced by a new ES, is expected to make the selection for the user participation process a material matter. Depending on the attitude of both participants and non-participants towards selection, the selection of participation elicits an effect on perceived relevance.

Timing: Due to the timing of the selection process for participation during the initiation stage of the implementation, it is assumed that the effect of selection on perceived relevance will mainly occur during the initiation stage and will not affect perceived relevance during later stages. This would mean that selection only affects perceived relevance once and is partially responsible for the perceived relevance of users at the start of the project. Because the actual implementation project is not yet under way at this point in time, selection offers participants with an expectation of increased influence and improved understanding of the new system or vice versa.

Scale: The relevant values of the mechanism that determines the effect of the selection of participants on perceived relevance can be expressed on a scale that ranges from a *positive attitude towards selection* to a *negative attitude towards selection*.

Sensitivity: The selection of participants takes place during an early stage of the ES implementation. Therefore, both participants and non-participants will only have vague ideas of the influence that can be wielded and the understanding that can be gained through the participation process. As a result, a positive or negative effect is expected, depending on the (non-)participants' attitude towards selection.

Hypothesis: Effect of *selection of participants* on *perceived relevance:*
- The selected end users with a positive attitude towards selection experience a positive effect on perceived relevance. Participation means that these participants are going to be a part of the implementation as they preferred and are given the opportunity to influence the system and realize their needs, increasing the perceived relevance. The end users that were not selected for the participation process but have a positive attitude it experience a negative effect on perceived relevance. They had a reason to participate in the development of the system and desired influence and/or understanding. Now that they are unable to secure their needs for the new system, the perceived relevance of the system is reduced.
- The end users that have been selected for participation and have a negative attitude towards selection undergo no change in perceived relevance. Although they did not prefer to be selected for the user participation, it is unlikely that their increased influence and understanding will lower their perceived relevance of the system. The end users that have not been selected for participation and have a negative attitude towards selection will not undergo a change in perceived relevance. Whatever the reason of the reluctance of positive non-participants to participate, it is apparent that these users see no urge to realize their needs with regard to the new system. As a result, participating will not have a positive or negative effect on perceived relevance.

The hypothesized relationship between *selection of participants* and *perceived relevance* is presented in Table 30.

Table 30: Anticipated effect of selection of participants on relevance

	Perceived relevance
Positive attitude towards selection	
Participating	+
Non-participating	-
Negative attitude towards selection	
Participating	=
Non-participating	=

Preparation of participants

Description: Most users are unfamiliar with the enterprise system domain and implementation methodologies. Preparation of the participants is important because the majority of participants are venturing into unknown territory when they join a large scale project like an ES implementation (Robey, et al., 2002). It is not a part of their daily routines to participate in the implementation of an ES and it is very difficult to envision the workings of the new system during the implementation process (Wagner & Piccoli, 2007). To make matters worse, the ES context demands a certain process-oriented mindset that is not self-evident for many end users. Therefore, it is anticipated that participants that are well-prepared to participate in the ES implementation domain will not incur the disadvantages that ill-prepared participant might encounter. Poor preparation is anticipated to lead to a poor understanding of the basic principles behind ES and an inability to express specific needs for the system. In turn, the compromised understanding and the reduced influence would lead to a deterioration of perceived relevance for unprepared participants. Contrary, a well prepared participant will have an improved understanding of the process and will be able to formulate his/her needs, leading to an improvement of the user's ability to influence and understand the new system.

Timing: Since all stages require a certain degree of expertise, the state of preparation is expected to have an effect on perceived relevance during all phases of implementation project. However, some phases of implementation projects require significantly more effort from participants. During the ES implementation project, this is especially the case with the blueprint phase. The blueprint phase requires a specific skill set that is not apparent for most participants. Therefore, preparation of participants is especially important in this phase, early on during the ES implementation project.

Scale: The state of preparedness ranges from *well-prepared* to *ill-prepared*. This scale is selected with the goal to cover the spectrum of likely scenarios that can be encountered in practice.

Sensitivity: A positive or negative effect of preparation of participant on perceived relevance is present during the project stage of the ES implementation. The importance of the blueprint phase results in a strong positive or strong negative effect on perceived relevance during this phase.

<u>Hypothesis:</u> Effect of *preparation of participants* on *perceived relevance:*

- Well-prepared participants are better able to understand and oversee the implementation process. This results in an improved understanding of the ES context and an ability to express their needs and requirements in the domain of the ES, making them better able to influence the system. Depending on the phase of the implementation project, it has an overall positive effect on perceived relevance but a strong positive effect during the blueprint phase.

- Ill-prepared participants lack the ability to express their needs and to represent these requirements during the participation process. In addition, they have a reduced understanding of the system. Depending on the phase of the implementation project, it has an overall negative effect on perceived relevance but a strong negative effect during the blueprint phase.

The hypothesized relationship between *preparation of participants* and *perceived relevance* is presented in Table 31.

Table 31: Anticipated effect of preparation of participants on relevance

	Perceived relevance
Well-prepared	
Blueprint phase	+ +
Later phases	+
Ill-prepared	
Blueprint phase	- -
Later phases	-

Degree of participation

The degree of participation refers to the possible differences in the responsibilities between individual users in the participation process and the overall degree of responsibility assigned to users during the participation process. In addition, the goal setting of the participation process also reveals a great deal about the intended purpose and related mandate of user participation during ES implementations. Figure 58 shows the two aspects of the degree of participation.
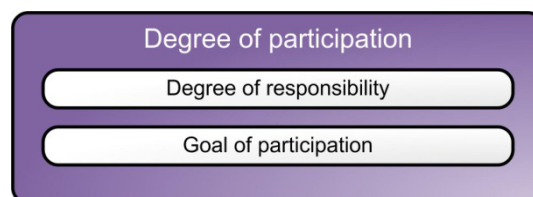

Figure 58: Aspects related to the degree of participation

Degree of responsibility

Description: The degree of responsibility refers to the level of responsibility that participants receive during the participation process. The levels of responsibility have been differentiated by Pasmore & Fagans (1992). Although not the same as the actual influence applied by participants during the implementation project, the degree of responsibility does relate to the planned or intended influence participants are expected to exert on the system under development. The higher the level of responsibility that is enjoyed by participants, the more likely it is they will be able to exert influence on the implementation through the participation process. Since the "influence" theme has been identified as one of the key themes in the relationship between participation and relevance (Barki & Hartwick, 1994), the degree of responsibility will be an important indicator of the actual influence that participants can apply.

Timing: The degree of responsibility indicates the mandate of participants during the participation process. The degree of responsibility is expected to account for the perceived influence of participants during the early phases of the project stage, especially the blueprint and realisation phase, when the actual influence of participants is still difficult to ascertain. The actual influence starts to become evident as the blueprint phase progresses and can only be assessed with certainty at the end of the implementation project. As a result, the effect of the degree of responsibility on perceived relevance diminishes as the project progresses to the later phases.

Scale: The degree of responsibility ranges from a *low degree of responsibility* to a *high degree of responsibility*. The spectrum is directly coupled to Pasmore & Fagans' levels of participation. Therefore, an additional intermediate value is provided by a *medium degree of responsibility*. A low degree of responsibility corresponds with the conforming level, a medium degree of responsibility corresponds to a contributing and challenging level, and a high degree of responsibility corresponds to a collaborating and creating level.

Sensitivity: Depending on the purview of participants, a higher degree of responsibility is expected to elicit an ever stronger positive effect on perceived relevance. A low degree of responsibility severely limits the influence participants can exert, leading to a reduction of perceived relevance.

Hypothesis: Effect of *degree of responsibility* on *perceived relevance.*
- A high degree of responsibility shows a strong effect on perceived relevance during the blueprint and realisation phase. It gives participants the prospect of a large degree of influence that can be exerted through the participation process. Because the actual influence can only be determined with certainty when the system is nearing completion, the importance of the degree of responsibility is reduced during the later phases and so is the impact of the degree of responsibility on perceived relevance.
- A medium degree of responsibility shows a more moderate effect on perceived relevance, leading to a positive effect on perceived relevance during the blueprint and realisation phases, while the effect on relevance is reduced during the later phases of the project.
- A low degree of responsibility limits the perceived influence of participant on the implementation, eliminating the ability of participants to incorporate important needs and

requirements into the system. The negative effect on perceived relevance weakens as the project advances.

The hypothesized relationship between *degree of responsibility* and *perceived relevance* is presented in Table 32.

Table 32: Anticipated effect of the degree of responsibility on relevance

	Perceived relevance
High degree of responsibility (Level: Collaborating and Creating)	
Blueprint and *realisation* phases	**+ +**
Testing, *training* and *go-live* phases	**+**
Medium degree of responsibility (Level: Contributing and Challenging)	
Blueprint and *realisation* phases	**+**
Testing, *training* and *go-live* phases	**=**
Low degree of responsibility (Level: Conforming)	
Blueprint and *realisation* phases	**- -**
Testing, *training* and *go-live* phases	**-**

Goal of participation

Description: According to literature, the goal of participation should be to develop both the organisation and the individuals in it (Pasmore & Fagans, 1992). However, sometimes the participation process is used as a window dressing effort. In these cases there is not really the intention to develop the organisation and the individual (Wagner & Piccoli, 2007). Genuine application of user participation should help to leverage a positive result, because it empowers end users to fulfil their needs for the new system and gives them influence. Feigned user participation, which is not aimed on the development of the organisation and its individuals, will lead to failure (from a participation perspective). It tries to trick users into accepting the change without the promised influence. Although no direct link between the goal of participation and the perceived relevance is reported in literature, there seems to be an indirect connection. Whether or not the goal setting for the participation process is genuine, defines to a large extend the eventual influence that is achievable through the process. The important role that influence plays in the relationship between user participation and perceived relevance (Barki & Hartwick, 1994) makes this an important issue. Sincere goal setting of the participation process is anticipated to have important consequences for the possible influence that can be wielded through it. However, in relation to

perceived relevance, the effect of the goal of participation will manifest itself to participants through the responsibility of participation and the influence of participation.

Timing: Not applicable.

Scale: Not applicable.

Sensitivity: Not applicable.

Hypothesis: Not applicable.

Content of participation

In theory, the content of the user participation process is split in two categories (Cavaye, 1995), namely participation with regard to the "harder" technical aspects, and the "softer" social aspects of the implementation. This is also shown in Figure 59, based on the literature study where the two aspects are assessed separately in the context of user participation. However, in relation to perceived relevance, the emphasis is on the correct balance of the two aspects during the participation process (Muntslag, 2001). As a result both technical and social design aspects of user participation are not discussed separately but concurrently.
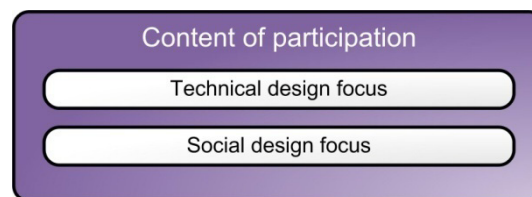
Figure 59: Aspects related to the content of participation

Balance between technical and social design focus

Description: As discussed in earlier chapters, the balance between technical and social design is often a problematic issue during implementations. Especially the social and organisational change aspects of the implementation are neglected, resulting in hardship when the system goes live (Muntslag, 2001). This is supported by findings in the research domain of socio technical system theory. Modern socio technical systems theory states that the design of all information systems needs to be preceded by the development of the corporate strategy and the design of production structures. The socio technical system perspective shows a remarkable overlap with the domain of business process reengineering, which also advocates the use of IT in combination with another way of organizing the business (Batenburg, Benders & Scheper, 2002). While a balanced design is preferred, practice shows that a lack of social design is more likely to occur (Muntslag, 2001). Without any technical design direction the developed social design is likely not to be in accordance with the technical imperatives that are dictated by the COTS nature of enterprise systems. In other words, the social design has to stay within the realm of the possibilities of the ES, while the technical design has to take into account the social characteristics of the organisation. In short, technology should be guided by the organisational needs, leading to a mix of technical and social considerations. Based on these sources, it is expected that an unbalanced approach of the system's design will have

severely reduce the participants' ability to influence and understand the system. A balanced design on the other hand increases the ability of participants to influence and understand the system.

Timing: A misfit between the system under development and the organisation in which the system has to be embedded is difficult to notice during the early phases of the implementation (blueprint and realisation phases). During the later phases (testing, training and go-live) participants will gradually start to take better notice of the possible misfit between system and organisation.

Scale: The scale of the balance between technical and social design focus is defined by three values, which also could be called scenarios: an *overly technical design*, a *balanced design*, and an *overly social design*. Together these three values describe the entire spectrum.

Sensitivity: As a result the effects of an (in)adequate design focus on perceived relevance will be positive/negative during the early phases, while the resulting impact on perceived relevance will be strong positive/negative during the later phases.

Hypothesis: Effect of *Balance between technical and social design focus* on *perceived relevance:*
- An overly focus on technical design aspects (thus an insufficient focus on social design) has a strong negative effect on perceived relevance, though it will not be as visible during the earlier phases of the implementation as during the later phases.
- An overly focus on social design aspects (thus an insufficient focus on technical design) has a strong negative effect on perceived relevance, though it will not be as visible during the earlier phases of the implementation as during the later phases.
- A balance design focus leads to a the progressive convergence of technical and social design aspects, gradually resulting in a strong positive effect on perceived relevance as the pieces of the puzzle fall into place.

The hypothesized relationship between *Balance between technical and social design focus* and *perceived relevance* is presented in Table 33.

Table 33: Anticipated effect of the balance of technical and social design focus on relevance

	Perceived relevance
Overly technical design	
Blueprint and *realisation* phases	-
Testing, *training* and *go-live* phases	- -
Balanced design	
Blueprint and *realisation* phases	+
Testing, *training* and *go-live* phases	++
Overly social design	
Blueprint and *realisation* phases	-
Testing, *training* and *go-live* phases	- -

Extent of participation

The extent of participation refers to the varying scope of the participation process during different stages and phases of the implementation project. The first aspect differentiates the time expenditure of participants during the different phases of the project and the second relates to the organisation and planning characteristics of the participation process (see Figure 60).
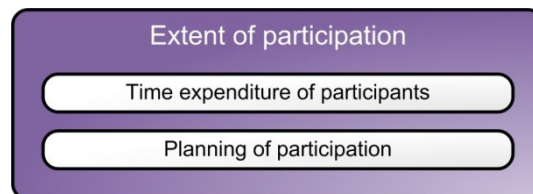
Figure 60: Aspects related to the extent of participation

Time expenditure of participants

Description: In literature there is no specific mentioning of a relationship between the varying scope (and therefore time expenditure) of the participation process and the perceived relevance of the system for end users. In assessing the effect of a varying time expenditure on perceived relevance, it is expected that the varying time expenditure itself does not directly affect perceived relevance either positively or negatively. In case of uneven time expenditure it just happens to be that user participation is more intense and requires more user input during certain phases of the project. As long as the time expenditure of participants does not compromise the quality of participation, no effect on perceived relevance is anticipated. In other words: as long as participants believe their needs are being accommodated, no effect on perceived relevance is anticipated. However, there are two scenarios where the quality of participation is threatened by the time expenditure of participants. The first is in case of an uneven work load of participation activities, especially

combined with the returning responsibilities of daily operations in the organisation. If participants are unable to secure the quality of participation, the process will suffer. The second is in case of a even work load of participation activities when actually a higher commitment is required. If participants are unable to scale up the participation process in order to secure quality of participation, the process will suffer. When the quality of participation is negatively impacted and thus affects the influence of the participation process, time expenditure will have a negative effect on perceived relevance.

Timing: The balance of time expenditure is important during the entire project. Due to the uneven workload of participants throughout the participation process, which is typical for these kinds of large scale projects, a higher risk of unbalanced time expenditure can be expected during certain periods.

Scale: The scale stretches from a *balanced time expenditure* of participants to an *unbalanced time expenditure* of participants.

Sensitivity: As soon as the balance of time expenditure negatively affects the quality of participation an indirect negative effect on perceived relevance is unavoidable.

Hypothesis: Effect of *time expenditure of participants* on *perceived relevance:*
- As long as there is no impact on the quality of user participation, an even time expenditure does not affect perceived relevance. When an even time expenditure of participants leads to a reduced quality of participation, a negative effect on perceived relevance will occur.
- As long as there is no impact on the quality of user participation, uneven time expenditure does not affect perceived relevance. When an uneven time expenditure of participants leads to a reduced quality of participation, a negative effect on perceived relevance will occur.

The hypothesized relationship between *time expenditure of participants* and *perceived relevance* is presented in Table 34.

Table 34: Anticipated effect of time expenditure of participants on relevance

	Perceived relevance
Even time expenditure	
No impact on participation quality	**=**
Reduced participation quality	**-**
Uneven time expenditure	
No impact on participation quality	**=**
Reduced participation quality	**-**

Planning of participation

Description: This aspect of the participation process is related to the time expenditure aspect of a participation process and refers to its planning-related qualities. Generally a project planning is created during project initiation, stipulating among other things the participatory involvement of the selected end users (the participants) during the implementation process. The complexity of ES project planning and the average unfamiliarity of users with these kinds of complex projects lead to the assumption that end users will not be able to detect planning-related issues upfront. If so, a poor planning of participation will only appear during the execution of the project, when the actual time expenditure becomes clear and missed opportunities are revealed. Therefore, planning of participation is anticipated to describe the same effect on perceived relevance as the already discussed time expenditure. This does not mean that the planning of participation is not of value in the assessment of user participation, but does not have a separate effect on perceived relevance.

Timing: Not applicable.

Scale: Not applicable.

Sensitivity: Not applicable.

Hypothesis: Not applicable.

Influence of participation

Academic literature mentions the importance of the influence of participation on perceived relevance uniformly. There seems to be a consensus that the degree of influence that can be applied by participants through the participation process is very important for the perceived relevance they have with regard to the new system. As can be seen in Figure 61, the influence of participation comprises of two aspects: degree of influence and treatment of participants input.

Influence of participation
- Degree of influence
- Treatment of participant input
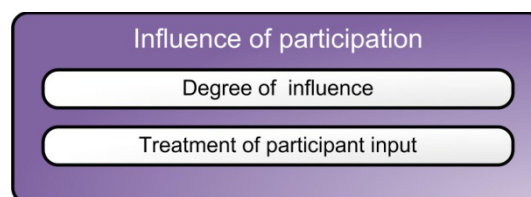
Figure 61: Aspects related to the influence of participation

Degree of influence

Description: The degree of influence is an aspect of user participation that is recognized as a crucial theme in the relationship between participation and relevance (Barki & Hartwick, 1994). It describes the transition of the participants' efforts in representing their needs and requirements into tangible outcomes; the incorporation of those needs and requirements into the new system. As mentioned earlier on, the degree of influence is related to the degree of responsibility. Where the degree of responsibility expresses the likelihood that the participants' efforts will lead to an impact on the system, the degree of influence assesses the actual influence of participants on the newly developed system.

Timing: The degree of influence is expected to be difficult to assess during the early phases (blueprint and realisation phases) of the implementation project due to the unfinished state of the system and therefore will only have a limited effect on perceived relevance. During the later phases of the project, when the participants start to see the actual influence of their participation efforts on the new system, their degree of influence will become ever more apparent.

Scale: Since perceived relevance is about the expectations of users and participants, the effect of the degree of influence on perceived relevance is dependent on the degree of influence relative to participants' expectations of influence. The scale stretches from a *high degree of influence* to a *low degree of influence*.

Sensitivity: Both a high and a low degree of influence (relative to the participants' expectation of influence) will have an effect on perceived relevance during the earlier phases. However, especially during the later phases of the implementation process the degree of influence will have a strong effect on perceived relevance. The rationale to estimate the effect of both positive and negative shifts as strong during these phases is due to the fact that the influence of participation is established as an important theme in the relationship between user participation and perceived relevance.

Hypothesis: Effect of *degree of influence* on *perceived relevance:*
- During the early phases of the implementation process participant will find it challenging to assess the degree of influence they are exerting on the system under development. If their degree of influence is high, it will "only" have a positive effect on perceived relevance. During the later phases of the implementation process, the participants become fully able to assess the degree of influence they are wielding. A high degree of influence then results in a strong positive effect on perceived relevance.
- During the early phases of the implementation process participant will find it challenging to assess the degree of influence they are exerting on the system under development. If their degree of influence is low, it will "only" have a negative effect on perceived relevance. During the later phases of the implementation process, the participants become fully able to assess the degree of influence they are wielding. A low degree of influence then results in a strong negative effect on perceived relevance.

The hypothesized relationship between *influence of participation* and *perceived relevance* is presented in Table 35.

Table 35: Anticipated effect of the degree of influence on relevance

	Perceived relevance
High degree of influence	
Blueprint and *realisation* phases	**+**
Testing, *training* and *go-live* phases	**+ +**
Low degree of influence	
Blueprint and *realisation* phases	**-**
Testing, *training* and *go-live* phases	**- -**

Treatment of participant input

Description: This aspect refers to the treatment of participants' input over the course of the participation process. It has been a deliberate decision to separate the treatment of participant input from the degree of influence during the assessment of the influence of participation. The reason to assess the treatment of participant input separately is because of its expected importance for the participants' perception of influence. Participants are expected to experience influence (and a successful participation effort) if they are able to see their needs incorporated in the new system. The actual influence is already being assessed by the degree of influence. The outcome of the participant's input is not yet visible during the earlier phases of the project, because a final product is not yet tangible. Before participants are able to recognize their needs in the system under development, they have to deduce their influence on the basis of the earlier discussed degree of responsibility. However, the treatment of participant input is expected to have a similar role.

Timing: Analogous to the degree of responsibility, the treatment of participant input is an important indicator for the degree of influence during the earlier phases (blueprint and realisation phases) of the participation process, when the actual influence of participants is not yet visible. During the later phases of the project, the influence of the participants starts to become assessable through the actual influence, reducing the effect of the treatment of participant input on perceived relevance. However, it remains important that input of participants is acknowledged and not ignored.

Scale: The way participant input can be treated is varied. The spectrum that is covered here is limited with a scale that stretches from *input used* to *input ignored*.

Sensitivity: The treatment of participant input results in a strong positive/negative effect on perceived relevance during the earlier phases of the implementation project, while its effect is reduced throughout the later phases of the process.

Hypothesis: Effect of *treatment of participant input* on *perceived relevance*:
- When the participants' input is well-received and adopted by the project team, this suggests to the participants the ability to influence the system. Even this suggestion of influence will reinforce the idea that the participants' needs and requirements are acknowledged and will

be adopted into the new system, thereby having a strong positive effect on perceived relevance during the early phases of the project. This effect remains important during the later phases, be it in a weaker form, having only a positive effect on perceived relevance.

- When participants feel their input is ignored by the project team, this suggests to the participants an inability to influence the system. As long as their input is ignored, it seems unlikely that the participants will be able to exert the desired influence on the system, reducing their ability to incorporate their needs and requirements into the system. The result is a strong negative effect on perceived relevance during the early phases of the project. This effect remains important during the later phases, be it in a weaker form, having only a negative effect on perceived relevance.

The hypothesized relationship between *treatment of participant input* and *perceived relevance* is presented in Table 36.

Table 36: Anticipated effect of the treatment of participant input on relevance

	Perceived relevance
Input used	
Blueprint and *realisation* phases	**++**
Testing, *training* and *go-live* phases	**+**
Input ignored	
Blueprint and *realisation* phases	**--**
Testing, *training* and *go-live* phases	**-**

Formality of participation

Formality of participation relates to the formal or informal character of the participative activities, events, and behaviours. It is recognized as a dimension with only one aspect, as can be seen in Figure 62.

Formality of participation

Formality of participation process

Figure 62: Aspects related to the formality of participation

Formality of participation process

Description: A relation between formality of participation process and perceived relevance is not mentioned in the reviewed academic literature. The formal or informal character of the participation process is not expected to directly affect the perceived relevance of a new system. It is assumed that the right degree of formality during a participation process is dependent on certain characteristics, such as the organisational culture, the level of autonomy of the end users and participants, the

preference and experience of the project's management, etc. When the degree of formality is in tune with these characteristics, the quality of participation will improve, while the opposite scenario would reduce the quality of participation. As a result, the perceived relevance of the ES will be indirectly affected by a positive or negative match of the degree of formality with organisational, project-related and/or end user characteristics.

Timing: The match of the formality of participation with organisational, project-related and end user characteristics is relevant for the quality of participation during course of the entire project. There are no specific moments in time anticipated where the match or mismatch of the degree of formality with organisational characteristics has a smaller or larger effect on the quality of participation.

Scale: The scale of the formality of participation is demarcated by *low formality* on one side and *high formality* on the other. This way a highly simplified spectrum of formality is covered.

Sensitivity: Due to the indirect nature of the relationship a positive or negative effect on perceived relevance is expected.

Hypothesis: Effect of *formality of participation process* on *perceived relevance*:
- When the organisational characteristics demand for a low formality of the participation process, a matching low formality improves the quality of participation and consequently has a positive effect on perceived relevance. The same logic dictates that a high degree of formality where a low degree is asked for has a negative effect on perceived relevance.
- When the organisational characteristics demand for a high formality of the participation process, a matching high formality improves the quality of participation and consequently has a positive effect on perceived relevance. The same logic dictates that a low degree of formality where a high degree is asked for has a negative effect on perceived relevance.

The hypothesized relationship between *formality of participation process* and *perceived relevance* is presented in

Table 37.

Table 37: Anticipated effect of formality of participation process on relevance

	Perceived relevance
Low formality	
Impact improves quality of participation	+
Impact reduces quality of participation	-
High formality	
Impact improves quality of participation	+
Impact reduces quality of participation	-

B3. Perceived relevance → User participation

This part of the appendix discusses the effects of perceived relevance on user participation. The literature study defined perceived relevance and consequently provides the structure for the assessment of hypothesized mechanisms (see section 3.3 and Figure 63).
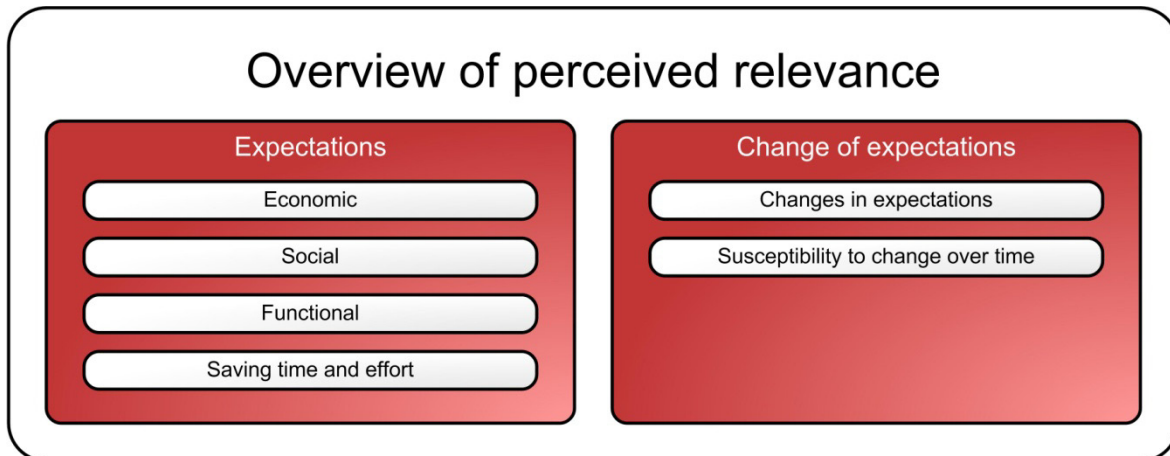
Figure 63: Overview of perceived relevance dimensions and underlying aspects

Expectations

The perceived relevance of a new system is based on the expectation of how the new system will serve the needs and requirements of users during their daily activities. Perceived relevance could be divided in four types of expectations of participants towards the system. Each of these types makes a different contribution to the expectation of relevance, value and importance of the system for the participants. Recalling the literature study in section 3.3, the four types of expectations are presented in Figure 64.

Figure 64: Aspects related to the expectations regarding relevance

A Lack of foundation in academic literature forces a deviation from the planned approach to identify and formulate mechanisms. The planned approach, to couple every aspect of the two perceived relevance dimensions to user participation in order to establish their relationship, is let go. The effects of expectations of all four types of improvements are now assumed to have similar impacts on user participation. As a result, a single mechanism is envisioned to explain the relationship between the expectations of these different types of improvements and user participation. After the formulation of this single mechanism, the effects of these different types of expectations on the

relation between perceived relevance and user participation are examined in order to provide at least a limited insight into some of the differences between them.

Expectations

Description: End users that participate in a participation process do so with a certain degree of motivation. Although the motivation of participants will probably not impact the frequency of participation activities performed or attended by participants (Barki & Hartwick, 1994), it is expected to determine the performance of participants and thus the quality of their efforts during the process. This is the main mechanism that is expected in the relationship between relevance and participation: the impact of relevance on participation through this motivation. In the end, motivating end users to adopt a new situation and create commitment towards the new way of working is a major goal of user participation. As stated by Wagner & Piccoli (2007), it is important to acknowledge that user participation on itself is not identical to user engagement. So even though user participation is a means to involve users in an ES implementation, only actual engagement and motivation of participants ensures an optimal outcome of the participation efforts. Previous research established that this commitment is dependent on a number of factors: personal characteristics, job characteristics and work experiences. Of these three, it appears that work experiences is closest related to user commitment and motivation (Steers, 1977). Without making an inventory of all other factors that impact the motivation and engagement of participants, it anticipated that perceived relevance is major factor that plays an important role in realizing the motivation and commitment of participants during the participation process.

Timing: The expectations of perceived relevance are anticipated to impact the motivation of participants at all times during the user participation process. However, it is expected that stressful stages or phases of the participation process have more to gain or lose. These phases are more dependent on the perseverance of the participants in the participation process. This perseverance is anticipated to be greatly affected by the motivation of participants to reach an optimal result and their motivation to perform well during the process.

Scale: The relevant values of the mechanism that determines the effect of the expectations on user participation can be expressed on a scale that ranges from a *high perceived relevance* to a *low perceived relevance*. Perceived relevance is a composite expectation, based on the expectations of at least the four types of improvements.

Sensitivity: The sensitivity of this hypothesized mechanism closely relates to the timing of the anticipated effect on user participation. During high effort phases the impact of the participants' expectations on participation will range from strong positive to strong negative, depending on the level of perceived relevance. This is because the motivation/engagement of participants is essential for the perseverance of the participants. During low effort phases a reduced effect on user participation will experience because the demand on the perseverance of participants is limited.

Hypothesis: Effect of *expectations* on *user participation:*
- A high perceived relevance improves the motivation of participants to really engage in the participation process. The result is a good performance of participants, having a positive

effect on the quality of the participation efforts. This positive effect is even stronger during phases of the participation process that put a high demand on participants, especially when operational efforts also put a strain on the available time of participants.

- A low perceived relevance reduces the motivation of participants to engage in the participation process. The result is a weak performance of participants, having a negative effect on the quality of the participation efforts. The negative effect is even stronger during phases of the participation process that put a high demand on participants, especially when operational efforts also put a strain on the available time of participants.

The hypothesized relationship between *expectations* and *user participation* is presented in Table 38.

Table 38: Anticipated effect of expectations on participation

	User participation
High perceived relevance	
High effort phases (for example blueprint, testing, go-live)	**+ +**
Low effort phases (for example initiate, realisation and training)	**+**
Low perceived relevance	
High effort phases (for example blueprint, testing, go-live)	**- -**
Low effort phases (for example initiate, realisation and training)	**-**

Differentiation of the expectations

Description: In the literature study expectations of at least four types of improvements have been identified that define the perceived relevance of a new ES: economic, social, functional and time and effort saving improvements. Even though the overall anticipated effect of the improvements has not been differentiated in the previous mechanism, this does not mean it is impossible to discuss differences in the motivational impact of these individual types. The reason for not doing so in the above mechanism was because it was deemed impractical. Expectations regarding the individual types of improvements are expected to have very similar effects on user participation. Repeating four similar mechanisms does not increase the explanatory potential of this research. However, explaining some anticipated nuances now increases the explanatory value of this research and hopefully offers practical advice for expectation management. Paraphrasing Lin & Shao (2000), they state that spontaneous involvement in a participation process is greatly preferred over forced involvement. Spontaneous is the key term here. This investigation uses this notion of spontaneous involvement to compare the different types of expectations. In the author's opinion, the improvements can be split into two groups, genuine improvements and artificial improvements.

Genuine improvements stem directly from the new system or the related organisational change. These improvements ensue from candid consideration and measures regarding the implementation of the new system and the related organisational change. These sorts of considerations and measures are the reason for the ES implementation in the first place. It is expected that genuine form of improvements create spontaneous involvement and, consequently, has a potent effect on the motivation of participants. The improvements that are expected to fall in this category are of the functional and time and effort saving type. It is expected that improvements in these areas stem from the new system or the related organisational change.

Artificial improvements stem from an artificial push to get the new system or the related organisational change in place. These expectations are based on improvements that are brought into existence in order to "create" perceived relevance. This is not illegitimate, but these kinds of initiatives are expected to produce an artificial form of relevance that cannot be classified as spontaneous. It is expected that "artificial" form of improvements does not create spontaneous involvement and, consequently, has a reduced effect on the overall expectations of participants. The improvements that are expected to fall in this category are of the economic and social type, but only when participants are motivated with rewards of these types of improvements. Economic rewards include a pay raise or another economic compensation for participation. Social rewards include the raised status of the participants or other kinds of hierarchical change that is not prompted by the new system or the related organisational change.

Timing: The two different types of improvements are anticipated to impact the overall expectations of participants at all times during the user participation process.

Scale: The relevant values of the mechanism that determines the effect of the different types of improvements on user participation can be expressed on a scale that ranges from *genuine improvements* to *artificial improvements*.

Sensitivity: Genuine improvements are expected to have a strong positive effect on the motivation of participants to participate. Artificial improvements are expected to have a positive effect on the motivation of participant to participate.

Hypothesis: Effect of *differentiation of expectations* on *motivation:*
- Improvements that stem from the new system or the related organisational change, and are therefore genuine improvements, result in a strong positive effect on the participants' overall expectations of the new system.
- Improvements that stem from an artificial push to get the new system or the organisational change in place and are therefore artificial improvements result in a positive effect on the participants' overall expectations of the new system.

The hypothesized relationship between *differentiation of expectations* and *perceived relevance* is presented in Table 39.

	Participation
Genuine improvements	++
Artificial improvements	+

Table 39: Anticipated effect of differentiated of expectation on participation

Change of expectations

As ES implementations advance, a number of factors impact the perceived relevance of the new system for the participants. Also the susceptibility of perceived relevance to change is expected to transform over time. Both aspects are presented in Figure 65.
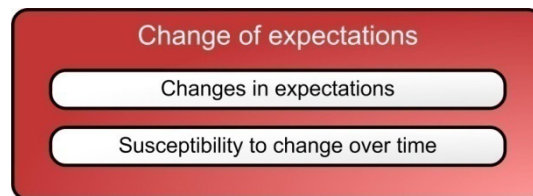

Figure 65: Aspects related to the change of perception regarding relevance

Changes in expectations

Description: The expectations and the perception of expectations towards the new system change due to a number of factors. Such factors are: (promotional) communications and rumours about the new system, the end users' (in)direct experiences with the ES implementation and the participants' experiences during the participation process. This last effect, of participation on relevance, has been extensively assessed and documented in section 4.3. In addition, a number of confounding factors, identified in section 3.6.1, also impact the expectation of end users. All these factors combined result in a changing perceived relevance during the ES implementation. Through the "expectations" mechanisms described above, the changes in the expectations of participants have an indirect effect on their motivation to participate.

Timing: The expectations of participants are impacted during the entire ES implementation process. Developments in every stage or phase can both positively and negatively affect the expectations and thus the perceived relevance regarding the new system.

Scale: The mechanism that expresses the effect of the change of expectations on perceived relevance is presented on a scale that ranges from a *positive change of expectations* to a *negative change of expectations*.

Sensitivity: The sensitivity of this anticipated mechanism closely relates to the timing of the anticipated effect on perceived relevance. During the initiate stage and the blueprint phase the changeability of the participants' expectations the possible change will range from strong positive to strong negative, depending on the developments in the implementation. During later phases the changeability of the expectations is reduced and ranges from a possible positive to a negative change.

Hypothesis: Effect of *Changes in expectations* on *perceived relevance:*
- As the expectations regarding the new system are negatively impacted, so will the perceived relevance.
- As the expectations regarding the new system are positively impacted, so will the perceived relevance.

Based on these hypotheses, the anticipated effect of *changes in expectations* on *perceived relevance* is presented in Table 40.

Table 40: Anticipated effect of changing expectation on perceived relevance

	Perceived relevance
Positive change of expectations	
Improved expectations	**+**
Strongly improved expectations	**+ +**
Negative change of expectations	
reduced expectations	**-**
Strongly reduced expectations	**- -**

Susceptibility to change over time

Description: The expectations and therefore the perception of expectations towards the new system subjected to change. There is a strong indication that the susceptibility of the perceived relevance to change is not constant over time. Depending on this susceptibility it becomes easier or more difficult to realize change in the participants' perceived relevance regarding the system as the ES implementation progresses. This mechanism is based on statements by Wagner & Piccoli (2007), who observed that the susceptibility to change is likely to decline over the course of the implementation. If their observation is correct, the impact of relevance on participation is receptive to this phenomenon. It also suggests that the management of expectations could be more effective during the early phases of the implementation. However, a warning is in place: this does not mean that neglecting the perceived relevance during the later phases will not do damage to the motivation of participants to participate. The susceptibility of expectations mechanism assumes that the top level implementation efforts and intentions remain the same during the entire ES implementations process.

Timing: Change of perceived relevance is expected to be more easily realized during the initiate stage or the blueprint phase of the implementation when the susceptibility to change is high. During later phases (the realisation, testing, training and go-live) it becomes increasingly difficult to manipulate the expectations of end users and thus change the impact of the perceived relevance of the system on the motivation of participants during the participation process.

Scale: The mechanism that expresses the effect of the change of expectations on perceived relevance is presented on a scale that ranges from a *low susceptibility of expectations to change* to a *high susceptibility of expectations to change*.

Sensitivity: The sensitivity of this anticipated mechanism closely relates to the timing of the anticipated effect on perceived relevance. During the initiate stage and the blueprint phase the changeability of the participants' expectations the possible change will range from strong positive to strong negative, depending on the developments in the implementation. During later phases the changeability of the expectations is reduced and ranges from a possible positive to a negative change.

Hypothesis: Effect of *Susceptibility to change over time* on *perceived relevance:*
- The susceptibility of the expectations to change is large during the early phases of the ES implementation (the initiate stage and the blueprint phase). At these times, perceived relevance is susceptible for strong positive and strong negative change of the expectations, with the corresponding consequences for the perceived relevance of the system and the end user's motivation to participate.
- The susceptibility of the expectations to change is small during the later phases of the ES implementation (the realisation, testing, training and go-live phases). At these times, perceived relevance is susceptible for positive and negative change of the expectations, with the corresponding consequences for the perceived relevance of the system and the end user's motivation to participate.

Based on these hypotheses, the anticipated effect of *susceptibility to change over time* on *perceived relevance* is presented in Table 41.

Table 41: Anticipated effect of the susceptibility to change on perceived relevance

	Perceived relevance
Positive change of expectations	
Initiate stage and *blueprint* phase	+ +
Realisation, *Testing*, *Training* and *Go-live* phases	+
Negative change of expectations	
Initiate stage and *blueprint* phase	- -
Realisation, *Testing*, *Training* and *Go-live* phases	-

B4. Perceived relevance & user participation → ES implementation success

A theoretical foundation is crucial for the conceptualization of the effects of the relationship between relevance and participation on ES implementation success. The two relation for which hypothesized mechanisms are formulated here are based on the foundations that have been discussed in section 4.5.1. In order to describe the relationship between respectively relevance and success, and participation and success, it has been attempted to link relevance and participation directly to the underlying elements of each of the three ES implementation success measures, namely project metrics, enterprise system success and user satisfaction (see section 3.5 for a complete overview of the ES implementation success measures). Summarizing, this part of the appendix provides the hypothesized mechanisms and additional consideration for the relation between:

1. perceived relevance and ES implementation success, and
2. user participation and ES implementation success.

The hypothesized mechanisms that are discussed in this appendix describe the relations with a slightly different structure from the approach that was laid out in Appendix B1. Because these proposed mechanisms describe the effect on success from a higher level view of both perceived relevance and user participation, the scale of both key variables is only described once per relationship, instead of once per mechanism, as was custom in the previous two appendix sections. This is deemed appropriate because each of the logically induced mechanisms take either perceived relevance or user participation as their independent variable. In addition to a central discussion of the scale, the timing aspects of each of the mechanisms is also discussed centrally for each of the two relationships, as each of the relationships is expected to have similar effects on ES implementation success.

B4.1 Perceived relevance and ES implementation success

The relationship between perceived relevance and ES implementation success is anticipated. However, based on the review of the relationship between perceived relevance and ES implementation success in section 4.5.1, only two out of ten links can be supported by academic literature. The lack of a broader, supported relationship can partially be explained by the lack of complete and descriptive academic literature on this specific topic. Therefore, the two supported links, with elements of ES success (individual impact) and user satisfaction (satisfaction with the system) have been extended by a number of additional, expected links. Only the ES implementation success measure "project metrics" is not expected to be directly linked to perceived relevance, even though an indirect link is expected through ES success and user participation. As announced at above, the scale and timing of each of the three mechanisms that connect relevance to success are discussed centrally:

> Scale: As discussed in section 4.4.1, perceived relevance, despite being psychologically complex, can be expressed as a singular dimension. Therefore, relevance is expressed in terms of *high perceived relevance* to *low perceived relevance.*

> Timing: Perceived relevance is expected to directly affect ES implementation success. Even though there are indirect impacts of relevance on success during the entire process, as has been suggested in section 4.4, the direct impacts are especially anticipated from the testing phase and onwards. Only from that moment in time the users really start to experience the new system. Perceived relevance is deemed an very important part of the mindset of users and therefore will determine how they will receive and perceive the new system and look back on its implementation project.

Relevance and project metrics

Description: The project metrics measure are rather quantitative indicators of the process-related success of the ES implementation. It is not expected that these rather abstract aspects, namely planned vs. actual budget, timeline and functionalities are directly impacted by the perceived relevance of the users. In addition, no academic sources were found to support such a relation. However, based on the current investigation, perceived relevance is expected to have at least an indirect effect on the project metrics through ES success and user participation (see respectively the recap of ES implementation success above and section 4.4).

Sensitivity: Not applicable.

Hypothesis: Not applicable.

Relevance and enterprise system success

Description: ES success consists out of two separate elements, namely indicators for:

- the "future impact", represented by the quality aspects of the system, and
- the "impact to date", represented by the individual and organisational impact of the system.

This division is important, because academic literature only supports a relation with one of the "impact to date" aspects (the individual impact), while a relation to the quality aspects of an ES is not identified (McGill & Klobas, 2008).

The individual impact of the system depends on elements that make a psychological orientation necessary, such as job performance and quality of work, linking perceived relevance to it. The mindset of user towards the system will impact the adoption of the system and thus job performance and quality of work, as these are influenced by the individual characteristics of the users. The organisational impact is expected to be influenced by a similar link to perceived relevance as the individual impact. Although perceived relevance will affect the organisational impact through job performance and job performance, also a direct link is expected. Being an important indicator of the mindset of users towards the system, perceived relevance is expected also to impact the overall productivity gains as it will be partially responsible for the mindset of all users in the organisation.

The relationship between perceived relevance and the quality aspects of ES success is somewhat complex. Even though no support for a direct relation was found, the setup of this investigation requires the distinction between actual and perceived quality of the system. The case studies rely heavily on interviews as its main source of data, indicating that this investigation measures perceived quality aspects instead of actual quality aspects. While the actual quality aspects are more objective in the determination of the quality of the system and can be expressed in absolute terms, the perceived quality aspects introduce a large role for the expectations of users, which are so closely related to perceived relevance. As a result, no direct relation with the actual quality aspects of ES success is expected or supported, but a substantial relation with the perceived quality aspects is anticipated and even partially supported (McGill & Klobas, 2008).

Sensitivity: The effect of perceived relevance on ES success is at best partially supported by evidence and rather complex to fathom, because of the psychological background. Therefore, it is expected that all effects range from a positive to a negative effect.

Hypothesis: Effect of *perceived relevance* on *ES success:*
- High perceived relevance has a positive effect on ES success. The impact of a high perceived relevance on ES success can be differentiated in a positive effect on the perceived future impact and the impact to date, while the actual future impact is not affected. The perceived "future impact" is improved, indicating that users with a high perceived relevance have a positively coloured perception of the quality aspects of the system. The "impact to date" is improved, acknowledging the positive contribution of a positive mindset of users towards the execution of their daily routines.
- Low perceived relevance has a negative effect on ES success. The impact of a high perceived relevance on ES success can be differentiated in a positive effect on the perceived future impact and the impact to date, while the actual future impact is not affected. The perceived "future impact" is reduced, indicating that users with a low perceived relevance have a negatively coloured perception of the quality aspects of the system. The "impact to date" is reduced, acknowledging the negative contribution of the negative mindset of users towards the execution of their daily routines.

The hypothesized relationship between *perceived relevance* and *ES success* is presented in Table 42.

Table 42: Anticipated effect of relevance on ES success

	ES success		
	Actual future impact	Perceived future impact	Impact to date
High perceived relevance	=	+	+
Low perceived relevance	=	-	-

Relevance and user satisfaction

Description: User satisfaction is a psychological state of users towards a system or process and its outcome is dependent on their requirements and expectations (Ives & Olson, 1984). Since the perceived relevance key variable is intended to reflect important aspects of the users' expectations towards the system and its implementation (as was discussed in section 3.3.1), these expectations plays an important role in the establishment of the users' satisfaction. The link between perceived relevance and user satisfaction measure is partly expected by the author and partly supported by academic sources (McGill & Klobas, 2008). During this investigation, user satisfaction is a composite measure, consisting of system-related satisfaction and process-related satisfaction. While only the link with the system-related satisfaction is supported by literature (McGill & Klobas, 2008), this research poses that the satisfaction with the process is as much an alternate indicator for implementation success as the satisfaction with the system is for ES success. The impact of perceived relevance on user satisfaction is dependent on whether or not the new system and the implementation project live up to the expectations (perceived relevance) of the users. The range of possibilities for the system and project to meet expectations is expressed in terms of exceeding expectations to failing to meet expectations and all values in between.

Sensitivity: High perceived relevance can result in both a strong positive and strong negative effect on user satisfaction, depending on the system or project exceeding or failing to meet expectations. Based on the same logical, a low perceived relevance translates in only a positive or negative effect, as the users are not really engaged in the process.

Hypothesis: Effect of *perceived relevance* on *user satisfaction:*
- High perceived relevance among users results in a strong positive effect on their satisfaction with the system or project, if their high expectations are exceeded. The users expected the system to be highly relevant, but it appears that the system or project is even better than they expected, strongly increasing their satisfaction. In the case of a system or project meeting the high expectations, though satisfied the users will not experience an additional rise of user satisfaction. A system or project that fails to meet the high expectations of users with a high perceived relevance, results in a strong negative effect on their satisfaction with system and project.
- Low perceived relevance among users results in a positive effect on their satisfaction with the system or project, if their low expectations are exceeded. The users expected the system

to lack relevance, but it appears that the system or project is not as worse as expected, increasing their satisfaction. In the case of a system or project meeting the low expectations, users do not experience a rise of user satisfaction; the satisfaction will be low and is not positively or negatively impacted. A system or project that even fails to meet the already low expectations of users with a low perceived relevance, results in a negative effect on their satisfaction with system and project.

The hypothesized relationship between *perceived relevance* and *user satisfaction* is presented in Table 43.

Table 43: Anticipated effect of relevance on user satisfaction

	User satisfaction
High perceived relevance	
System or project exceeds expectations	**+ +**
System or project fails to meet expectations	**- -**
Low perceived relevance	
System or project exceeds expectations	**+**
System or project fails to meet expectations	**-**

B4.2 User participation and ES implementation success

The relationship between user participation and ES implementation success is strongly anticipated. All three ES success measures and their ten underlying aspects are expected to be impacted, even though there are some differences with respect to the availability of academic support for four of these links in literature. The links with ES success and user satisfaction are largely supported, but the link that relates participation to project metrics is only expected and cannot be supported by academic sources. Similar to the previous discussion of the relation between relevance and success, both the scale and timing of each of the three mechanisms are presented centrally:

Scale: User participation is expressed in terms of a the quality of user participation. The scale ranges from high quality user participation to low quality user participation. Two characteristics of user participation are important to define the quality of user participation, namely the proportion of participation and the quality of the participative process (as discussed in section 4.3.1). However, in order to maintain a clear overview, the scale "quality of user participation" is simplified by joining the two separate concepts into a single scale. Figure 66 illustrates the scale that need to be taken into account when relating user participation to ES implementation success.
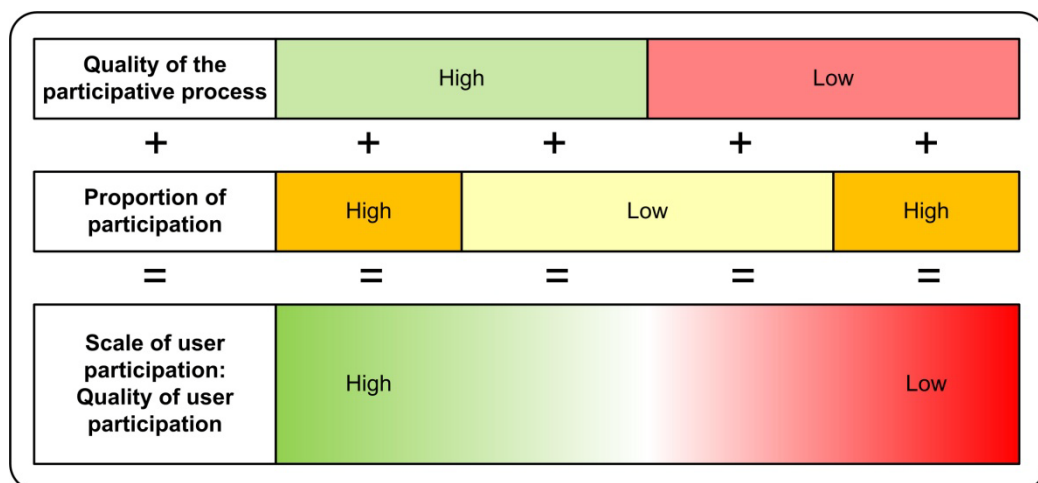

Figure 66: Scale of user participation: Quality of user participation

Timing: The activities during the initiate stage and the blueprint phase have a disproportionately strong effect on all aspects of ES implementation success. This is caused by the great importance of the management and planning of such a process and the great impact of the blueprint phase on the eventual system (through the formulation of the requirements during the early phases). As a result, the three mechanisms anticipate a amplified effect of user participation on ES implementation success during the initiate stage and blueprint phase. For the mechanism describing the effect of participation on user satisfaction, there is even quantitative evidence (McKeen & Guimaraes, 1997), which has already been presented in section 4.5.1 and can be found in Table 19 on page 99.

User participation and project metrics

Description: As mentioned before, the project metrics are rather quantitative indicators of the successfulness of the implementation process. While no academic support can be found for a link with user participation, it is strongly expected. As the user participation process adds managerial complexity and some degree of uncertainty to the project, it does have the potential to results in unforeseen costs, time loss and deviation from planned functionalities. While this increased complexity could lead to a negative impact on the project metrics, user participation has the potential to play an essential role in the implementation process (see section 3.4). It helps to prevent errors, misses and other complications that could negatively impact the project during later phase. In turn, user participation can easily prevent large budget and timeline overruns and substantial deviation from planned functionalities. While the relation discussed here is complex, the theoretical support for such a mechanisms is logical. Even though it is not straight forward to determine how the precise interaction occurs, it is expected that the quality of user participation will be the most important indicator and determinant of the impact of the participative efforts on the project's metrics. Based on this set of considerations, a hypothesized relation between participation and project metrics is certainly warranted.

Sensitivity: User participation can have both a *strong positive effect* and a *strong negative effect* on the project metrics, depending on the quality of user participation.

Hypothesis: Effect of *user participation* on *project metrics:*
- High quality user participation has a positive effect on planned vs. actual budget, timeline and functionalities during the course of the entire project. The impact is amplified into a strong positive effect by participative activities that are performed during the initiate stage and blueprint phase. This way, user participation has an increased chance to prevent errors and misses later on, which in turn can easily lead to budget and timeline overruns. It also has a enhanced positive effect on the planned vs. actual functionalities during these early phases, as it leads to careful and thorough planning of the to-be-implemented functionalities and reduces the risk of redefining requirements later on.
- Low quality user participation has a negative effect on planned vs. actual budget, timeline and functionalities during the course of the entire project. The impact is amplified into a strong negative effect by participative activities that are performed during the initiate stage and blueprint phase. During the early phases of the project, low quality user participation increases the chance of introducing complications, as it adds members (end users) to the project team, potentially resulting in budget and timeline overruns. At the same time errors and misses are not prevented. During these early phases it also has a strong negative effect on the planned vs. actual functionalities, as it leads to faulty requirements, which are notoriously expensive to correct during the later phases of such projects.

The hypothesized relationship between *user participation* and *project metrics* is presented in Table 44.

Table 44: Anticipated effect of participation on project metrics

	Project metrics
High quality user participation	
Initiate stage and *blueprint phase*	**+ +**
Later phases	**+**
Low quality user participation	
Initiate stage and *blueprint phase*	**- -**
Later phases	**-**

User participation and ES success

Description: All aspects of ES success are expected to be impacted by user participation. Except for the link with ES success aspect "organisational impact", all links are supported by academic sources (Esteves, et al., 2005; McGill & Klobas, 2008). As mentioned in 4.5.1, user participation impacts ES success because it "provides a more complete assessment of user (information) requirements, provide expertise about the organisation the system is to support, avoids development of unacceptable or unimportant features, and improves user understanding of the system" (Esteves, et al., 2005). These four key elements can be related directly to the five aspects of ES success. First, the better assessment of user (information) requirements improves both the system and information quality of the ES. Secondly, providing expertise of the existing organisation and avoiding development of unnecessary features (either because they are unimportant or unacceptable) improves the individual and organisational impact, as well as the quality aspects. Finally, the key users' improved understanding of the system makes them aware of the individual and organisational impact, while they are better able to support their non-participating colleagues, impacting the service quality of the system. The expected relation between participation and the organisational impact is further supported by knowledge that user participation is as important for the individual impact of the system, as the change it brings to the high level organisational processes, having a distinct effect on the overall performance of the system and in fact the entire organisation. Unlike the qualitative mechanism that linked relevance to ES success, it is not necessary to distinguish in actual and perceived quality aspects of the system, as user participation impact both.

Sensitivity: User participation can have both a *strong positive effect* and a *strong negative effect* on the ES success, foremost depending on the quality of user participation.

Hypothesis: Effect of *user participation* on *ES success:*
- High quality user participation has a positive effect on ES success during the entire implementation process. The interaction between ES project specialists and participating end users helps to obtain an optimal results regarding system, information and service quality. In addition, it also helps to improve the individual and organisational impact of the change that an ES implementation causes. The importance of the initiate stage and blueprint

phase of the participation process amplifies the effect of participation on success during these moments in time, resulting in a strong positive effect on ES success.

- Low quality user participation has a negative effect on ES success during the entire implementation process. In this case, user participation results in wrong decisions and creates confusion about requirements and project goals. In addition, it also negatively influences the individual and organisational impact of the change that an ES implementation causes. The importance of the initiate stage and blueprint phase of the participation process amplifies the effect of participation on success during these moments in time, resulting in a strong negative effect on ES success.

The hypothesized relationship between *user participation* and *ES success* is presented in Table 45.

<div align="center">**Table 45: Anticipated effect of participation on ES success**</div>

	ES success
High quality user participation	
Initiate stage and *blueprint phase*	+ +
Later phases	+
Low quality user participation	
Initiate stage and *blueprint phase*	- -
Later phases	-

User participation and user satisfaction

Description: User satisfaction with the system, but also with the implementation process, are viewed as important alternate measures for ES implementation success. There is sufficient research to support the link between participation and satisfaction with the system, while the satisfaction with the process is not explicitly supported but strongly expected. With regard to the user satisfaction with the system, there is a list of participation activities that proved to have a large impact on the user satisfaction (McKeen & Guimaraes, 1997). The feelings of ownership that are generated by participation (Barki & Hartwick, 1994) are also likely to play an important role in giving users satisfaction. A very similar effect is expected with regard to the process-related user satisfaction. User participation is a has a strong psychological context and as a result participants will be less than objective when judging the results of their own participation efforts. Positive result will be attained more easily, while negative results will be explained away.

Sensitivity: User participation can have both a *strong positive effect* and a *strong negative effect* on the user satisfaction, foremost depending on the quality of user participation.

Hypothesis: Effect of *user participation* on *user satisfaction:*
- High quality user participation results in a strong positive effect on user satisfaction during the initiate stage and blueprint phase. Based on their participation activities, users will

become increasingly satisfied with both the system and the implementation process. However, the activities during the later phases of the project will only have a weaker effect (only a positive effect, instead of a strong positive effect).

- Low quality user participation results in a strong negative effect on user satisfaction during the initiate stage and blueprint phase. Based on their participation activities, users will become less satisfied with both the system and the implementation process. However, the activities during the later phases of the project will only have a weaker effect (only a negative effect, instead of a strong negative effect).

The hypothesized relationship between *user participation* and *user satisfaction* is presented in Table 46.

Table 46: Anticipated effect of participation on user satisfaction

	User satisfaction
High quality user participation	
Initiate stage and *blueprint phase*	+ +
Later phases	+
Low quality user participation	
Initiate stage and *blueprint phase*	- -
Later phases	-