FACTORS INFLUENCING THE SUCCESS OF VIRTUAL COOPERATION WITHIN DUTCH - CHINESE STRATEGIC ALLIANCES

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“I dedicate this book to my family”

Yi Wei

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SUMMARY

With the globalization wave taking place, companies are increasingly seeking partnerships to gain and sustain competitive advantages. The rapid development of the Internet has speeded up such processes and Information and Communication Technology (ICT) is enabling organizations to be flatter, networked, and more flexible on a global level; and the distance and place are no longer the barriers to expand business. Over the past few years, China has made great progress in Internet development, which provides a new way and channel for organizations, especially SMEs both in China and Europe, to gain advantages from cooperation and to create added value. Therefore, the research of how traditional international cooperation sustains and expands business relationships in the age of 'going virtual' has been executed. In order to research this phenomenon, International Virtual Alliance is defined as: An electronically-networked cooperation involving companies, from different countries, that envisage mutual benefits by delivering products or services on the basis of common business understandings and a set of agreed goals and standards. The cooperating units provide their respective complementary assets and core competencies.

The key concept of this definition is the construction and operation of electronic communication systems.

Regarding the new concept, most of the literature focuses on the technical issues, different forms, and trust building. The main objective of this research has been to investigate the success of international virtual alliances. However, as purely virtual alliances are rare, in practice it was only possible to study virtual cooperation within international strategic alliances rather than international virtual alliances. When discussing virtual cooperation within international strategic alliances it is necessary to study relevant aspects such as the degree of virtuality and the general ICT applications. The higher the degree of virtuality, the more virtual becomes an alliance. The highest level of virtual cooperation is regarded as a virtual alliance. Virtual cooperation within an international strategic alliance is defined as:

Cooperating companies or business units from different countries in an alliance that are linked by an ICT system in order to achieve mutual benefits by delivering products or services on the basis of common business understandings and a set of agreed goals and standards. The ICT applications may vary from basic supporting communication to fully integrated collaborative systems.

By extending Arnold's (1995) and Skyrme's (1998) findings, in this research we have summarized the degree of virtuality using five levels and also discussed example applications based on this. Alliances between Dutch and Chinese businesses that have implemented ICT applications beyond level one will be considered as virtual cooperation to some extent.

The framework for characterizing the state of the Internet in a country is used to compare Internet development in China and Netherlands. From the comparison, it

is clear that the Netherlands is ahead of China in almost every dimension except in terms of organizational infrastructure. However, as rapid improvement in China is expected to be made in the near future, the gap between China and the Netherlands in macro-ICT infrastructure is expected to narrow. Also, there is one thing that needs to be kept in mind: the imbalance of ICT diffusion in different regions in China. In some well-developed regions, the ICT infrastructure could well support virtual cooperation, while in other parts, the weak ICT infrastructure could have negative impacts on virtual cooperation within international strategic alliances.

In order to identify the influential factors to the virtual cooperation within Dutch-Chinese strategic alliances, relevant literature such as international strategic alliances, virtual organization, and success of information system have been studied. From the literature study, several factors, namely strategic, operational (resource, cultural, organizational, and technological), and related ICT (ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality) factors that influence the success of virtual cooperation within international strategic alliances have been selected. As this research aims to investigate virtual cooperation within international strategic alliances, strategic and operational factors together with macro-ICT infrastructure act as independent variables, and ICT factors act as intermediate variables that influence the virtual cooperation.

From the literature on success in strategic alliances and the success of information systems, four measurements emerge: satisfaction with the alliance, satisfaction with the partner, usefulness, and user satisfaction. As this research aims to investigate virtual cooperation within international strategic alliances, the four measurements are elaborated to: satisfaction with the alliance, usefulness of the ICT system in the virtual cooperation, satisfaction with the ICT system in the virtual cooperation, and satisfaction with the partner's conduct with the ICT system in the virtual cooperation.

After the conceptual research model had been developed, the relationships of the relevant factors defined have been identified and tested in ten case studies. The findings of the case studies provided the factors that influence the success of virtual cooperation within Dutch-Chinese strategic alliances in actual practice. Four main propositions formed in the case study protocol of this research have all been examined, and supporting evidence has been found for all.

Literature suggests that the strategic fit is the starting point, and that the operational factors are 'equally' important in influencing the success of international alliances. Regarding virtual cooperation forms, some researchers argue that cultural factors might not be as important as before once a high degree of standardized electronic information exchange takes place. Moreover, the macro-ICT infrastructure also plays a key role in forming and operating virtual cooperation successfully. For the intermediate variables, previous research mostly focused on ICT use in a single organization, with ICT system importance, ICT system quality, and information quality being centrally important for the success of ICT system use. From the case

studies, several similarities and also differences have been found compared with the earlier reported studies. The results are discussed in the following paragraphs.

Strategic fit has the highest score in most cases, showing its strong influence on the success of an alliance. From this, it can be concluded that, as with traditional international alliances, strategic fit plays the key role in the international virtual cooperation form.

In terms of operational fits, the most important ones are the cultural and organizational factors, followed by technological and resources factors. In terms of cultural factors, and disagreeing with what some researchers have argued, this research shows that the cultural issue still plays an important role in international virtual cooperation by influencing the information quality, which in turn has an impact on satisfaction with regard to the partner's conduct with the ICT system in the virtual cooperation. This finding is in line with the quote 'trust is the heart of a virtual organization'. Thus, it can be concluded that in order to build and sustain trust in a virtual cooperation, cultural factors have a central role in international business cooperation. Regarding organizational factors, the organizational arrangements not only need to focus on the alliance itself, as in a traditional alliance design, but also carefully consider the requirements of electronic communications within an alliance. Traditionally, companies have mainly focused on the technologies relating to products and production, whereas in the virtual cooperation form, as a heavy user of ICT, the ability and competence in implementing and operating advanced ICT is a key factor. Compared with traditional alliances, the technological fit does have a great impact on the success of virtual cooperation which influences the degree of virtuality and ICT system quality which, in turn, affect the usefulness of the ICT system, and satisfaction with the ICT system. In traditional alliances, resource inputs heavily influence the alliances. This is even more important in a virtual cooperation since the ICT infrastructure requires substantial resource inputs. Without this, the degree of virtuality cannot be upgraded and the ICT system quality cannot be high, which influences the usefulness of the ICT system, and satisfaction with the ICT system.

From the case studies, direct links were confirmed between the macro-ICT infrastructure and the degree of virtuality, and ICT system quality, indicating that the macro-ICT factor mainly influences the 'hard part' of the ICT system. Previous researches suggest the macro-ICT infrastructure in China is far behind that in the Western world, inhibiting the use of ICT systems. However, with the rapid developments in China, the macro-ICT infrastructure in both areas has reached a certain level; and for the ICT applications currently used it is no longer expected to be a major influential factor in the more developed regions of China.

Based on the case studies, the various intermediate ICT factors all influence certain measures of virtual cooperation within Dutch-Chinese strategic alliances, of which ICT system importance to the alliance and the degree of virtuality are the two dominant factors. ICT system importance to the alliance is mainly dependent on the nature of the companies and the alliance; it also depends on the management mindset.

Within the intermediate variables, ICT system importance to the alliance also acts as a starting point and influences other factors. The degree of virtuality is an important measure for a virtual cooperation. Without a certain degree of virtuality, the usefulness of the ICT system will be limited. The next important factor is the core of electronic communication, information quality, which is closely related to the trust, confidence, and communication processes between partners. However, unlike other factors, the 'hard' factor of ICT system quality only plays a limited role in influencing the success of virtual cooperation. This means that while, within their own organizations, companies are more focused on 'hard' infrastructure and development, in cross-cultural cooperation, the 'soft' part is more important and, as such, a more difficult barrier to overcome than the 'hard' part. However, it must be taken into account is that the scores for ICT system quality in all cases were neutral or higher. This means that, unlike other relationships identified in this research, the conclusion on the relationship between ICT system quality and the success of a virtual cooperation lacks a range of results and, as a result, it is not as strong as the other relationships identified.

Overall, the strategic fit is found to be the most important in terms of influencing the success of an international alliance. The cultural and organizational fits influence the ICT system, in turn influencing the success of a virtual cooperation. Technological and resource fits also cannot be avoided as, without them, virtual cooperation cannot be implemented and operated well.

From the analysis of the differences among the cases, further findings were identified: it is clear that trust is a key element (part of cultural factors) that influences the quality of electronic communication which, in turn, influences the success of a virtual cooperation. The core of successful virtual cooperation is information openness and sharing based on standardized roles, structures, and formats. However, trust alone cannot lead to a successful virtual cooperation. In some of the cases studied, mature trust does exist; however, as the management of the cooperating partners do not regard ICT systems as strategically important, the use of ICT system stays at a lower level and leads to an unsuccessful virtual cooperation. It can be concluded that even though trust is the key for a successful virtual cooperation, the appropriate management support and related strategies are required, especially when non-ICT enterprises are involved. Without meeting these requirements, Dutch-Chinese virtual cooperation was judged unsuccessful.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line
ARPA	Advanced Research Projects Agency of US. Department of Defence
BEG	Broadband Expert Group
CIC	China Inspection Company
CITIC	China International Trust and Investment Corporation
CNNIC	China Internet Network Information Centre
CRM	Customer relationship management
DIY	Do it yourself
EC	European Commission
EDI	Electronic data interchange
ERP	Enterprise resource planning
EU	European Union
FDI	Foreign direct investment
HRM	Human resource management
ICP	Internet Contents Provider
ICT	Information communication technology
IP	Internet Protocol
IPP	Internet Phone Provider
IS	Information system
ISP	Internet Services Provider
IT	Information technology
ITU	International Telecommunication Union
MNC	Multinational Corporation
MOFCOM	Ministry of Commerce of the People's Republic of China
NIST	National Institute of Standards & Technologies of United States
PWC	PricewaterhouseCoopers
RvA	Dutch Council for Accreditation
SARS	Severe acute respiratory syndrome
SCM	Supply chain management
SME	Small and medium sized enterprises
TCP	Transmission Control Protocol
VO	Virtual organization
VPN	Virtual private networks
WTO	World Trade Organization
XML	Extensible Markup Language

CHAPTER 1 INTRODUCTION

1.1 Introduction

In today's world, companies are increasingly searching for partnerships to stay ahead in an ever more competitive global environment. The driving forces behind this need are globalization, shorter innovation cycles, and deregulation leading to increasingly dynamic markets.

Operating effectively across geographic and cultural spaces has required many companies to rethink how they manage people and other resources. One major result of this process was an increased emphasis on the use of transnational teams coupled with advanced means of electronic communication and decision-making (Snow et al., 1999). Information and communication technologies (ICTs) have permitted an increased flow of information across borders, and increasingly companies are moving to so-called virtual cooperation. Such new 'virtual' forms, e.g. virtual organizations, virtual enterprises and virtual alliances, have been discussed frequently during the recent past and are generally considered very promising. Thus, companies from different countries are eagerly joining this movement.

As one of the fastest developing economies, China is rapidly changing its structures in order to exploit the expected benefits from modernization and synchronization with global technologies, institutions, and markets. Chinese companies are also following this globalization wave by increasingly joining forces with their foreign counterparts. The business relationships between Dutch and Chinese enterprises are becoming closer through outsourcing, new market development and other cooperation activities. As the Chinese government has recognized the need to improve its ICT infrastructure to suit the needs of business if rapid growth and expansion of these businesses is to be achieved, major progress has been made over the past decade. The new virtual cooperation form has provided opportunities for companies in various sectors in countries to conduct business easily at low cost.

As an example, the international outbreak, in March 2003, of the illness known as severe acute respiratory syndrome (SARS) forced many business people to cancel trips to China. However, one vice president of a Dutch multinational company was from his office in the Netherlands holding a meeting with counterparts in China and in other countries. 'Implementing the EDI (electronic data inter-exchange) and teleconferencing systems ensures our network operates effectively as usual despite the SARS issue', this manager stated. In his opinion, many advantages could result from using ICT systems.

However, it is important to realize that ICT by itself is only a communications infrastructure. Companies adopting any form of ICT need to adapt to the implications of these new systems for internal organizational processes, business relationships and

bargaining positions within a network, and to the relative competitive advantages of the firm relative to its competitors. Although the adoption of ICT can provide important cost savings and deliver competitive advantages, it is important to consider how an alternative form of ICT might create advantages or disadvantages for companies (Westland & Clark, 1999). Moreover, despite the advantages of using ICT in the current Dutch-Chinese business contexts, implementing advanced ICT towards a so-called virtual alliance is still largely untried. Therefore, there is a need to investigate this promising form so that it can be applied in business practice. This research aims at identifying the operating processes and aspects, and the key influencing factors, with regard to success in an international virtual alliance.

1.2 Research background

1.2.1 A trend of international business cooperation

In today's global economy, companies are increasingly seeking partnerships such as strategic alliances to enter new markets, obtain new skills, and share risks and resources (Inkpen & Beamish, 1997; Faulkner, 1995; Douma, 1997; Chen, 2003; Todeva & Knoke, 2005). The rapid development of the Internet has speeded up the business cooperation process, and ICT is enabling organizations to be flatter, networked, and more flexible on a global level in the new economy, and time and place are no longer barriers to expand businesses. Many successful companies, for instance, Wal-Mart, Dell, and Cisco Systems, have adopted a so-called Networked Virtual Organization model, in which an organization teams up with two or more external organizations, all connected by a common network infrastructure, to bring a new product or service to the market. Such a model fosters agility and efficiency by prescribing the adoption of enabling technologies to increase organizational competitiveness. On the technology side, the applications have caught up with the hype that preceded them in the dot-com era. The Internet and Web-based applications now provide the first-ever global, ubiquitous, easy-to-use, and economical communications channel. Most companies have already automated their operations to some degree, and this enhances their ability to interact with other companies electronically. With the advent of Web services, the interaction between companies becomes easier and more transparent. These technologies simplify the process of maintaining visibility and control over transactions within a networked virtual ecosystem, and enable real-time collaboration which is a key principle in the Networked Virtual Organization business model (Sifonis, 2003).

For large companies, which are mainly focused on specific mass-market segments, it is too costly to maintain all the necessary value-adding competences to follow rapid short-term market changes affecting their production environment. Hence, such companies are very likely to concentrate on clusters of core competences, using external resources for the missing parts. The concept of these core competence

clusters linked with networked cooperation seems to be a successful strategy. Small-and-medium-sized enterprises (SMEs) usually do not have the resources to adapt in a similar way to fast changing market demands. Hence, SMEs could benefit from networked cooperation through much easier and more open market positioning (Erben & Gersten, 1997). Therefore, over the next few years, companies in many industries will likely form or join networks, which will have not only the levels of integration and internal transparency of very large companies but also the openness to market information and the flexibility in responding to it that are the strength of small, young companies. In addition, networks give their organizers a competitive scale, which they achieve not by taking the expensive route of mergers and acquisitions but by turning their suppliers, subcontractors, and, sometimes, their competitors into close collaborators (Hacki & Lighton, 2001).

Since the open-door policy was adopted two decades ago, China has become one of the most rapidly developing economies. The opening of China's markets has attracted foreign enterprises at an unprecedented level. Much of the implicit gain sought by investing firms has been predicated upon China's large market and cheap labor and manufacturing costs. Currently, China's economic development is approaching a level where it can become a serious global competitor in many industries. Taking foreign direct investment (FDI) as an example, according to the Ministry of Commerce of China, the absorption of foreign investment is an important component of its fundamental principle of opening up to the outside world, and one of the great practices in building up a socialist economy with Chinese characteristics (China FDI, 2006). China became the second biggest recipient of FDI in the world after the United States in the 1990s, and its FDI has grown more than twenty-fold since the beginning of the reform period. In 2002, FDI to China was 28 times higher than in 1986, and its share of global FDI inflows rose from 1.4% to 8.1% over the same period. Following its WTO entry in 2001, China attracted FDI of US$ 52.7 billion in 2002. Cumulative FDI in China in the reform period exceeded US$ 400 billion at the start of 2003, and China accounts for about 20% of global FDI in all developing countries. In 2003, China overtook the US as the largest destination for FDI and, with inflows of US$ 53.5 billion, became the largest FDI recipient in the world. In 2004, 43,664 new foreign invested enterprises were approved in China, the contractual FDI value topped US$ 153.4 billion, and the realized FDI value reached a record US$ 60.6 billion, an increase of 13.32% on an annual basis. From January to November 2005, 39,679 more approved foreign invested enterprises were added; the contractual value and the actual FDI were US$ 167.2 billion and US$ 53.1 billion (MOFCOM, 2006). Chinese officials forecast that FDI will double to reach US$ 100 billion by the end of the 11th Five-Year Plan period (2006-10).

Concerning international trade and cooperation, WTO entry is expected to increase investment aimed at accessing the Chinese market, particularly in banking, tourism, commerce, hospitals and education as China gradually lifts its restrictions on foreign investment in line with its WTO agreements (Breslin, 2003). International

business cooperation, especially membership of the WTO, has been a priority for China to ensure its economic reform and to strengthen its position. In 2003, China's annual foreign trade topped US$ 840 billion (up 35% year-on-year), with imports amounting to US$ 410 billion and exports to US$ 430 billion. These exports contributed 25 percent of the national industrial added value (CNE, 2003). In 2004, the total value of China's imports and exports broke US$ 1,000 billion for the first time, reaching US$ 1,154.74 billion, up by 35.7% on an annual basis. Exports were worth US$ 593.36 billion, up by 35.4%; and imports US$ 561.38 billion, up by 36%. In 2005, the total value of China's imports and exports reached US$ 1,422 billion (includes exports US$ 762 billion and imports US$ 660 billion), which booked an increase of 23.2% compared to 2004. For the first half of 2006, the numbers reached another record, with exports US$ 429 billion, imports US$ 367 billion, and the total value reaching US$ 796 billion (MOFCOM, 2006).

In addition, reflecting the global wave of the information age, China has made great progress in Internet development over the past few years. Governmental efforts have already been put in place to provide the impetus, facilitated by China's entry and full membership in WTO, 2008 Olympics in Beijing, and 2010 World Expo in Shanghai (Efendioglu & Yip, 2004). With a population of over 1.3 billion, and the installed base of over 25 million PCs by mid-2003 and 45.6 million computer hosts by mid-2005, China's Internet market has become the fastest growing in Asia, and an important part of the global Internet economy. According to the CNNIC, the number of online users reached 68 million by mid-2003; 94 million by the end of 2004; and 103 million by mid-2005, making China the second largest Internet market in the world (CNNIC, 2006). In particular, this enlarged and more mature Internet market could motivate and increasingly enable companies to conduct businesses over the Internet.

Relations between the European Union and China are close, covering trade and direct investment, from environmental protection to science and support for the crucial economic, social insurance and judicial reforms. In 2002, the EU was China's third largest trading partner and the fifth largest foreign investor in China. The realized FDI value from the European Community to China increased from US$ 1.79 billion in 1986 to US$ 3.7 billion in 2002 (MOFCOM, 2006). According to the European Commission, in the coming years, China's further integration into the world trading system will be a new focus of the economic policy dialogue between the EU and China (EU, 2003). According to the Chinese prime minister Wen Jiabao, the bilateral trade volume between China and EU topped US$ 100 billion for the first time in 2003, indicating that a win-win pattern had taken shape (News, 2004). In 2004, the bilateral trade volume between China and EU reached US$ 177.3 billion (25 countries)/ US$ 168.1 billion (15 countries); while in 2005, the number increased more than 20%, which reached US$ 217.3 billion (25 countries)/ 206.6 billion (15 countries). The trend is still on the rise, for the first half of 2006 the bilateral trade volume between China and EU reached at US$ 121 billion (25 countries)/ 114 billion

(15 countries), and it will result in a significant increase for the whole year (MOFCOM, 2006).

The Netherlands, as one of the most open economies, has blossoming bilateral economic relations with China. In recent years, the Netherlands has set up seven trade representative offices in China, which have helped boost cooperation between Chinese and Dutch enterprises, especially SMEs. According to the statistics of the Chinese Customs, the total value of imports and exports between China and the Netherlands was US$ 2 billion in 1993; it was doubled to at US$ 4 billion in 1995; and reached US$ 6.4 billion in 1999. This number topped US$ 7.9 billion in 2000, up 23.3% on the previous year (CNE, 2004). In 2003, the bilateral trade volume between the Netherlands and China jumped 44.3 percent on an annual basis, making the Netherlands the first time to be China's second largest trading partner among all the EU members (News, 2004), and since then, the Netherlands has retained this position just behind Germany. In 2004, the bilateral trade volume between the Netherlands and China was US$ 21.5 billion, and for the first half of 2006, this number jumped to US$ 14.7 billion, which will result in another record for the business relationship between the two countries (MOFCOM, 2006).

According to Dutch statistics, China is the second largest trading partner of the Netherlands in the Far East. The Netherlands also ranks fourth in the European Union in terms of investment in China (CNE, 2004). The economic and technological cooperation between China and the Netherlands is concentrated on, predominantly, agriculture, chemicals, electronics, communications, water conservancy and food processing. By the end of June 2000, the number of direct invested projects by the Netherlands in China had reached 764 with a contractual sum of US$ 4.481 billion and an actual input to date of US$ 2.416 billion (CNE, 2004). In 2002 alone, realized FDI from the Netherlands to China was US$ 0.572 billion, ranking it 12th in the world, and 4th in EU behind Germany (US$ 0.928 billion), UK (US$ 0.896 billion), and France (US$ 0.576 billion) (MOFCOM, 2006). Historically, Dutch multinational companies have been very active in China. For instance, after its first entry to China in 1920, Philips re-opened its first joint venture in Beijing in 1985. By 2003, Philips had more than 30 joint ventures and subsidiaries with total investment US$ 2.5 billion and annual turnover US$ 5 billion, employing more than 18,000 employees in China. Philips, as one of the first foreign investors in China, is well known and is regarded as very successful now. In October 2000, China and the Royal Dutch Shell Group signed an agreement concerning a petroleum and chemical project in the South China Sea with a total value of more than US$ 4 billion making it the largest foreign investment in China so far (CNE, 2004). Nowadays, Dutch SMEs are also following this trend. The Internet has provided new ways and channels for organizations, especially SMEs both inside and outside China, to gain cooperative advantages and to create added value over a long period.

1.2.2 Key concepts of virtual alliances and virtual cooperation within strategic alliances

The term virtual alliance is derived from two concepts: the strategic alliance concept and the virtual organization concept. A brief description of both concepts is given below.

At the end of 1980s, academic interest in the alliance phenomenon greatly increased since, viewed from an international perspective, the number of alliances between companies had risen sharply (Douma, 1997). Walker & Tank (1990) remarked on this: 'for many of the world's major companies, alliance strategies are becoming fundamental to their way of competing. Already, it is hard to think of a global competitor in any industry without a portfolio of alliances.' Strategic alliance literature provides a wide variety of terminology, using general terms such as alliances, cooperation, joint venture, coalition, and specific collaborative agreements such as joint manufacturing, technical assistance, joint marketing, cross-distribution, cross licensing, research pooling, and consortia (Porter, 1987; Barney, 1996; Faulkner, 1995; Gulati, 1998; De La Sierra, 1995; Douma, 1997; Phan, 2000; Chen, 2003; Todeva & Knoke, 2005). It can be concluded that, despite the variety of definitions, a basic concept can be derived for the purpose at hand, in which an international strategic alliance is defined as a cooperation between two or more companies, from different countries, that unite to pursue a set of agreed goals through continuously sharing their respective complementary assets and core competences, whereby each of them retains their independence and identity, to gain mutual benefit and to strengthen their competitive advantage (Faulkner, 1995; Mulyowahyudi, 2001).

As the market increasingly demands short response times and more flexible adaptation to customer needs, there has been a growing recognition of the need for new kinds of flexible cooperation towards the networked organization. The virtual corporation, as a specific example of a flexible networked organization, provides the means to meet the aforementioned requirements, in particular for SMEs. Hence, the virtual corporation model has received great attention from researchers and practitioners in order to define, investigate, and implement various aspects of networked cooperation based on advanced information and communication technology that could support optimized information and workflow.

Recently, the concept of the virtual organization has been widely discussed. Arguments mainly concern redefining the internal structure by means of 'a company without walls' such as tele-working, virtual offices, virtual teams and so on (Galbraith, 1995; Ahuja & Carley, 1998; Lipnack & Stamps, 1997; Skyrme, 1998; Jarvenpaa & Shaw, 1998; Cascio, 1999; Kierzkowski, 2004; Akkirman & Harris, 2005; Henttonen & Blomqvist, 2005), and external (virtual) value-added partnerships, meaning integrated supply chain structures, strategic alliances and strategic webs (Davidow & Malone 1992; Rayport & Sviokla, 1995; Holland, 1998; Burn et al., 1999). In this research, the focus is on the matter of external, ICT-based, partnerships because it is

observed that such a form can be an important way for companies to sustain and extend their business relationships.

According to DeSanctis & Monge (1998), a virtual organization is a collection of geographically distributed, functionally and/or culturally diverse entities that are linked by electronic forms of communication and rely on lateral, dynamic relationships for coordination. Burn et al. (1999) define a virtual organization as an electronically networked organization that transcends conventional organizational boundaries. The relationships involved in such a form differ in significant ways from traditional partnerships or alliances in that these relationships are product or project focused, flexible and short lived. Such relationships are based primarily on competences rather than historical relationships or cost, and seek innovative ways to add value through information and change management and rich functionality.

Despite the various definitions of virtual organizations/enterprises, there is a need to investigate the virtual cooperating form from an international perspective. Based on international strategic alliance and virtual organization concepts, *an International Virtual Alliance is defined in this research as an electronically-networked cooperation involving companies from different countries that envisage mutual benefit by delivering products or services on the basis of a common business understanding and a set of agreed goals and standards.* The cooperating units provide their respective complementary assets and core competences. The key component in it is cooperation using electronic communication systems.

However, despite the seemingly attractive cooperation model, few pure virtual forms exist (Dutton, 1999). Thus, it is considered appropriate to study virtual cooperation within international strategic alliances rather than the concept of international virtual alliances. For most firms, being virtual is a matter of degree. Firms become more virtual when a larger proportion of important production processes occur outside their traditional organizational boundaries, and with electronic document exchanges or fund transfers used to deliver invoice or payment information; or by using electronic mail networks where people exchange messages via computer (DeSanctis & Monge, 1998). An organization with a high degree of virtuality (i.e. more virtual) is characterized by geographical dispersion (implying less personal contact) and ICT-dependence (a high level of ICT applied for co-ordination and communication) (Bosch-Sijtsema, 2002). Virtual cooperation within an international strategic alliance in this research can be defined as: *cooperating companies or business units from different countries in an alliance that are linked by an ICT system in order to achieve mutual benefits by delivering products or services on the basis of common business understandings and a set of agreed goals and standards.* The ICT applications may vary from basic supporting communication to fully integrated collaborative systems.

1.3 Objectives and problem formulation

The intensive use of international strategic alliances, together with their high failure rate, has encouraged many authors to offer solutions for ensuring an alliance succeeds (Ernst et al., 2001). As Douma (1997) states: 'every company seems to work together, but more than half the alliances are not successful. Evidently, starting and successfully continuing an alliance is more troublesome than many managers had expected.' Concerning the concept of an international virtual alliance, most literature is focused on areas such as technical issues, different forms, and trust building. Little attention is paid to the success or failure of such virtual business relationships. Moreover, as pure virtual alliances are rare in practice, it is appropriate to study virtual cooperation within international strategic alliances rather than virtual alliances alone, even though the term virtual alliance is used as the highest level of virtual cooperation (the ideal form). Therefore, the main objective of this research is to identify the influencing factors and assessing the success of virtual cooperation within strategic alliances between Dutch and Chinese enterprises.

Based on the research background and objectives, the main research problem can be formulated as:

> *What insights can be obtained regarding the factors that influence the success of virtual cooperation within Dutch-Chinese strategic alliances?*

1.4 Research questions

In order to address the formulated problem, the first step of the research approach comprises a literature study to identify the characteristics of the core subject as well as the influence of the macro-environment. For building the research model one can distinguish variance models (also called factor models) and process models. In line with the main research problem above a variance model is most appropriate, in particular because this type focuses on causal relationships between potential antecedents (predictors, independent variables) and outcomes (results, dependent variables) (Newman & Robey, 1992). The next research step therefore addresses the construction of such a variance model. The final research step then consists of applying the research model in order to derive the key factors from practice.

To provide the necessary theoretical background on the subject of international virtual cooperation, first a literature study was conducted. This leads to the first research question:

1) *What are the characteristics of virtual cooperation within international strategic alliances?*

In particular, the macro-ICT infrastructure is an important element of electronic communication. Thus, the situation of the macro-ICT infrastructure in the Netherlands and in China, and how this influences ICT use in business cooperation, are identified. This leads to the second research question:

2) *To what extent does the macro-ICT infrastructure affect virtual cooperation within Dutch-Chinese strategic alliances?*

To investigate virtual cooperation within international strategic alliances, a literature study regarding factors influencing the establishment and operation of such cooperation ways was conducted. This leads to the third research question:

3) *What internal factors, that affect the establishment and operation of virtual cooperation within international strategic alliances, are reported in the literature?*

How those factors defined on the basis of the literature study influence the ultimate success of a virtual cooperation within international strategic alliances must be evaluated. In order to make this evaluation, it is important to be clear about the operational definition of virtual cooperation success. This leads to the fourth research question:

4) *How can the success of virtual cooperation within international strategic alliances be measured?*

By collecting data and analyzing the outcomes, for example identifying similarities and differences, the factors determining the success of virtual cooperation within an international strategic alliance in practice can be defined. This leads to the fifth research question:

5) *What factors emerge from practice that influence the success of actual virtual cooperation within Dutch-Chinese strategic alliances?*

1.5 Research strategy

Research design can be classified by the approach used to gather primary data in order to answer the research questions. According to Yin (1994), a research design is supposed to represent a logical set of statements, and the quality of the given design can be judged according to certain logic tests. Concepts that have been offered for these tests include trust-worthiness, credibility, confirmability, and data dependability. Four tests namely construct validity, internal validity, external validity, and reliability

have been commonly used to establish the quality of any empirical social research (Yin, 1994).

The research method is developed by taking into account the knowledge needed to answer the research questions as well as practical conditions that influence the applicability of specific methods. Five types of knowledge are described by Verschuren & Doorewaard (1999), which are descriptive, explanatory, predictive, evaluative, and prescriptive knowledge. In general, this research is aimed at generating descriptive and explanatory knowledge. The descriptive knowledge is generated from the description of international strategic alliances, virtual alliances, virtual cooperation within international strategic alliances, and macro-ICT infrastructure in China and the Netherlands. The explanatory knowledge is companies' explanation about the factors that influence the virtual cooperation within their strategic alliances.

Case study is selected as the research method for generating descriptive and explanatory knowledge on factors that influence the success of virtual cooperation within Dutch-Chinese strategic alliances in the selected companies. This method is selected based on its suitability for building descriptive and explanatory knowledge from the field and it is a preferred approach when 'how' and 'what' questions are to be answered (Ghauri & Gronhaug, 1995). Ghauri & Gronhaug also suggest that case studies can be used when studying a number of organizations with regard to a set of variables that have already been identified or assumed. The purpose of data collection in a case study is to compare (replicate) the phenomenon studied in different cases in a systematic way, and to explore different dimensions of research issues or to examine different levels of research variables. Characteristics of case study research appropriate for this study are a small number of research units, more depth than breadth, a selection of cases, and the ability to employ different data collection techniques as well as the ability to conduct qualitative analysis (Krathwohl, 1996; Yin, 1994; Verschuren & Doorewaard, 1999). This enables the researcher to take different sources of data to support the findings, and to gain an overall picture of the research objective and a profound insight into the selected objects that are restricted in time and space.

Initially, this research aimed to investigate virtual alliances between Dutch and Chinese businesses. However, after months of searching, few pure virtual alliances had been identified, which led to difficulties in testing the developed research framework at the virtual alliance level. Therefore, changes had to be made, such that the core of this research is aimed at the virtual cooperation within strategic alliances rather than the virtual alliances concept in Dutch-Chinese business contexts.

In order to determine the influencing factors, both successful and failed cases are investigated, and the influencing factors for virtual cooperation in Dutch-Chinese strategic alliances will be analyzed and compared with the findings available from literature. Supporting data for this research is obtained from primary data including interviews and investigation/observation results, and secondary data including

literature, documents, and reports. The overall research approach is illustrated in Figure 1.1.

To address research question 1 concerning the characteristics of virtual cooperation within international strategic alliances, a literature study is undertaken to collect, compare, and analyze characteristics of international virtual alliances/cooperation. Based on the literature study, definitions of international virtual alliances and virtual cooperation within international strategic alliances are given.

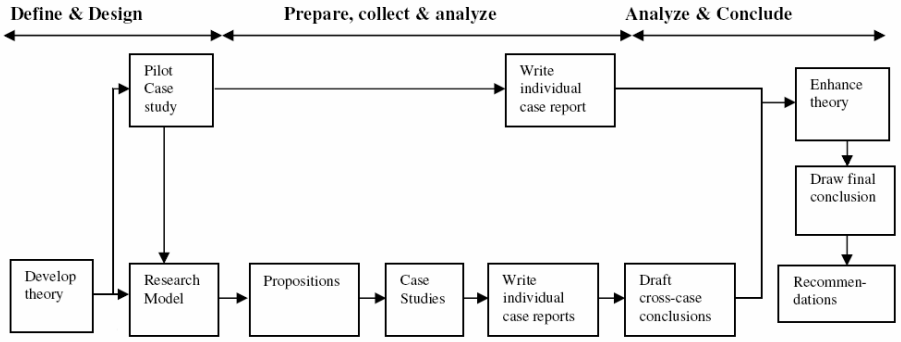

Figure 1.1 Research approach

Research question 2 is aimed to identify the relationship between macro-ICT infrastructure and virtual cooperation within Dutch-Chinese strategic alliances. It is addressed through desk research and analysis undertaken in the area of ICT development in the Netherlands and China.

In order to answer research question 3, concerning factors affecting the establishment and operation of virtual cooperation within international strategic alliances, a literature study regarding influencing factors in establishing and operating such a new form is conducted.

Moreover, as there is a need to measure the success of virtual cooperation within international strategic alliances, an explorative literature study is undertaken to provide an answer to question 4: how can the success of virtual cooperation within international strategic alliances be measured.

Based on the theoretical foundation, together with a pilot case study, the research model is developed. The research model is then applied in a number of selected case studies. After the specific characteristics of each case have been provided, the similarities and differences among the various cases are also analyzed. Through this, research question 5: what factors emerge from practice that influence the success of actual virtual cooperation within Dutch-Chinese business relationships, will be answered.

1.6 Dissertation structure

The dissertation is structured as shown in Figure 1.2.

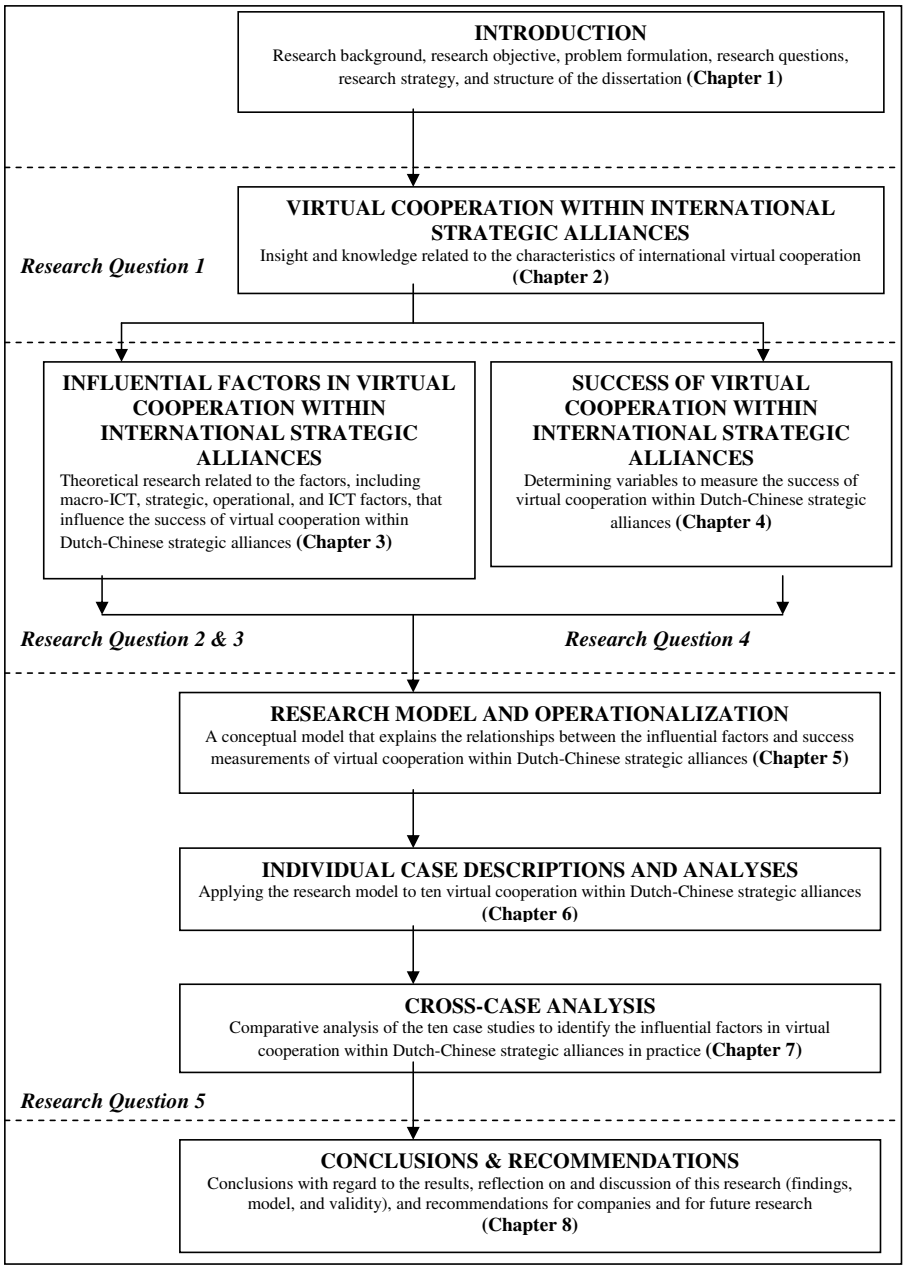

Figure 1.2: Structure of dissertation

CHAPTER 2 VIRTUAL COOPERATION WITHIN INTERNATIONAL STRATEGIC ALLIANCES

2.1 Introduction

In order to provide the necessary theoretical background for defining the characteristics of international virtual cooperation, a literature study in related areas has been conducted.

In today's global economy, companies are increasingly seeking partnerships to stay ahead of the competition or sometimes just to survive. Such movements are fuelled by a number of global developments such as the internationalization of markets, increasing complexity of technologies, shortened product life cycles, high economic uncertainty, and increasing speed of innovations (Faulkner, 1995; Douma, 1997; Christie & Levary, 1998; Chen, 2003; Todeva & Knoke, 2005). Few firms have the human, financial and technical resources to 'go-it-alone' in every market and with every product; and thus advantage can be achieved when the combined efforts of cooperating partners add up to a value chain that produces a more competitive end result (Contractor & Lorange, 1988; Chen, 2003; Todeva & Knoke, 2005).

In the 1990s, firms were re-engineering internal production and managerial functions around the possibilities of ICT. With the increasing ICT deployment in organizations, the linkage between the technology and the organizational structure strengthened (Porter, 1987). The potential of ICT to redefine entire business systems can provide leading innovators with powerful competitive advantages. ICT has helped break down the boundaries separating functions, geographic locations, and management levels, thus allowing new networks of relationships among an organization's membership. ICT also redefines the primary work of many firms, from creating physical products to managing information. Many researchers have suggested that ICT has enabled organizations to sustain their competitive advantage by gaining direct or indirect influence in the relationships with all kinds of existing or potential business partners, by reaching beyond physical borders (Castells, 1996; Ball & McCulloch, 1999). Such (inter-) organizational networks are increasingly important in order to cope with a complex and rapidly changing environment (Chisholm, 1998). The creation of new forms of ICT-enabled alliances can transform companies and even re-engineer the scope of the businesses in which they compete.

The term virtual alliance comes from the hotly discussed concepts of strategic alliances and virtual organizations/enterprises. By studying both concepts, further definitions of international virtual alliances and virtual cooperation within international strategic alliances will be given. Compared with the virtual organization concept, a strategic alliance is not new and therefore more attention will be given to the former concept. Moreover, in order to gain insights into the characteristics of

international virtual cooperation, two relevant concepts, i.e. the degree of virtuality and ICT applications, will also be presented.

2.2 International strategic alliances

2.2.1 Strategic alliances

To define strategic alliances, literature provides a range of terminology such as alliances, cooperation, joint venture, coalition, plus collaborative agreements such as joint manufacturing, technical assistance, joint marketing, cross-distribution, cross licensing, research pooling, and consortia. In simple words, a strategic alliance is sometimes just referred to as "partnering" that offers businesses a chance to join forces for a mutually beneficial opportunity and sustained competitive advantage. A key benefit in forming alliances is leveraging the abilities of a company's success into new customers and new markets (Gale, 1994; De la Sierra, 1995; Chen, 2003; Todeva & Knoke, 2005). To summarize, strategic alliances can be grouped into three broad categories: non-equity alliances, equity alliances, and joint ventures (Barney, 1996). The various forms of a strategic alliance can be based on the degree of interdependence (see Figure 2.1). From Figure 2.1, it is clear that the degree of the interdependence for merger and acquisition is the largest, and the strategic alliance will become subsidiary-parent relationship after the completion of the merger and acquisition.

Merger & Acquisition	Joint Ownership	Joint venture	Formal cooperative venture	Informal cooperative venture
Large ← Interdependence → Low				

Figure 2.1: Forms of strategic alliance (Lorange & Roos, 1992)

To gain further understanding, a literature review of the definitions of strategic alliances is given in Table 2.1.

Douma, 1997	A strategic alliance is a contractual, temporary relationship between companies remaining independent, aimed at reducing the uncertainty around the realization of the partners' strategic objectives (for which the partners are mutually dependent) by means of coordinating or jointly executing one or several of the companies' activities. Each of the partners is able to exert considerable influence upon the management or policy of the alliance. The partners are financially involved, although by definition not through participation, and share the costs, profits and risks of the strategic alliance.
Dussauge & Garrette, 1995	An alliance is a cooperative agreement or association between two or more independent enterprises, which will manage one specific project, with a determined duration, for which they will be together in order to improve their competences. It is constituted to allow its partners to pool resources and coordinate efforts in order to achieve results that neither could obtain by acting alone. The key parameters surrounding alliances are opportunism, necessity and speed.

Faulkner, 1995	A strategic alliance is a particular mode of inter-organizational relationship in which the partners make substantial investments in developing a long-term collaborative effort, and common orientation.
Gulati, 1998	Strategic alliances are voluntary arrangements between firms involving exchange, sharing, or co-development of products, technologies, or services.
Phan, 2000	Alliances are long-term, trust-based relationships that entail highly relationship-specific investments in ventures that cannot be fully specified in advance of their execution.
Porter, 1990	Strategic alliances are long-term agreements between firms that go beyond normal market transactions but fall short of merger. Forms include joint ventures, licenses, long-term supply agreements, and other kinds of inter-firm relationships.
Yoshino & Rangan, 1995	A strategic alliance is a partnership between two or more firms that unite to pursue a set of agreed upon goals but remain independent subsequent to the formation of the alliance to contribute and to share benefits on a continuing basis in one or more key strategic areas, e.g. technology, products.

Table 2.1: Definitions of strategic alliances

Even though there are various definitions of strategic alliances, there are no differences in the basic meaning such as cooperation, a set of agreed goals, and shared resources and competences. Thus, the term strategic alliance as applied in this research will cover all the above-mentioned aspects.

2.2.2 International strategic alliances

In the literature, in many instances, the concept of a strategic alliance is also seen as cross-cultural cooperation since global alliances form one of the quickest, least risky, and cheapest ways to develop a global strategy to meet a fresh set of demands placed on companies (Porter & Fuller, 1986; Forrest, 1990; Baird et al, 1997; Deresky, 1997; Chen, 2003; Nielsen, 2003; Todeva & Knoke, 2005). When an alliance involves companies from different countries, the cultural issues clearly loom larger (not only corporate culture, but also national and individual cultures) (Porter, 1990; Snow et al., 1999). Previous work shows that many companies have used alliances successfully to enter new areas. Corning, for instance, has used alliances very effectively to enter new geographical markets and achieve a range of other objectives. When the company teamed up with Asahi Glass and Samsung in December 1996, to build a Mexican factory to manufacture glass funnels and panels for color-TV tubes, the announcement was accompanied by a significant increase in Corning's share price as they own 40 percent of the venture (Ernst & Halevy, 2000).

Researchers have concluded that an international strategic alliance is cooperation between companies from different countries that unite to pursue a set of agreed upon goals through continuously sharing their respective complementary assets and core competences. While each of them retains its identity, they gain mutual benefits and strengthen their competitive advantage (Faulkner, 1995; Mulyowahyudi, 2001). As this definition is in line with the concept of a strategic alliance to be applied

in this research, it will be used as a basis for defining international virtual alliances and virtual cooperation within international strategic alliances.

2.3 Virtual organization

2.3.1. The trend of virtual organization

Advances in ICT have made it easier for companies to exchange data and to coordinate. That has led to a worldwide growth of new business models for cooperation such as virtual organizations. The internationalization of markets, the speeding up of innovation processes, the increasing complexity of technologies and enabling interactive ICT capabilities, have led to revitalizing decentralization and outsourcing concepts. Time and place are thus no longer barriers for companies wanting to expand businesses (Cash et al., 1994; Wigand et al., 1997; Fleisch et al., 1999; Van der Zee & Van Wijngaarden, 1999; Chesbrough & Teece, 1996; Hossain & Wigand, 2003).

In his book 'The T-Form Organization', Lucas (1995) states that 'to remain flexible, a firm has to respond quickly to these rapidly changing market needs and business conditions, a characteristic not associated with large bureaucracies'. While the T-Form (meaning technology-based) organization may appear to be a traditionally structured firm, its actual physical structure relies on communications technology such as electronic mail (e-mail), groupware, and distributed offices. The T-Form organization has a number of virtual components, replacing business functions that exist physically in a traditional organization with an electronic version. A step beyond the virtual component is the *virtual organization*, representing *a new form of strategic alliance*. A virtual organization can be created through a negotiated agreement between firms. These types of agreements represent a new form of strategic alliance among corporations. Inter-organizational networks are increasingly important in order to cope with complex and rapidly-changing environments. In such networks, organizations often find themselves in networks of alliances that include customers, suppliers, business partners, and even competitors (Lucas, 1995).

Virtual has several meanings and researchers tend to view the word 'virtual' from their own understanding. In normal usage, virtual means having the effect but not the form or substance while, in ICT, it can be traced back to the early days of computer technology when "virtual memory" was used to describe "a way of making a computer act as if it had more storage capacity than it really possessed" (Davidow & Malone, 1992; Byrne, 1993). This word has recently gained wide currency in its conventional form where it is taken to mean lacking substance or without equivalent reality. In this sense it is often used to describe simulated digital environments. Other common contemporary usage now suggests an Internet presence, or even simply a term to describe a relationship to a computer (Hales & Barker, 2000). Although the virtual organization is a comparatively new concept, some of its components are

recognizable from earlier concepts of the organization (Mowshowitz, 1994). Features of virtual organizations that have gradually become evident include the reliance on the medium of cyberspace and the technologies of computing and communications (Barnatt, 1995).

2.3.2 Virtual organization

A virtual organization can be seen as a virtual collaboration, which refers to the use of ICT for supporting the collective interaction among multiple parties involved (Hossain & Wigand, 2003). According to Goldman et al. (1995) a virtual organization is valuable because it reduces time, costs and risks, and increases product service capabilities and relationships.

The concept of virtual organization has been widely discussed in recent years. There are three generic types of accounts available on virtual organizations in the literature. The first one is on organizations that outsource some of their business activities, forming virtual alliances to achieve organizational objectives. The second one is related to an organization that is "abstract, unseeing and existing within the minds of those who form a particular organization" (Harrington, 1991). The framework of virtual organizations is often subjective and open to many different perceptual interpretations. A virtual organization is thus the antithesis of the physical organization with which we are familiar. The third type is about organizations that are built by virtual links using information technology. In this research, the combination of type 1, 2, and 3 mentioned above is used; however, the main focus will be on companies that form alliances based on virtual links with information and communication technology (type 3).

Earlier work in the area of ICT and organizations points to the general direction in which ICT contributes to organizational structures and provides an increasingly virtual mechanism for realizing organizational objectives (Barnatt, 1995; Foster & Flymn, 1984; Haeckel & Nolan, 1993; Lucas & Baroudi, 1994; Miller et al., 1993; Mowshowitz, 1994). Chutchian-Ferranti (1999) gives three very different views of a virtual corporation. The first is viewing a virtual corporation as "any group of skilled people" who get together to form a company to meet a specific goal, and each team member performing a different and specific function. The individuals function as an organization through their communications using electronic means such as e-mail, faxes, or videoconferencing. Similar to the first, the second is viewing the "group of partnering companies or people that specialize in particular functions." They come together to perform a specific function or task. The third one is viewing a traditional, large company that chooses to outsource some of its critical operations in an attempt to control costs and allowing it to concentrate on its core competencies and thus obtain increased profitability.

Similarly, Wassenaar (1999) classified virtual organizations into three sub-levels: the internal organization structure (also called intra-organization structure), the

coordination structure, and the inter-organizational structure. According to DeSanctis & Monge (1998), the components (individual workers, teams, departments, units or firms) that make up a virtual organization are geographically distributed, functionally or culturally diverse, electronically linked, and connected using lateral relationships. It is important to note that these attributes can be applied to employee-employer relationships, to teams, to firms, and to inter-organizational arrangements. From the intra- or inter- organizational point of view, all arguments concern redefining the internal structure by means of a 'company without walls' such as teleworking, virtual offices, and virtual teams (Galbraith, 1995; Lipnack & Stamps, 1997; Jarvenpaa & Shaw, 1998; Cascio, 1999; Kierzkowski, 2004; Akkirman & Harris, 2005; Henttonen & Blomqvist, 2005), and through external (virtual) value-added partnerships, meaning integrated supply chain structures, strategic alliances and strategic webs (Rayport & Sviokla, 1995; Holland, 1998; Burn et al., 1999).

In this research, we believe that the coordination mechanisms should cover both the inter-organization level and the intra-organization level. However, in the intra-organizational relationship, the networked units should be independent in the sense of having their own objectives and goals (even though those objectives and goals might be set by parent companies). Following this approach, Table 2.2 gives a brief overview of definitions of a virtual organization.

Bauer & Köszegi, 2003	a temporary, loosely coupled network of legally independent companies, who combine their individual core competencies to exploit a specific business opportunity by optimizing the value adding business process. Mutual trust between the partners and the extensive use of ICT guarantee the coordination of modularized production.
Burn et al., 1999	an electronically networked organization that transcends conventional organizational boundaries, with linkages, which may exist both within and between organizations. ICT is used to enhance organizational activities while reducing the need for physical or formalized structures. The relationships involved differ in significant ways from traditional partnerships or alliances in that these relationships are product or project focused, flexible and short lived. Such relationships are based primarily on competencies rather than historical relationships or cost, and seek innovative ways to add value through information and change management and rich functionality.
Byrne, 1993	an ICT-enabled temporary network of independent companies, suppliers, customers and even rivals, based on trust to share costs, skills and access one another's markets. It will have neither a central office nor an organizational chart.
Davidow & Malone, 1992	a co-operation of independent partners who combine their knowledge and skills in order to fulfill a certain goal, in the form of research or a product.
DeSanctis & Monge, 1998	a collection of geographically distributed, functionally and/or culturally diverse entities that are linked by electronic forms of communication and rely on lateral, dynamic relationships for coordination. It is characterized by (a) highly dynamic processes, (b) contractual relationships among entities, (c) edgeless, permeable boundaries, and (d) reconfigurable structures. Relative to more traditional settings, communication processes occur in virtual contexts are expected to be rapid, customized, temporary, greater in volume, more formal, and more relationship based.

Mowshowitz, 1997	a network of independent firms in a synergistic relationship with a central executive entity operationally linked by extensive ICT to achieve a common goal. It is a process to structure and manage any enterprise by identifying task requirements and the appropriate elements capable of satisfying them.
Pletsch, 1998	an enterprise concept of the future in order to create new markets, offer new products (value added), and assure flexibility in responding to new market requirements.
Sieber et al., 1998	a form of cooperation involving legally autonomous companies, institutions and/or individuals delivering a product or service on the basis of a common business understanding. The cooperating units participate in the collaboration primarily with core competencies and present themselves to third parties as a unified organization, when delivering the product or service. In so doing, they largely dispense with the institutionalization of central management functions for shaping, managing and developing the virtual organization, through the use of appropriate ICT.
Travica, 1997	a temporary or permanent collection of geographically dispersed individuals or groups, and organizational units, which do not belong to the same enterprise – or entire enterprises that depend on electronic linking to complete production.

Table 2.2: Definitions of a virtual organization

2.3.3 Definition of virtual organization as applied in this research

There is no generally accepted definition of a virtual organization; even the general definition provided by Byrne (1993) raises many questions. For instance, what does the organization look like since there is no mention of governance? What does temporary mean? Is the organization a coalition of equals, or is there a hierarchy? Does disbandment apply to all the partners or does it mean that the partnership network is dynamic and so only the partner constituency is subject to change? Even the very widely held notion that the enterprise is driven and enabled by ICT can be challenged – as is the case of the film making industry where, until the present and increasing use of computer generated special effects, ICT has not been used intensively in an operational sense (Hales & Barker, 2003). Thus, it is necessary to define the common characteristics evident in many of the technical definitions and points of view regarding virtual organization in the literature.

The first characteristic is that a virtual organization makes use of technology as the central form of communication and coordination, and that it has an overarching strategy to move its essential processes to a digital dimension. Even though some scholars argue that some virtual organizations do not use ICT extensively for operational matters, the majority argue that the perception of the virtual organization as an ICT-enabled network remains the central concept. In our point of view, there is no doubt that, without ICT, a virtual organization could not exist.

The second characteristic is the virtual organization's heavily and dynamically networked structure. No matter whether a virtual organization concerns a network within one organization or inter-organizational partnerships, the network forms the basic structure, and physical locations and time will no longer be barriers. Also, the

network can change over time as new parties are added or existing participants drop out.

The third characteristic is the virtual organization's focus on developing its own core competencies and accessing other competencies through outsourcing arrangements. Some scholars argue that, in the virtual environment, only core competences could enable organizations to strengthen their positions in a network. Prahalad & Hamel (1990) describe core competences as the collective learning of an organization consisting of its resources, knowledge, and, in particular, production skills or integrating technologies that provide a distinct benefit to customers or increase customer value above that offered by competitors. The management challenge is to transform basic resources into core competencies. When resources that are difficult to imitate or substitute are embedded as core competences they become the basis for superior enterprise performance. Hedberg et al. (1994) contend that companies which identify and develop core competencies are able to maintain strong bargaining positions when partnering with outside firms. As repositories of enterprise-based knowledge, core competencies improve with use and are less prone to depreciation, making them a source of increasing value and sustainable competitive advantage.

The fourth characteristic, many researchers agree, is that a virtual organization is a temporary or project-based network, while some researchers argue that a virtual organization may appear as temporary or permanent. In this research, the latter, broader definition will be applied.

The fifth characteristic is that participants in a network have to be able to 'understand' each other at many different levels in their relationships in order to be able to organize their interdependency. Thus, standards are essential to make this 'understanding' possible. Standards are defined as objects, which are accepted and shared within a network (Fleisch & Osterle, 2000).

By summarizing the aspects discussed above and by covering the inter- and intra- organizational relationships, the definition of virtual organization to be used in this research is as follows:

A virtual organization is an electronically-networked one, formed by separate companies or business units based on agreed goals and standards that transcend conventional boundaries. Cooperating units provide their respective complementary assets and core competencies to capitalize on business opportunities.

2.4 International virtual alliance

From the literature study in the previous two sections, it is clear that there is an overlap between strategic alliances and virtual organizations. In this section, the similarities and differences between the two concepts will be discussed and, next, the new concept of an international virtual alliance will be defined based on the study.

According to Syler & Schwager (2000), a virtual organization is not an organization, but, rather, it is a strategy for organizing the elements of the value chain or a characteristic of an organizational approach. However, a clear distinction between virtual organizations and strategic alliances is lacking. The terminology can be confusing and misleading if not operationalized and if clear distinctions are not drawn between different forms. For example, many cases cited in the literature are referred to as illustrations of a virtual organization; however, they are merely strategic alliances or joint ventures (Syler & Schwager, 2000).

Both strategic alliances and virtual organizations are types of business networks. Wigand et al., (1997) state that there are two main driving forces behind the need for business networking and that these are highly interrelated. First, management is being confronted with trends such as globalization, shorter innovation cycles and deregulation, all leading to increasingly dynamic markets. This requires new strategies, such as core competence focus, outsourcing, and a stronger customer orientation. Business networking is thus an inherent element of these strategies. Second, ICT allows for the efficient exchange of information among organizations and acts as a main enabler for networking among businesses, which means that a generic difference between strategic alliances and virtual organizations is the ICT usage in a business network. The virtual organization is viewed as a cooperative organizational structure with a complete dispersion of the workforce and intensive use of ICT for communication and co-ordination, whereas the strategic alliance is not (Miers, 1999). According to Jagers et al. (1998), every virtual organization is a network organization, but not every network organization is a virtual organization. They suggest allocating network organizations based on control and uncertainty, see Figure 2.2. In this figure, the virtual organization form has high uncertainty and low control, a planet-satellite (mostly parents-subsidiary or core/leading organization within a network) relationship has low uncertainty and high control, while a strategic alliance is midway on both aspects.

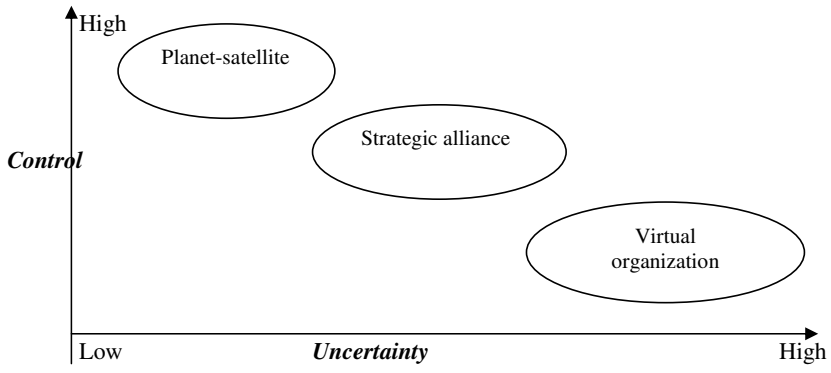

Figure 2.2: Jagers et al.'s (1998) network organizations based on control and uncertainty

In Lucas' opinion, a virtual organization can be created through a negotiated agreement with another firm. These types of agreements represent a new form of strategic alliance. The firms in such an alliance become interdependent and each is interested in the success of the other (Lucas, 1995). Syler & Schwager (2000) consider the virtual organizational form to be more complex than a strategic alliance. A strategic alliance is narrower in scope than a virtual organization, focusing on such tasks as a specific product release or research and development projects, and involves fewer players than a virtual organization. A strategic alliance focuses strictly on operational issues, while a virtual organization involves a larger number of players and encompasses a wider section of the value chain. The life cycle characteristics of the strategic alliance and virtual organization are the most difficult ones to distinguish. Both organizational forms are technically considered as temporary. However, a strategic alliance can become so successful and involved that the arrangement becomes relatively permanent. A virtual organization is generally temporary as it typically disbands after the project or task at hand is complete, but it may last longer if a series of similar tasks are strung together. Table 2.3 illustrates the distinctions between a virtual organization and a strategic alliance.

Characteristic	Strategic Alliance	Virtual Organization
Complexity	More complex	Less complex
Scope/focus	Narrow; operations focused	Broader section of value chain; includes non-operational elements such as HR, marketing, and legal; provides core competences
Number of players	Few; typically 2	Many
Life Cycle	Usually temporary; but can sometimes last for many years	Usually temporary

Table 2.3: General characteristics of strategic alliances & virtual organizations (Syler & Schwager, 2000)

According to Grenier & Metes (1995), the relationships involved in virtual organizations differ in significant ways from traditional partnerships or alliances in that these latter relationships are product or project focused, flexible and short-lived. Relationships in virtual organizations are based primarily on competencies rather than on historical relationships or costs, and are also often complex. They also state that even 'in the best of situations, such relationships are difficult to maintain, and even more difficult to turn to value. What is needed is a set of business processes based on ICT that can support these flexible, far-reaching, information intensive virtual organizations.' There are two important points regarding the above quote. One is that virtual organizations are information intensive, and could probably benefit from appropriate support from suitable information technologies. A second point is that

these relationships, and indeed the qualities of virtualness itself, are difficult to 'turn to value' (DeSanctis & Monge, 1998).

Based on the similarities and differences between international strategic alliances and virtual organizations discussed above, and in line with the definitions of international strategic alliances and virtual organizations applied in this research, an international virtual alliance is defined as:

An electronically-networked cooperation involving companies, from different countries, that envisage mutual benefits by delivering products or services on the basis of common business understandings and a set of agreed goals and standards. The cooperating units provide their respective complementary assets and core competencies.

The key concept is the construction and operation of electronic communication systems.

2.5 Virtual cooperation within international strategic alliances

When discussing virtual cooperation within strategic alliances, it is necessary to study relevant aspects such as the degree of virtuality and the general applications used to support the concept of virtual cooperation.

2.5.1 Degree of virtuality within an organization

Few pure virtual forms exist, for most firms, being virtual is a matter of degree (Dutton, 1999). According to Mowshowitz (1997), a virtual organization is a process that uses ICT to satisfy strategic and operational goals, and further that a virtual organization recognizes ICT's impact on all areas of its business. A virtual organization is very demanding in terms of necessary IT and telecommunications infrastructure; in fact only with the extensive use of innovative technologies it is possible to form a virtual organization (Miller, et al., 1997).

The newly-formed word 'virtuality' can be used to explain this: measuring the degree of virtuality provides the enterprise with a quantifiable link between its organizational use of ICT and its capacity to meet its strategic objectives. Varying degrees of virtuality exist and within ICT-based networks, different organizational structures can be formed. According to Skyrme (1998), virtuality creates the opportunity to disperse organizational activities. ICT, especially the Internet, makes it economically viable to separate operations and people that were previously bound together. Firms will exploit three dimensions of virtuality—space, time and structure—to reconfigure their operations for strategic advantage. In its simplest form, virtuality exists where ICT is used to enhance organizational activities while reducing the need for physical or formalized structures. Degrees of virtuality then exist which will reflect:

- the virtual organizational culture (strategic positioning);

- the intensity of linkages and the nature of the bonds which tie the stakeholders together (internal and external structures); and
- the market (ICT dependency and resource infrastructure, product, customer) (Skyrme, 1998).

A high degree of virtuality implies a complete dispersion of the workforce and an extensive use of ICT to communicate. Firms become more virtual as a larger proportion of important production processes occur outside the traditional organizational boundaries; as they use electronic document interchanges or fund transfers, delivering invoice or payment information; or people exchange messages via electronic mail networks. For example, although most companies still maintain a divisional structure, they increasingly form external relationships with other firms in the form of strategic partnerships, alliances, and outsourcing contracts, and through this firms are acquiring more virtual characteristics than in the past (Mowshowitz, 1994; Nohria & Berkley, 1994). Even firms that may not look virtual on the surface are organizing selected activities and processes virtually (DeSanctis & Monge, 1998).

There are two distinct approaches to determine the degree of virtuality. The first approach suggests a predetermined ICT-driven path through different stages of evolution from a non-virtual to a virtual organization. Within the different stages of evolution, organizations exhibit various degrees of virtualization (Bauer & Köszegi, 2003). Arnold et al. (1995) suggested an evolutionary path-model using five stages of development from a non-virtual structure (Stage 0) to a virtual organization (Stage 4). Corporations moving from Stage 0 to Stage 1, take advantage of new ICT by optimizing internal processes. Through the concentration on core competences in Stage 2, parts of the value-adding process are outsourced. In Stage 3, a business network redesign enables a corporation to integrate customers and/or suppliers into the value-adding process. Finally, in Stage 4, so-called brokers configure a virtual corporation perfectly adapted to the requirements of the customer.

The second research stream explains the emergence of virtual structures by adopting established organizational frameworks such as contingency, resource based, or transaction cost theories. It proposes an "ideal" virtual cooperation, exhibiting predetermined characteristics, as a reference for measuring the virtuality. The degree of virtuality is conceptualized independently of a specific evolutionary path (Bauer & Köszegi, 2003). In this research, the first approach will be applied, in which measuring the degree of virtuality is ICT focused.

In this model, the emergence of a virtual organization is typically shown as the final stage of an evolutionary development commencing with the traditional organization and progressing along a predefined path of technological or organizational parameters (Alter, 2002; Amor, 2002). To illustrate, Figures 2.3 and 2.4 describe Tapscott's (1995) and Porter's (2001) conceptions of virtualization based on technology and integration.

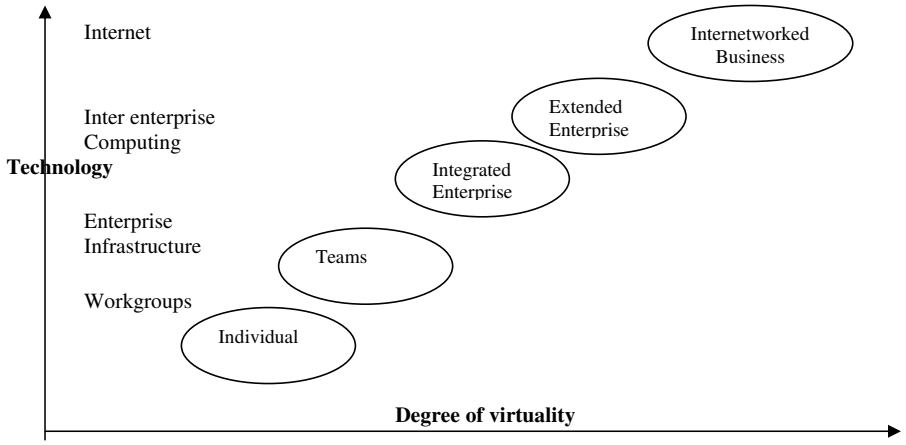

Figure 2.3: Virtualization based on technology, adapted from Tapscott (1995)

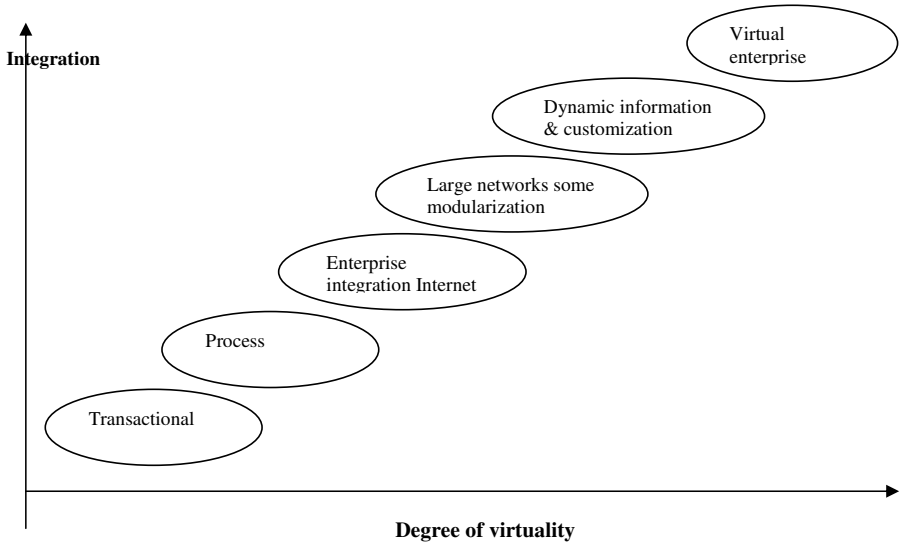

Figure 2.4 Virtualization based on integration, adapted from Porter (2001)

In contrast to the single issue approach, Arnold (1995), proposed a five-stage multi-function model that describes the transformation of a traditional firm into a virtual form. The stages are: internal integration, emphasis on core competencies and outsourcing, external integration and brokerage (see Figure 2.5). Arnold's model is significant in that it integrates many of the issues identified in two dimensional virtualization models and identifies a logical sequence of independent but inter-related activities. As with the previous models, any firm's degree of virtualization can be estimated in general terms.

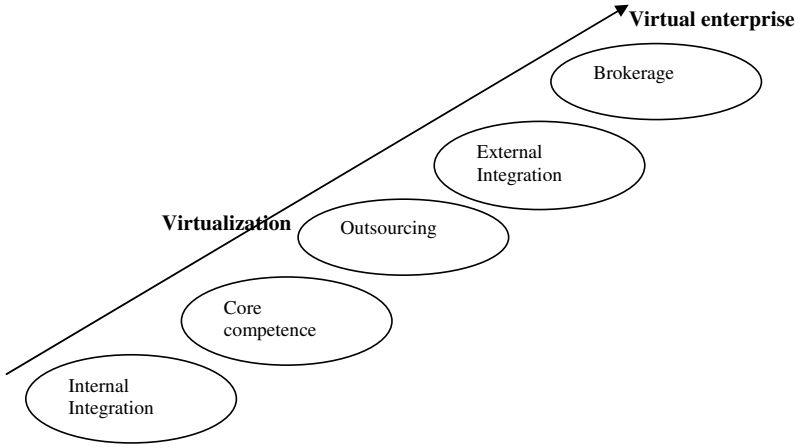

Figure 2.5: Five stages of virtualization (Bauer & Köszegi, 2003)

From these given models, a common characteristic is that most of the structural perspectives are closely related to the firm's progressive adoption and integration of ICT. Organizations can fix their own position using any of the above models to derive their relative degree of virtualization and use the model as a guide to future developments. Key points in the structural view are that it makes virtual/non-virtual and distinction amongst business models and that it considers virtualization as the process of developing the characteristics of a broadly recognizable structural form of virtual cooperation (Chaffey, 2002).

According to Skyrme (1998), virtuality requires the development of a knowledge collaboration infrastructure. This blends the 'hard' infrastructure (information and communication technology) with the 'soft' infrastructure (human and organizational factors) that are the ultimate determinants of success of any such operation. On the 'hard' side, the electronic information exchange applications can be classified into different categories using a typology of four virtual infrastructure levels as below:

1. Connections: people should be able to connect into the infrastructure whenever and wherever they are.
2. Communications: provision of basic communications of several types –voice, data, text messages etc.
3. Conversations: start to add meaning to the communications.
4. Collaborations: the highest level of virtuality, where shared documents, evolving knowledge bases and in-depth relationship-building take place.

In summary, the degree of virtuality can be characterized by the geographical dispersion (implying less personal contact) and ICT dependence (a high level of ICT

applied for co-ordination and communication) (Bosch-Sijtsema, 2002). This concept will be applied in this research. A five-level scale will be used to measure the degree of virtuality based on a combination of Bauer & Koszegi's (2003) five-stage model and Skyrme's (1998) four levels of virtual infrastructure (see Table 2.4 presented below on p. 30).

2.5.2 ICT applications

Virtual cooperation within international strategic alliances is built on inter-organizational ICT systems that facilitate reduced transaction and communication costs, and data sharing and coordination across enterprise, geographic and temporal boundaries. Such ICT-enabled cooperation can be referred to as electronically supported communication media ranging from telephone to Internet to low-earth orbit satellite cellular technologies that organizations use to support linking individuals in electronically mediated communication (Hossain & Wigand, 2004). The virtual form can be optimally managed by implementing the correct ICT solutions. The object of such a solution is to distribute and process information in real time throughout the entire system linking customers and suppliers – since this allows all to make rapid decisions and quickly coordinate action in a fairly reliable and secure way (Miers, 1999; Fowler 1999). Until recently, the building of a VPN with the use of dedicated leased lines was the most feasible way to fulfil the needs. However, because of the high cost, this solution was mostly available to larger companies that could handle the large cost (and the know-how) involved (Fowler 1999). Implementing cheap and effective IP technology and standard tools like XML provided an alternative solution to the tools necessary for SMEs and Vos (Katzy & Dissel, 2001; Roberts et al., 2003). Currently, there are many ICT solutions in use. According to Laudon (1999), these solutions can be grouped into four categories namely facilitating applications, EDI, ERP/SCM/CRM, and GroupWare.

Facilitating applications are used for communication, coordination, and speeding the flow of transactions, messages and information (Laudon, 1999). Current facilitating applications are:

- Electronic mail: computer-to-computer exchange of messages.
- Voice mail: for digitizing a spoken message and transmitting it over a network.
- Fax: digitizes and transmits documents with both text and graphics.
- Digital Information services: enable networked microcomputer and workstation users to obtain information from outside the firm instantaneously.
- Teleconferencing: communicating with a group of people simultaneously using the telephone or electronic mail group communication software.
- Data conferencing: two or more users are able to edit and directly modify data files simultaneously.
- Videoconferencing: teleconferencing with the ability of participants to see each other on video screens.

EDI provides computer-to-computer exchange of information using standardized transaction formats. Such transactions typically involved purchase or sales functions (Westland & Clark, 1999). In the past, many enterprises relied on EDI and enterprise-wide integrating technologies for communication and coordination, but the Internet with its lower cost and superior networking capability rapidly surpassed these and fostered the further development of virtual cooperation (Domberger, 1998). The information transferred in EDI systems was ideally structured in predefined formats set by rules. The advantages of EDI systems can be characterized (Strader et al., 1998):

- increasing the speed of handling business processes,
- decreasing errors due to misinterpretation by people,
- improvements in enterprise integration,
- improvements in inter-organizational coordination, and
- increasing the accuracy of information and processes.

Enterprise resource planning (ERP)/ Supply chain management (SCM)/ Customer relationship management (CRM) are integrated systems that are widely used by many companies. During the last decade, enterprises have integrated their functional information systems in ERP systems, providing an integrated database for various functions, such as finance, marketing, and production. These ERP systems have emerged on a large scale and have become the backbone for business networking. ERP vendors such as SAP, Baan, Oracle and Peoplesoft are eagerly adding business networking functionality for electronic commerce, SCM and CRM. Enhancing and extending existing ERP systems, as well as implementing business networking strategies, are of foremost importance for companies and require decisions concerning strategy, processes and systems (Hales & Barker, 2003).

A SCM system connects a firm with its suppliers and manages its supply chain network relationships, while CRM software is designed to manage the customer interface. Initially designed as stand-alone applications, SCM and CRM software is now sold by the major software houses as essential parts of extended ERP suites that integrate the supply network. Supply chain integration connects the business processes and information systems that belong to the enterprise with its suppliers and customers to allow seamless transfer of information across the entire system. Supply chain integration is driven by enterprises that require constant global visibility of all corporate activities across their value networks and is enabled by increasingly powerful and effective technologies that automate complex workflows, streamline transaction processes and provide integrated feedback to management. Supply chain visibility and coordination are major contributors to reduced inventory and operational costs and increased margins. Web-based technologies are presently the major means of data transmission and enable enterprise integration at all levels (Hales & Barker, 2003).

GroupWare such as Lotus Notes is employed within a secure, managed environment, and supporting e-mail, group writing and commenting, calendaring, scheduling, real-time conferencing, information sharing, and workflow management (Westland & Clark, 1999; Laudon, 1999). It has been widely used in many large scale organizations especially multi-national enterprises in order to lower the cost of communication and improve the security, effectiveness and efficiency of dispersed and unstructured or document-based information exchange tasks. According to Jude-York (1998), Lotus Notes groupware applications such as TeamRoomTM enabled remote members to store and work on common documents. This was further supported by a dynamic e-mail system, which allowed for the categorization of stored documents beyond e-mail by enabling an entire group to have dialogues electronically, versus participating in sequential information exchange. This resulted in improvement for (1) building upon each others' work, (2) alignment of individual work around a business plan, and (3) improvement in team communication, coordination and collaboration.

Linked to defining the degree of virtuality, researchers have provided stages or levels based on the ICT applications used. Collaborative systems can range from email, online discussion groups and Internet chat rooms to sophisticated Group Decision Support Systems (Lucas et al., 2003). The ideal virtual cooperation's specific ICT requirements are:

- distributed data processing and application-to-application connectivity,
- groupware for process integration,
- interoperable systems amongst the partners, and
- internal and external connectivity between individuals (Miers, 1999).

In the ideal situation the infrastructure requirements for virtual organizing include access, preferably using broadband, to worldwide secure networks, fully functional and interactive websites and portals; and access to all organizational, process and transactional information. With the infrastructure in place, the enterprise needs to ensure that all the information required by key players is available on demand and in a format that is readable and relevant to the user (Hales & Barker, 2003). Westland & Clark (1999) concluded that such applications could be grouped in five divisions: e-mail; enhanced fax; electronic data inter-exchange (EDI); transaction processing, supporting credit, claims, payment authorization and settlement of transactions; and groupware. Skyrme (1998) also provides ICT application examples related to his four levels of virtual infrastructure: physical infrastructure for connections; email, voicemail, fax, teleconferencing etc. for communications; EDI for conversation; and groupware for collaboration.

Based on the functions and requirements, current ICT applications can be placed on one of five levels (very low, low, neutral, high, and very high) of virtuality (see Table 2.4).

Level	Name	Characterized by	Example applications
1	Very low	Absence of ICT applications; mainly traditional communication technology	Telephone, Fax
2	Low	Traditional communication tools are still mainly used, ICT just acts as additional tool	Telephone, Fax, Email
3	Neutral	ICT plays a supporting role in communication, email and Internet are daily used	Email, Internet
4	High	Existence of a few basic advance ICT solutions, some business functions have been replaced by electronic version, however, those systems are not integrated	Video conference, EDI, Intranet
5	Very high	Fully integrated collaborative systems, most business functions have been replaced by electronic version	Groupware, Workflow system, Collaborative Networks, ERP/CRM systems

Table 2.4: Five levels of virtuality and example ICT applications

2.5.3 Summary

A virtual cooperation within an international strategic alliance can be defined as:

Cooperating companies or business units from different countries in an alliance that are linked by an ICT system in order to achieve mutual benefits by delivering products or services on the basis of common business understandings and a set of agreed goals and standards.

The ICT applications may vary from basic supporting communication to fully integrated collaborative systems.

The ICT application may change over time. Simple applications such as email systems are often used in the early stages of virtualization, while advanced solutions such as integrated ERP or groupware systems may be implemented in later stages. The highest level of virtual cooperation, within international strategic alliances, is regarded as a pure international virtual alliance.

2.6 Conclusion

Based on the strategic alliance and virtual organization literature, the concept of an international virtual alliance has been defined. Due to the lack of pure virtual alliances, the concept of virtual cooperation within international strategic alliances has also been defined. In order to identify the characteristics of virtual cooperation within international strategic alliances, the degree of virtuality and general ICT applications have been discussed. By extending Bauer & Koszegi's (2003) and Skyrme's (1998) findings, in this research we have summarized the degree of virtuality using five levels and also discussed example applications based on this. The main difference between virtual cooperation within an international strategic alliance and a virtual alliance is the degree of virtuality. The highest level of a virtual cooperation (using fully integrated collaborative systems) within an international strategic alliance is seen

as a pure international virtual alliance, and this is expected to be the future direction of Dutch-Chinese business cooperation.

In this research, alliances between Dutch and Chinese businesses that have implemented ICT applications beyond level one (see Table 2.4) will be considered as virtual cooperation to some extent. A basic model for such cooperation is presented in Figure 2.6.

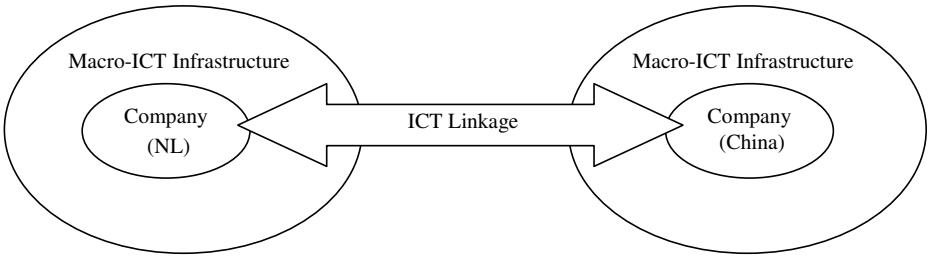

Figure 2.6: Model of virtual cooperation within Dutch-Chinese strategic alliances

From Figure 2.6, it is clear that companies from the Netherlands and China are linked by ICT systems in order to form a virtual cooperation within their alliance, and this cooperation is influenced by macro-contexts, such as macro-ICT infrastructure, and the companies themselves.

CHAPTER 3 FACTORS INFLUENCING VIRTUAL COOPERATION WITHIN INTERNATIONAL STRATEGIC ALLIANCES

3.1 Introduction

The success of international business cooperation is influenced by both external and internal factors. In particular, there are a number of influential external factors. As this research aims to investigate virtual cooperation within international strategic alliances, the attention regarding external influential factors will be focused on the macro-ICT infrastructure factors. Macro-ICT factors play an important role when using ICT applications within international business cooperation. The situation of macro-ICT infrastructures in the Netherlands and in China, and how this influences ICT use in business cooperation will be identified in this chapter.

Turning to the internal factors, the success of strategic relationships is driven by both structural elements and social elements. Starting and successfully continuing an international alliance is more troublesome than many managers expect, and there are many principal causes of failure or difficulties in business partnerships (Rodrigues, 1996; Griffin & Pustay, 1998; Van der Zee & Van Wijngaarden, 1999; Taylor, 2005). In the virtual environment, Davidow & Malone (1992) suggest that two key aspects of organizations, namely relationships and technology, must be successfully managed. This is in line with the observation that, on the one hand, organizations that are linked together to form a virtual cooperation should examine their policies, systems, structures, and culture to see if they support collaboration; and, on the other hand, the information technology systems that are used deserve special care, because they enable people to communicate across geographic and organizational boundaries (Cohen & Mankin, 1999). Following Davidow & Malone's suggestion, in order to identify the factors that influence the success of international virtual cooperation, relevant literature in the fields of international strategic alliances (focusing on relationships) and information system success (focusing on technology) need to be studied; short descriptions can be read in the following paragraphs.

In defining influencing factors on an effective and successful strategic alliance, Douma (1997) presents a fit model. Before going deep, the term 'fit', which is used in literature to describe the characteristics of an alliance, needs to be discussed. The concept of fit is normally a generic term to cover the nature of different relationships between alliance partners. Fit can be broadly described and translated as 'alignment' between the companies involved in an alliance (Douma, 1997), and it will be so applied in this research. In Douma's (1997) opinion, strategic fit is the starting point, followed by cultural fit, operational fit, human fit, and organizational fit. In his opinion, fit is primarily about whether successful cooperation is possible, given the

strategic backgrounds, objectives and organizational characteristics of the potential partners. This fit model is to an extent in line with Lasserre & Schutte (1995), who propose that there are basically four different types of fit: strategic, resources, cultural, and organizational that could influence an international strategic alliance. As a virtual cooperation is a heavy user of electronically-based information technologies, the ability and competences in the use of ICT deserve special attention and, therefore, technological fit should be taken into account (Davidow & Malone, 1992; Holland, 1998; DeSanctis et al., 1999). Combining the various fits mentioned, strategic, resource, cultural, organizational, and technological fits will be considered in this research. Since strategic fit is the starting point at the strategic level and the other four fits can be regarded as relevant at the operational level, the five fits will be grouped into two subgroups: strategic and operational as the major measures of fit in an international strategic alliance.

In order to identify the influential factors in the success of an information system (IS), researchers have offered various suggestions such as system importance, degree of virtuality, information quality, system quality, use, user satisfaction, individual impact, organizational impact (DeLone & McLean, 1992; DeLone & McLean, 2003; Seddon & Kiew, 1996; Dutton, 1999; Wassenaar, 1998; DeSanctis & Monge, 1998; Skyrme, 1998). In this research four aspects are selected and grouped as the ICT factors that influence the success of a virtual cooperation: ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality. The reason of the selection of these four aspects will be given in Chapter 4.

3.2 Macro-ICT infrastructure factors

3.2.1 Introduction

In commercial use, ICT became prevalent in large corporations in the 1960s and ubiquitous in all aspects of business by the 1990s. Its early use was primarily as an automating technology for transaction processing in functional areas and its impact on organizational structure was insignificant. Following further evolution, the electronic networks were seen as efficient ways to communicate beyond the formal boundaries of the organization including with suppliers (e.g. concerning JIT) and customers. It now plays an instrumental role in aspects of organizational structure and strategy. Just as the steam engine and telegraph drove the industrial revolution and the organizations it spawned (Rosenberg, 1982), computing power and modern telecommunications now herald the rise of new organizational forms and alternative ways of doing business. Electronic networks have become preferred ways to communicate, and are often touted as direct attacks on formal paper communications (Timmers, 1999).

The diffusion of ICT, especially the Internet, is one of the most rapid and extensive of any advanced technology in history. Like any widely adopted technology, the Internet is not just technical; it is seen as a huge network of computers spanning

the globe but also involving social, political, and economic dimensions (Wolcott & Goodman, 2003). The beginnings of the Internet can be found back in the 1960s and 1970s when the United States Department of Defence's Advanced Research Projects Agency (ARPA) began funding computer programmers who wanted to redesign the ways in which computers operated. In 1980, only 213 host computers, in less than a half dozen NATO countries, were connected. By 1989, only a few years after the ARPANET migrated out of the Department of Defense and became the Internet, connectivity jumped to more than 20 countries and 100,000 host computers. During the 1990s, annual worldwide growth in both hosts and users was often in the neighborhood of 100 percent and even much higher in some countries. The millionth host was connected in 1992. In 2003, over 200 countries could enjoy full TCP/IP connectivity, and in some accounts, over 500 million users could access the Internet regularly (Wolcott & Goodman, 2003).

The Internet has aroused great attention from governments, scientific research and educational sectors, entrepreneurial circles, and other fields with its flexible ways of connection, rich information resources, low costs, diversified information services and broad prospects of development. Electronic channels such as the Internet change the basis of wealth: innovation, communication, and information increasingly substitute for tangible products (Westland & Clark, 1999). The Internet's commercialization has outpaced that of any automation or communication technology in history. For instance, radio was in existence for 38 years before it reached 50 million people; television took 13 years to reach that milestone; cable TV took 10 years; the PC took 16 years; but the Internet took only four years after its commercialization in 1991, and the Web took less than five years after its introduction in 1993 (Westland & Clark, 1999). However, even in spite of its growth over the last decade, the Internet is used by less than 10% of the world's population, it is still less widespread than the telephone, or television, or radio. So further growth is still expected (Timmers, 1999). By September 2004, the number of people online worldwide reached 801.4 million, more than 13% of the total population (Global Reach, 2004). The Internet provides opportunities for both SMEs and larger enterprises. Especially the recent development: the price drop and wide spread of broadband connections, is acting as a key factor that increasing the possibilities for SMEs to compete successfully by utilizing technological advantages and innovations that used to be considered as more suitable for larger enterprises (Roberts et al., 2003). By this way, large companies can use value networks for outsourcing, and small firms can appear bigger as, virtually, they command more resources.

According to Cohen & Mankin (1999), implementing an integrated information system in a partnership requires a reliable and high-speed macro-network to support the information exchange. As the diffusion of the Internet is non-uniform, for instance, in the vast majority of countries especially developing ones, less than one percent of the population uses the Internet, while the majority of the world's Internet traffic at some point flows through a node located in the United States (Cohen

& Mankin, 1999), and only within the last few years does more of the Internet exist outside the United States than within it. In this sense, the imbalance of Internet diffusion in different countries/regions may create barriers for companies when forming international virtual cooperation. As this research focuses on the Netherlands and China, it is necessary to analyze the macro-ICT infrastructures both in developed (the Netherlands) and developing countries (China).

3.2.2 Characterizing the status of the Internet in a country

Foster & Goodman (2000) present a framework for characterizing the status of the Internet in a country, and it has been supported by many researchers (e.g. Wolcott et al., 2001; Travica, 2002). This framework consists of *dimensions* and *determinants*. The dimensions consist of six variables that capture the state of the Internet within a country at a given point in time. Determinants reflect the factors that led to the observed state and will likely influence future development. A useful analytic framework should be sufficiently rich that it captures well the multifaceted diversity of countries' experiences with the Internet. At the same time, the number of variables should be small enough that they can be easily kept in mind. Each of the variables should describe an important, somewhat intuitive, but measurable feature of the presence of the Internet in a country. In a sense, the variables should form a complete set in that they collectively cover almost everything that might reasonably be of interest, and each variable should have something to offer to the overall picture that the others do not. Finally, for the framework to be useful, it must be feasible to measure the values of the variables given a modest investment of resources (Foster & Goodman, 2000). The six dimensions used in assessing Internet diffusion are shown in Table 3.1.

Dimension	Description
Pervasiveness	Number of users per population.
Geographic Dispersion	Physical dispersion of infrastructure and access; primarily a function of the fraction of first-tier political subdivisions (states, provinces, governorates, etc) with Internet points of presence (POPs).
Sectoral Absorption	Extent of connectivity in four social sectors; education, commercial, health, and government.
Connectivity Infrastructure	Capacity of the technical infrastructure; primarily a function of the capacity of domestic and international backbones, and the types of access (e.g. modern vs. high-speed) available to users.
Organizational Infrastructure	Internet services market characteristics; a measure of the richness, robustness, and level of choice of the Internet service provision market.
Sophistication of Use	Integration, transformation, and innovation; a measure of the nature of Internet usage by a leading segment of the user community.

Table3.1: Dimensions of the diffusion of the Internet (Foster & Goodman, 2000)

Foster & Goodman (2000) propose that the Internet within a country at a particular point in time may be assigned to one of five levels (level 1 to level 5) along each dimension. Table 3.2 gives an example of these levels as applied in the dimension of the pervasiveness of the Internet in a country.

Level 1	Nonexistent: Internet does not exist in a viable form. No computers with international IP connections are located. There may be some Internet users in the country; however, they obtain a connection via an international telephone call to a foreign ISP.
Level 2	Embryonic: the ratio of users to population is of the order of magnitude of less than 1 in 1,000 (less than 0.1%).
Level 3	Nascent: the ratio of Internet users per population is at least 1 in 1,000 (0.1% or greater).
Level 4	Established: the ratio of Internet users per population is at least 1 in 100 (1% or greater).
Level 5	Common: the Internet is pervasive. The ratio of Internet users per population is at least 1 in 10 (10% or greater).

Table 3.2: The Pervasiveness of the Internet (Foster & Goodman, 2000)

In this chapter, Foster & Goodman's framework will be applied for analyzing Internet diffusion in China and Europe and especially perhaps the Netherlands.

3.2.3 Brief introduction of macro-ICT in Europe (the Netherlands)

The market for Internet networks and services in Europe has been liberalized for quite some time. The Netherlands is also very active in developing its ICT infrastructure. According to Internet World Stats' report, the Netherlands has a small but advanced telecom market, and in March 2005, Internet, broadband and mobile penetration in this country were all far ahead of the EU average (Internet World Stats, 2006). Regarding Internet usage, according to the ITU (International Telecommunication Union), there were 3.8 million in 2000 and 8.5 million Internet users in the Netherlands by the end of year 2003, which counted 52.5% of the total population of this country (ITU 1). While in Global Reach's statistics, by September 2004, there were 10.8 million Internet users in the Netherlands, which counted about 65.9% of the total population (Global Reach, 2004), and this number has been remained at the same level until June 2006 (Internet World Stats, 2006). The Netherlands has historically been a leader in the provision of broadband services, this country's concentrated demography and economic prosperity has leant itself to investment in advanced networks, including fiber and ADSL2+. In 2002, the Netherlands ranked ninth in the world in terms of the number of broadband subscribers, penetration rate, and as percentage of all Internet subscribers in the ITU report, with 4.5 million Internet subscribers and 1.17 million broadband subscribers. While according to the latest report, this country's broadband penetration in early 2006 is the highest in Europe. Much of this achievement is due the government's progressive Broadband Expert Group (BEG) which has promoted the broadband economy. Growth has largely followed the BEG's expectations, with a compound annual growth rate of 60% in data

traffic driving demand for more capacious connections. Bandwidth averages are expected to reach 10Mb/s by 2007, with many urban areas able to receive up to 24Mb/s, making the provision of triple play offers a viable option for many (Internet World Stats, 2006). Those figures show that although the Netherlands is a small country, it is one of the front-runners in the development of the information society. Through its active participation in international organizations at both European and world levels, it has been instrumental in the development of many instruments on the legal and technical aspects of network implementation. As a member of the EU, the Netherlands has implemented a large number of European directives in the area of telecommunications. This limits the freedom for action of the country in terms of creating its own rules on such topics as network security. However, the Netherlands compensates for this by being an active participant within the EU and thus stimulating the timely development of the necessary directives to promote the development of new applications and protect infrastructure and applications. As a result of the implementation of European directives and a generally open-minded approach to the law, the Netherlands has a liberal telecommunications environment, leaving the door open for self-regulation within the private sector (ITU 1). To summarize, Internet diffusion in the Netherlands is characterized in Table 3.3:

Dimension	**Details**
Pervasiveness	10.8 million Internet users, about 65.9% of population, common (level 5).
Geographic dispersion	Commercial Internet access available in all areas/regions (level 5).
Organizational infrastructure	Industrial competition: *fixed line telephone*: highly monopolized (level 4); *mobile communication:* high, several main players (level 5); *Internet*: high, door open for self-regulation within the private sector (level 5).
Connectivity infrastructure	in 2000, home of 7 of 78 Internet exchange points in Europe; in March 2005, Internet, broadband and mobile penetration in this country were all far ahead of the EU average (Internet World Stats, 2006) (level 5).
Sectoral absorption	very high in *connectivity in four social sectors: education, commercial, health, and government* (level 5).
Sophistication of use	small country, the education level among its populations is relatively high; PC penetration per household is very high (level 5).

Table 3.3: Internet diffusion in the Netherlands

3.2.4 Brief introduction to macro-ICT in China

"In the new century, liberty will spread by cell phone and cable modem … We know how much the internet has changed America, and we are already an open society. Imagine how much it could change China. Now, there's no question China has been trying to crack down on the Internet --- good luck. That's sort of like trying to nail Jello to the wall" (former President of the United States, Bill Clinton, 8 March 2000). This quote from Clinton shows what appears to be the general consensus in the West

and in particular in the United States: the development of the Internet will bring immense changes to authoritarian regimes such as China.

Along with the continued growth of the economy and the open door policy, the demand in China for high speed and multi-function communication has grown. The Chinese government has given much attention to the construction of the ICT infrastructure. Governmental efforts have already been put in place to provide the impetus, facilitated by China's entry and full membership in WTO, 2008 Olympics in Beijing, and 2010 World Expo in Shanghai (Efendioglu & Yip, 2004). With a population of over 1.3 billion, and the installed base of over 25 million PCs by mid-2003, and 45.6 million computer hosts by mid-2005, China's Internet market has become the fastest growing in Asia, and an important part of the global Internet economy.

During the 1990s, the telecommunications sector in China grew faster than the economy as a whole and was expanding at an annual rate of 30-50%. The number of fixed-line telephone users in China reached 111 million in 1999, and the total number of mobile communications network subscribers exceeded 40 million and was increasing by about 10 million each year. This meant that China had more than 10 phone lines per 100 people in 1999, up from 0.6 per 100 in 1985. China had become the second largest telecom market in absolute size, just behind the US. Going further, statistics show that, in the first quarter of 2002, China's fixed line users grew by 9.61 million to reach 188.65 million, and mobile users increased by 16.68 million to hit a total of 161.5 million (News, 2002) while, by the end of June 2003, the number of fixed phone users was 237.6 million and the number of mobile phone users had reached 234.47 million, which means for every 100 Chinese people there are 19.4 fixed telephones and 18.3 mobile phones (News, 2003). By September 2003, telephone users in China had risen to 500.44 million of which fixed-line subscribers totaled 250.47 million, against 249.97 million mobile phone customers. These figures show that China has overtaken the US in the number of phone users. Based on Ministry of Information of China's statistics, the number of telephone users in China exceeded 700 million (include 337 million fixed telephone users and 363 million mobile phone users) by mid-2005, and the number increased to 746 million by the end of 2005 (News, 2006a). The latest data show that the telephone users in China topped 791 million, which including 365 million fixed telephone and 426 million mobile phone users, and it is expected that this number could reach 820 million by the end of 2006, and 1 billion in 2010 (News, 2006b). Those data also show that it took two years for the number of telephone users in China from 100 million to reach 200 million in September 2000, and just took less than three years to reach 700 million from 400 million (News, 2005).

The growth of Internet users in China has also been dramatic. According to the CNNIC, the number of online users reached 68 million by mid-2003; 94 million by the end of 2004; and 103 million by mid-2005, making China the second largest Internet market in the world (CNNIC, 2006). However, based on the ITU's report on

Internet diffusion worldwide, China was only ranked 84th in terms of penetration rate in 2002. In addition, China has approximately 100 million Cable TV subscribers and about 300 million TV sets in use. Experts argue that lower prices for PCs, the high rate of government investment in telecommunications, the increasingly competitive Internet Content Provider market, and low-cost and fast-access through TV cable becoming widely available, will help spur the growth of China's online population.

Despite the rapid growth of Internet users in China, by Western standards, ICT diffusion in Chinese enterprises is relatively low (Mockler et al., 1999). After studying some joint ventures in China, Mockler et al. concluded that ICT diffusion in foreign invested and private companies in China was higher than in state-owned enterprises. In general, the survival-oriented companies that were still under strong government control utilized IS and ICT mainly to provide information for management activities, not to meet competitor pressures or nurture new business opportunities or improve customer service. In contrast, the growth-oriented state-owned companies were more likely to take advantage of the opportunities that ICT afforded them to develop strategic information systems. State-owned companies are only one part of China's ICT diffusion story, and they are rapidly becoming the smaller segment of the economy as privatization continues at a rapid pace. Joint ventures (often between state-owned national and privately-owned Western companies) are becoming the major driving force in the Chinese economy. Based on field studies of close to twenty Chinese joint ventures with established Western companies, it was clear that, in general, such joint ventures lead to greater advancement in ICT applications than does state ownership (Mockler et al., 1999). Liu (1997) found that many Chinese firms have set up joint ventures with foreign firms to assemble products, such as computers, digital and program-controlled communication equipment, using imported parts, according to technological specifications provided by their foreign partners. According to Mockler et al. (1999), the reasons that the joint ventures seemed to have an edge in making progress in ICT diffusion were:

- Western partners stimulated interest in the more rapid diffusion of ICT because of their awareness of, and experience with, advanced technology, and the competitive advantages arising from it;
- The ability of Western partners to provide guidance and technical assistance in the steps to be taken to diffuse ICT;
- The encouragement of Western partners for their Chinese partners to adapt basic information technologies to the special needs of Chinese business;
- The need in some instances to coordinate Chinese venture information systems with Western systems elsewhere in the world; and
- The government's requirement, in many instances, that advanced ICT should be transferred as a condition for joint approval.

Also, privately-owned Chinese companies were observed to be moving rapidly to increase the speed of ICT diffusion in order to remain competitive, especially in industries such as the chemical industry where ICT is important for running the business effectively and efficiently (Mockler et al., 1999). In 2000, International Business Daily published a report entitled: How Do Trade Companies View E-commerce in China. In this report, 628 enterprises in different provinces and cities in China were studied. The investigated enterprises were divided into export enterprises, foreign ventures, general enterprises, manufacturing enterprises and administrative departments. Among those companies, export and manufacture enterprises accounted for more than 30%, while general enterprises made up about 20%, and foreign ventures and administrative departments the rest. Some general findings about ICT usage were:

- 96.3% have access to the Internet. Of these enterprises, 73.2% logon through dial-up services, 19.3% through ISDN and 3.3% through Broadband access.
- 42.4% do not have an intranet; 31.8% have 5-20 terminals; 17.0% have 20-100 terminals; and only 5.4% have over 100 terminals.
- 58.9% have set up homepages, and 36.0% are planning to do so.
- 53.9% have joined foreign trade websites, and 36.7% are planning to join. A few have no intention to do so.
- 58.7% have installed office automation or export-import software. However, less than half of this group, or 25.8% of the total made use much of the software.
- Only 22.5% have exclusive connections to their respective administrative departments, and 22.2% are in the planning stages of such a move.

This report also observes that economic regions and municipal levels have marked influences over e-commerce applications. In other words, the more advanced the economy (the eastern region in comparison to the central provinces, and the central provinces in comparison to the western region), and the higher the municipal level (large cities in comparison to small townships), the better the e-commerce applications, including equipment and facilities (in terms of means of Internet access, intranet, establishment of websites and homepages, and software). Little variation was detected among the different types of enterprises. The analysis indicates that economic development also has a notable influence over the attitudes to e-commerce applications. The same is also true with municipal level, although to a lesser degree. In other words, the more advanced the economy or the higher the municipal level, the more positive were the attitudes expressed by enterprises towards e-commerce application. Little variation was detected among different types of enterprises. Investigation also shows that the basic e-commerce situation has a great impact on the attitude towards its application, i.e. the better the basic e-commerce environment, the more positive the attitude. This report shows the rate of ICT use in Chinese enterprises investigated is not low. However, turning to the question of ICT use in all

Chinese companies, the number of WWW sites compared with the total number of companies in China (more than 4 million), is still below 10%.

To summarize, Internet diffusion in China is characterized in Table 3.4:

Dimension	Details
Pervasiveness	103 million, No. 2 in the world by size, 7.9 % of population, established (level 4) (by June 2005)
Geographic dispersion	Imbalances between the east and the west; the inland and the coast; the large cities and small towns; etc (level 2).
Organizational infrastructure	Industrial competition: *fixed line telephone*: highly monopolized (level 4); *mobile communication:* high, several main players, all are state owned (level 5). *Internet*: high, many players, most of ISPs are stated owned (level 5).
Connectivity infrastructure	both satellite and terrestrial links; few broadband Internet subscribers (but increasing rapidly); by June 2005, its bandwidth reached 82,617M, 3,220 times that of 1997 (level 3).
Sectoral absorption	education sector is high (especially in universities/institutes and some secondary schools); low in other three sectors (level 2).
Sophistication of use	large country, large rural populations, not all 1.3 billion people will go online anytime soon; PC penetration per household is still relatively low (level 2).

Table 3.4: Internet diffusion in China

3.2.5 Conclusion

The framework for characterizing the state of the Internet in a country, discussed in section 3.2, will be used to compare Internet development in China and Netherlands. The table below gives an overview.

Dimension	The Netherlands	China	Comments
Pervasiveness *(Internet users)*	10.8 million, about 65.9% of population, common (level 5).	103 million, No. 2 in the world by size, 7.9 % of population, established (level 4) (by June. 2005).	Internet is more pervasive in the Netherlands.
Geographic dispersion *(Commercial Internet access)*	available in all areas/regions (level 5).	imbalance between the east and the west; the inland and the coast; the large cities and small towns; etc (level 2).	Internet infrastructure in the Netherlands is much better.
Organizational infrastructure *(Industrial competition)*	*fixed line telephone*: highly monopolized (level 4); *mobile communication:* high, several main players (level 5); *Internet*: high, open for self-regulation within the private sector (level 5).	*fixed line telephone*: highly monopolized (level 4); *mobile communication:* high, several main players, all are state owned (level 5). *Internet*: high, many players, most of ISPs are stated-owned (level 5).	except fixed line telephone, the competition for both mobile communication and Internet in the two countries are high.

Connectivity infrastructure	in 2000, home of 7 of 78 Internet exchange points in Europe; in March 2005, Internet, broadband and mobile penetration in this country were all far ahead of the EU average (Internet World Stats, 2006) (level 5).	both satellite and terrestrial links; few broadband Internet subscribers (but increasing rapidly); by June 2005, its bandwidth reached 82,617M, 3,220 times that of 1997 (level 3).	the connectivity infrastructure is improving rapidly in China even though it is still behind the Netherlands.
Sectoral absorption (*connectivity in four social sectors)*	very high in the four sectors (level 5).	education sector is high (especially in universities/institutes and some secondary schools); low in other three sectors (level 2).	the Netherlands clearly leads in sectoral absorption.
Sophistication of use	small country, the education level among its population is relatively high; PC penetration per household is high (level 5).	much larger country, large rural populations, not all 1,3 billion people will go online anytime soon; PC penetration per household is still relatively low (level 2).	the Netherlands clearly leads.

Table 3.5: Summary of comparison of Internet diffusion in the Netherlands & China

Based on Table 3.5, it is clear that the Netherlands is ahead of China in almost every dimension in the comparison except in terms of organizational infrastructure where the situation is comparable. However, as rapid improvement in China is expected to be made in the near future, the gap between China and the Netherlands in macro-ICT infrastructure is expected to narrow. Moreover, Mockler et al. (1999) find that difficulties in working with the Chinese language continue to hamper speedy and easy diffusion of information technology throughout all levels and segments of individual companies in China. By thinking and acting in the longer term, which it is doing by developing a structure with key ICT diffusion enablers in place, China will in all likelihood be able to overcome such problems and ensure its position as a formidable economic force in the decades to come (Mockler et al., 1999). However, there is one thing that needs to be kept in mind: the imbalance of ICT diffusion in different regions in China. In some well-developed regions, the ICT infrastructure could well support virtual cooperation, while in other parts; the weak ICT infrastructure could have negative impacts on virtual cooperation within international strategic alliances.

3.3 Strategic factors

In general, strategic factors are cooperating partners' strategies, objectives or motives, while the term strategic fit reflects whether these strategies, objectives or motives are mutually dependent and compatible, and the alliance is of strategic importance to the partners' competitive position (Douma, 1997). Firms may have different strategic

positions in terms of the strategic importance of a particular business activity and how it fits with the overall portfolio of the partners (Miles & Snow, 1986; Lorange & Roos, 1992; Das, 2006). Research has shown that if no fit exists between partners, and there are no signs of an improvement in this situation, that cooperation is not desirable (Niederkofler, 1991; Das, 2006). It is believed that a successful alliance is only possible when the partners have similar objectives (Douma, 1997; Lasserre, 1999; Murraya & Kotabeb, 2005). Lorange & Roos (1992) suggest the following aspects for measuring strategic fit among partners: strategic vision; compatibility of the partners' strategies; importance of the alliance; mutual dependency of the partners; internal and external added-values of the alliance; and stakeholder acceptance.

Strategic vision consists of the vision on the development of the market, and on opportunities and threats for the alliance partners in the market. Although similar strategies can be an important driver towards success in an alliance, it also frequently happens that partners have different strategies. Thus, strategies have to be carefully balanced (Lorange & Roos, 1992; Douma, 1997; Nielsen, 2003; Das, 2006). According to Porter (1985), there are three levels of strategies, namely corporate strategy, competitive strategy, and alliance strategy, that relate to alliances. Corporate strategy consists of the mission, strategic intent, and core competences that are concerned with the overall purpose and scope of the organization in order to meet the expectations of owners or major stakeholders and add value to the different parts of the enterprise (Porter, 1985; Johnson & Scholes, 1999). Competitive strategy deals with the strategy a company adheres to in gaining competitive advantage in its industry. It is a combination of the ends (goals) or outputs for which the firm is striving and the means (policies) by which it is seeking to get there (Porter, 1985; Chen, 2003). Alliance strategy is the building block of the alliance, and encompasses the direct objectives and motivations that a partner has for the alliance (Lorange & Roos, 1992). To ensure a thorough strategic fit, attention has to be paid to all three levels of strategy (Douma, 1997).

The importance of an alliance concerns the strategic importance of the particular business within which the strategic alliance is being contemplated, and how this fits the overall portfolio of a particular partner (Lorange & Roos, 1992; Murraya & Kotabeb, 2005; Das, 2006). In order to have a sufficient strategic fit, both partners should deem the alliance to be important for their organization. Harrigan (1988) comments on this by stating that at least a "medium strategic importance" should exist between the respective partners. A certain balance should be present in order to ensure the stability of the co-operation. Especially when one of the partners has a greater interest, or gains a greater interest, in the alliance, it is important that the other partner keeps sufficient interest in the alliance. The importance of the alliance can be determined by mutual dependency. Mutual dependency implies that partners need each other, and the alliance to achieve their objectives. Fundamental in this is the issue of complementarity. In general, the more complementary the partners, the greater the chance of success for an alliance. Complementarity of competences and

know-how, complementarity of resources, and complementarity of markets are three determining complementarities (Lorange & Roos, 1992).

Strategic fit is also dependent on the added value that the alliance could bring. The internal and external added values are determined by the extra value created by the alliance for the alliance partners' customers, and the extra value created by the alliance for the internal organization of both partners (Lorange & Roos, 1992).

When two partners engage in an alliance, this does not go unnoticed for the stakeholders who have an interest in both companies. Customers, shareholders, credit providers, the government and also competitors could react negatively to the combined efforts of the partners in starting an alliance. As a result, partners should investigate if the alliance obstructs the interests of their respective stakeholders too much, creating a misfit in the long term (Lorange & Roos, 1992).

To summarize, strategic fit is almost unanimously recognized as an important success factor in a strategic alliance. Strategic fit exists when both partners are determined to make the alliance work for their mutual success. It does not exist when one party, at least, is looking at the venture as a vehicle for extracting resources from the other partner for its own strategic agenda. Another form of strategic fit exists when the two partners share a common view about the objectives of the venture and about how to position the business and compete in the marketplace (Lasserre, 1999; Murraya & Kotabeb, 2005; Das, 2006). In this research, besides the strategic fit of the alliance, the strategic views regarding the use of ICT must also be taken into account (Sabherwal & Chan, 2001; Bradley et al., 2006). According to Scott & Lane (2000), common business goals and objectives or a shared vision is considered to be a prerequisite for ensuring the optimal use of ICT for supporting information exchange among business partners in a business network. As operationalisation in this research, five levels of fit, namely strong misfit, misfit, neutral, fit, and perfect fit, will be applied to describe the degree of mutual dependence and compliance of strategic factors between the cooperation partners.

3.4 Operational factors

3.4.1 Introduction

If the strategic fit between potential partners is limited, this does not have to mean that an alliance is not feasible, it can be overcome by an appropriate alliance design implemented by the respective partners. In the end, the operationalization of the alliance determines its success, and effective management can lead to positive results even if there are conflicts with certain strategies. Strategic fit can be seen as an indication of the alliance's potential and operational fit as an indication of its practical feasibility. Operational fit can be troublesome to achieve, as it requires the synchronization of many aspects. In order to develop or market the product or service intended by the alliance, organizational procedures, structure, human resources, cultures and other aspects should be combined by the partners. Operational fit is

therefore of great importance and they determine to a large extent and in the long run, if an alliance is successful (Douma, 1997; Arino, 2003). As discussed in section 3.1, resource, cultural, organizational, and technological factors have been selected as operational factors; the following sections will discuss each of these four factors.

3.4.2 Resource factors

The general reason behind business cooperation is use of resources, which firms need in common (Klofsten & Scharberg, 2000). All firms rely on other organizations for resources needed for their operations; as a result, firms can be viewed as connected to each other in multiple networks of resource and other flows (Gulati et al., 2000). According to Lorange & Roos (1992), regardless of underlying motives, a fundamental concern of each prospective strategic alliance parent is the question of how much of its resources to put into and retrieve from a strategic alliance. Alliances improve the strategic position of firms in competitive markets by providing the resources of other firms that enable them to focus on their core skills and competencies, and to share costs and risks in product design, production, marketing, or distribution with partners (Ohmae, 1989; Hamel et al., 1989; Shan, 1990; Chen, 2003).

Alliances will only succeed if each partner delivers something distinctive (Hamel et al., 1989; Tidd & Izumimoto, 2002). Partners may have different views as to what resources are, and their potential value. At one extreme of the input side, companies may wish to put in only organizational resources such as people, technologies, funds, and staff support. This assumes, however, that the initial strategic direction for the alliance will be the one pursued, without any contingencies to counteract unexpected strategic changes. At the other extreme, a parent may be willing to put in sufficient strategic resources for the strategic alliance to adapt to an array of potential changes in the environment, and so the strategic alliance would then be able to deal with opportunities and potential threats in a more freestanding manner (Lorange & Roos, 1992). As such, Nielsen states that “as few partners will possess all resources and capabilities deemed necessary, the desired task-related and partner-related capabilities should be prioritized according to importance in reaching the strategic objective of the alliance” (Nielsen, 2003).

In the virtual cooperation form, besides the above resources input to the alliance, the resources provided by the partners such as capital and personnel to ensure the establishment and operation of ICT systems must also be considered (Syler & Schwager, 2000). Thus, it can be concluded that resource fit, which requires the partners to be willing and able to contribute to the critical resources, assets and competences needed, is a key factor for alliance success and in the use of ICT systems. In operationalizing this factor, five levels of fit namely strong misfit, misfit, neutral, fit, and perfect fit will be applied to describe the degree of compliance of resources input from the cooperation partners.

3.4.3 Cultural factors

When going global, cultural factors clearly loom larger (Austin, 1991; Snow et al., 1999). National culture relates to the unique 'soft' features of a host country's 'way of doing things', and national cultural distance between countries has been associated with significant differences in their legal systems, administrative practices and working styles (Hofstede, 1980; Brouthers & Brouthers, 2001). Extensive empirical research has shown that the greater the national cultural distance, the larger the difference in terms of routines and practices (Hofstede, 1980). Companies that single-mindedly focus on the bottom line almost always end up in trouble, for a myriad of cultural factors also shape the eventual success or failure of a partnership (Ernst & French, 1996). Cultural fit involves individual corporate culture, industry culture, and national or ethnic culture, and differences in these cultures influence three major aspects of management of particular relevance in a partnership: business objectives, competitive approaches, and management approaches (Redding & Baldwin, 1991; Mead, 1994).

There are huge differences between the West and China, where business styles have deep roots in an ancient and enduring culture (Chen, 2003). Many Western firms have found difficulties in building strong and enduring relationships with customers or partners in China due to the large cultural barriers (Mead, 1994). The frequently discussed items are summed up as 'Guanxi' - personal relationships or connections, trust, language, ambiguity, and patience (Austin, 1990; Woo & Prud'homme, 1999; Child, 2001). Language barriers also play a key role in any Western-Chinese business cooperation. For instance, in most Dutch-Chinese business cooperation, English is often taken as the main communication language; however, according to Feely & Harzing (2004), typically, the second language users will have some proficiency, but not enough to be totally relaxed and effective in the communication, misunderstandings are therefore easily caused, resulting in uncertainty and anxiety. Misunderstandings are aggravated by the need to avoid a loss of face. The concept of "face" is much used when discussing Chinese culture, but in fact it applies to all nationalities. Nobody, least of all international managers of senior status, want to be considered stupid, ill informed or slow on the uptake (Child, 2001). Within all those cultural factors, Child (2001) points out that trust is important for teamwork and joint knowledge creation, for preventing opportunistic behavior, and for the creation of numerous other benefits. In contrast to the cultural bases for trust found in the East with the greater use of institutional bases of trust found in the West, he stresses the importance of developing strong personal bonds or what the Chinese call "relationship building". Child's thought is trust should be regarded as the 'heart' and a key factor among cultural factors of cooperation with a Chinese company, and this will be applied in this research.

In business relationships, Ring & Van de Ven (1994) define trust as 'the confidence that another organization will behave according to its expectations and that it will exhibit goodwill'. The expectation by one person, group, or firm of ethical

behavior, morally right decisions and actions based upon ethical principles of analysis on the part of the other person or party in an exchange, may be referred to as trust (Hosmer, 1995). Trust-building is a gradual process requiring a cumulative commitment to a relationship. A high level of attention to the development and sustainability of trust is required for ensuring successful business transactions and cooperative work. Trust may also be based upon the rational appraisal of a partner's reliability and competence, and upon feelings of concern and attraction. These factors may help to reduce awkwardness, complexity and uncertainty in social interactions and, therefore, make the collaboration effective (Hossain & Wigand, 2004). Trust and interpersonal relationships are seen as essential for understanding the role of communication media in collaborative work. Collaboration is seen as most effective and rewarding when the participants trust each other. It is suggested in a previous study that there are two types of activities: cognitive and emotional faculties must be established for developing trust. Cognitive-oriented activities may convey competence and reliability, and thereby increase confidence that a task will be successfully completed. Emotion-oriented activities may create an emotional bond, and help decrease fears of exploitation and increase feelings of mutual support for building trust (Hossain & Wigand, 2004).

Researchers suggest that the greater the degree of trust, the less conflicts the venture will have since each partner will have a defined role to play in the venture, and each of them will trust the other to perform its tasks in the correct way (Shapiro et al., 1992; Hart & Saunders, 1997; Krishnan et al., 2006).

Building and sustaining trust requires shared understanding. However, the difficulty of developing such shared understanding, for those only connected virtually, should not be underestimated. Handy (1995) questions whether virtual teams can even function effectively in the absence of frequent face-to-face interaction. The heart of Handy's argument centers on trust, and a belief that "trust needs touch". Handy states: "if it is even true that a lack of trust makes employees untrustworthy, it does not bode well for the future of virtuality in organizations. If we are to enjoy the efficiencies and other benefits of the virtual organization, we will have to rediscover how to run organizations based more on trust than on control. Virtuality requires trust to make it work: technology on its own is not enough" (Handy, 1995). Similarly, Hossain & Wigand (2004) give an example that audio conferencing may be substituted for and can even outperform face-to-face meetings, however, face-to-face communication was found to be more effective than audio conferencing for tasks which rely on interpersonal communication and are more complex in nature. In an empirical study in face-to-face versus virtual team settings, 411 subjects participated, communicating asynchronously via groupware technology. The results suggest that virtual teams are most effective in making decisions. However, a higher level of satisfaction was reported for the case of face-to-face communication when compared to virtual teams in this exploratory study (Schmidt et al., 2001). In Hossain & Wigand's (2004) opinion, trust is critical to ensure the optimal use of ICT to support the exchange

among business partners. It is suggested that the social exchange systems in which individuals, groups or organizations operate is critical to the development and sustainability of trust in an on-line or virtual environment. This is important as effective collaboration is seen to be largely dependent on the trust relations among different interest groups. Thus, they suggest that communication, trust development, and types of ICT use depend on time, space, culture, and the level of face-to-face communication support. And initial face-to-face communication is an essential prerequisite to establishing higher levels of trust among parties from geographically dispersed locations (Hossain & Wigand, 2004). The centre of Hossain & Wigand's argument is: trust for managing virtual collaborative relationships is increasingly seen as important so that optimal use of ICT for supporting collaboration is ensured. An electronic interface is not a substitute for face-to-face communication. However, ICT may be used to support further relationships once teams have experienced some level of initial face-to-face communication, and successful business transactions and cooperative work result from higher levels of trust among the participants.

In essence, collaboration involves personal relationships between people, and this becomes a real challenge in the virtual organization that cannot rely on informal contacts to build these relationships (Cohen & Mankin, 1999). If there is intensive use of ICT for communication, then non-verbal and informal contacts decease due to differences in space and time. Non-verbal contacts can be helpful in order to understand each other and to share knowledge. Often a lot of non-verbal aspects are lost when communicating using ICT, e.g. facial expressions and tone of voice, and it is difficult to interrupt or interact with messages (Hinds & Kiesler, 1995). For this reason, the way the media is used to distribute information becomes an important matter, since media can affect the way the message is obtained, and whether there is an opportunity for interaction (Daft & Lengel, 1990).

To summarize, cultural variations can cause major knowledge exchange/ transfer and communication barriers. When communication, trust and management system compatibility exist among partners, opportunism and uncertainty will be lower, and, as a consequence, cultural fit is positively associated with satisfaction (Lasserre, 1999). In this sense, cultural fit is the core in building a trust-based virtual cooperation within international strategic alliances. In operationalizing this factor, five levels of fit namely strong misfit, misfit, neutral, fit, and perfect fit will be applied to describe the degree of compliance of cultural factors of the cooperation partners.

3.4.4 Organizational factors

An alliance requires agreement about governance, generally through some sort of joint process. It entails some degree of inter-corporate integration among partners — less integration than an outright merger but more than with a simple buy/sell relationship. It is the governance framework that creates the umbrella within which the operating parties in the alliance can carry out their tasks with reliable support and

minimal day-to-day interference from the various businesses that are party to the alliances (De La Sierra, 1995; Gulati, 1998; Nohrman, 1999).

Organizational fit is described as a situation, in which the organizational differences are not hidden in the functioning of the alliance, and the partners have a shared vision of the alliance design, and the intended alliance design enables them to realize their objectives (Douma, 1997). The range of organizing structures means that firms face an array of choices in structuring their alliances (Gulati, 1998). As a result, the decision-making and control mechanisms used by partners should be conducted to achieve good communication and effective monitoring in order to realize their objectives (Lasserre & Schutte, 1995; Faulkner, 1995). The analytical challenge is less one of "fitting" structure to a particular situation and more about understanding the dynamic interplay between changes in interdependent relationships and changes in form (e.g., how new relationships necessitate design changes, and how new designs enable or inhibit the development of relationships) (DeSanctis et al., 1999). The central premise of co-dependency is the creation of structural similarities between the partnering firms over a variety of institutional rules, 'in a desire to achieve a fit, or become isomorphic with their normative environments' (Dacin, 1997). Four factors have been identified to determine the degree of organizational fit, namely flexibility, management control, complexity, and trust (Douma, 1997). In addition, another concept - bargaining power - is also frequently used in alliance design. Relative bargaining power depends on three factors: the initial strengths and weaknesses of the partners, how these strengths and weaknesses change over time, and the potential for competitive conflict (Bleeke & Ernest, 1991).

In the virtual collaborative environment with geographically dispersed groups, traditional social mechanisms for facilitating communication and decision-making are not present. Therefore, members must find new ways to communicate and interact and this has to be guided by business principles which promote trust among parties. The effectiveness of ICT for supporting ongoing collaboration is dependent on the rules and resources for supporting the interaction between the cooperating parties (Hossain & Wigand, 2004). Understanding the relationship of collaborative information technologies and changes in work and organization is critical to ensuring the optimal use of ICT for supporting collaboration. Therefore, the introduction of ICT needs to be supported by the social process. This social process in turn helps understand group behavior, which is essential for supporting technology-enabled group processes. Specifically, many organizations fall into the trap of taking technology for granted and believing that the introduction of ICT helps increase communication and thus increase productivity. For example, empirical studies of technology utilization for collaboration suggest that a common misconception in introducing Lotus Notes and similar technologies was that it would positively influence collaboration and problem-solving behavior (Hossain & Wigand, 2004). Four essential conditions therefore must be met in order to ensure optimal use of ICT for supporting collaboration. The conditions are: (1) understanding the need to collaborate; (2) user understanding of

the use and utility of ICT for supporting collaboration; (3) appropriate support for the adoption, implementation, and post-implementation phase; and, (4) an organizational culture for supporting collaboration. These conditions may be referred to as the social factors or organizational arrangements which guide the successful implementation of technological systems.

According to Galbraith (1994), in a virtual context, organizational design features that affect lateral, distributed work include the information systems infrastructure, communication norms and systems, planning, goal-setting, budgeting processes, and measurement, review, and reward systems (Galbraith, 1994). Lucas & Baroudi (1994) state that a new design variable of ICT deserves special consideration in the organizational design. From an information processing perspective, the basic function of organizational design can be seen as to create the most appropriate configurations of structures, processes and information technologies to facilitate the collection, processing, exchange and distribution of information. From this, the new organizational design variables are made possible through information technology. These design variables include structural variables (e.g. virtual components, electronic linking, and technological leveling), work processes (e.g. production automation and electronic work flows), and communications (e.g. electronic communications, technological matrixing and electronic customer-supplier relationships) (Lucas & Baroudi, 1994). The key in Lucas & Baroudi's suggestion is that the organizational arrangements of partners should be made, on the one hand, to suit the requirements of the alliance and, on the other hand, to fulfill the use of ICT systems. Thus, organizations that are virtually linked together should examine their policies, systems, and structures to see if these support the collaboration (Williamson, 1991; Cohen & Mankin, 1999; Wiesenfeld et al., 1999), and could overcome many barriers mostly in terms of management and technology (Wagner et al., 2004).

To summarize, organizational fit can be assessed by aspects such as the similarities and differences of the partners, their shared vision on alliance design and the virtual cooperation design, resolution of conflicts, and a shared vision on the policies and structures for ICT systems. This last point is essential in operating ICT systems within international strategic alliances. To operationalize this factor, five levels of fit namely strong misfit, misfit, neutral, fit, and perfect fit will be applied to describe the degree of compliance of organizational factor from the cooperation partners.

3.4.5 Technological factors

Technology in traditional organizations tends to focus on production capabilities, whereas in virtual organizations it tends to embrace the "informate" and "transformate" parts of the technology factor. Since virtual cooperation is a heavy user of electronically-based information technologies, any ICT systems that are used deserve special comment because they enable people to communicate across geographic and organizational boundaries (Davidow & Malone, 1992; Holland 1998;

DeSanctis et al., 1999). Without technology to link the nodes in an organizational network, virtual cooperation could not exist. ICT is an enabler and a prerequisite to guarantee the efficient coordination of activities along the value-adding process. Many researchers consider ICT to be of central importance in virtual cooperation. In Wagner et al.'s point of view, participating in a complex and demanding form of cooperation such as the virtual cooperation can be very demanding: new environment, new business processes, and new technologies (Wagner et al., 2004). According to Cascio (1999), technology also plays an instrumental role in that it affects aspects of organizational structure and strategy, so influencing the success of a virtual cooperation. Thus, technological fit is, on the one hand, the ability to adapt the ICT and, on the other hand, the extent of the differences between the product and production technologies of the partners. In this research, the focus will be on the former part, in which the technological fit mainly concerns the ability of the cooperating partners to implement and operate the ICT system. Where there are differences or gaps between the partners, or a misunderstanding of each other's technologies involved, problems may arise (Ford et al., 1998; Hamel & Prahalad, 1994).

The distributed nature of virtual cooperation requires integration on both a social and on a technical level, which can be divided into the 'soft' and 'hard' components of ICT. The 'soft' part of ICT is regarded as the technological fit discussed in this section, and the 'hard' part will be analyzed in Section 3.5, as ICT factors.

To summarize, the key points regarding technological fit are, on the one hand, a company's ability to bear the weight of its electronic partnership process, which requires an inter-enterprise system capable of providing a clear view of the data exchanged and shared between the functionally-and-geographically distributed partners in a coherent manner (Cohen & Mankin, 1999). On the other hand, capable IT related personnel are needed because even when advanced technology is available, if it is not properly utilized by knowledgeable people, in a controlled manner, its capabilities are neutralized and the operation can be compromised (PWC, 1999). Thus, technological fit is the key in constructing and successfully operating ICT systems. To operationalize this factor, five levels of fit namely strong misfit, misfit, neutral, fit, and perfect fit will be applied to describe the degree of compliance of technological factors of the cooperation partners.

3.5 ICT system factors

3.5.1 Introduction

In identifying the influential factors in the success of an information system (IS), academics have made various suggestions. According to DeLone & McLean (1992), six IS success categories, namely: information quality, system quality, use, user satisfaction, individual impact, and organizational impact, of which information

quality and system quality act as the main independent variables, can be used to measure information system success. Their work was supported by Seddon & Kiew (1996). However, Seddon & Kiew produced a modified version, in which they suggest adding a third independent variable: system importance. In addition, as discussed in Chapter 2, the *degree of virtuality* must be considered when discussing inter-organizational relationships (Dutton, 1999; Wassenaar, 1998; DeSanctis & Monge, 1998; Skyrme, 1998). Therefore, in this research, four aspects: ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality are selected and grouped as ICT factors that influence the success of a virtual cooperation (details of the selection will be discussed in next chapter).

3.5.2 ICT system importance to the alliance

Theoretical bases for the ICT system importance to an alliance are hard to find, since system importance is an objective factor usually defined by the end-user of the system. Hence, analysis of this issue is based on the limited relevant literature.

The strategic intensity raster developed by McFarlan & McKenney is an important tool in defining the impact intensity of an ICT system on the core business activities. They define ICT system intensity as the extent to which supporting ICT strategically impacts on current and future business activities since they believe:

- ICT can generate barriers against new entrants,
- ICT can change the basis of competition,
- ICT can generate new products,
- ICT can build-in switching costs, and
- ICT can change the balance of power in supplier relationships.

Regarding system intensity, they suggest two measurements that can be used:

- Strategic consequence and impact of the current IS;
- Strategic consequence and impact of the possible IT applications in the future (McFarlan & McKenney, 1992).

Their framework is shown in Figure 3.1, accompanied by an overview of the level of importance related to their theory.

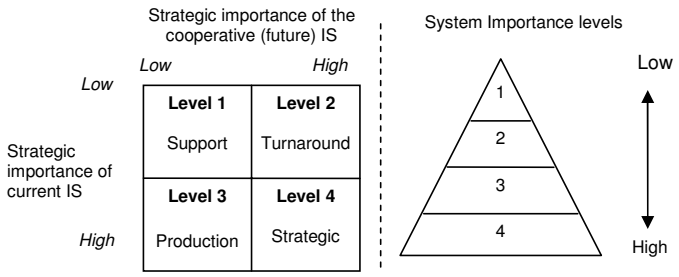

Figure 3.1: The strategic raster proposed by McFarlan & McKenney (1992)

Figure 3.1 indicates that there are four levels of ICT system importance namely: support, turnaround, production, and strategic, and partners in a virtual cooperation could be located on any of the levels.

The information intensity raster is developed by Porter & Millar (1985). They suggested a framework that defines the intensity of an Information System that is to an extent duplicated in McFarlan & McKenney's raster discussed above, in order to define the intensity of an Information System, by studying the impact of information and information technologies on the transformation, processing and structuring of products leading to competitive advantages. According to them, the information intensity of products and services has to be assessed before gaining an information advantage. Their model can be used to estimate the overall potential of IT to achieve a strategic advantage by measuring both the information exchange in the value chain (shown on the vertical axis in Figure 3.2) and the information content of the product itself (shown on the horizontal axis of Figure 3.2). Similar to McFarlan & McKenney's strategic raster, Porter & Millar's framework also uses four levels of information intensity namely: other factors are dominating, no evidence, IT is important, and IT is crucial.

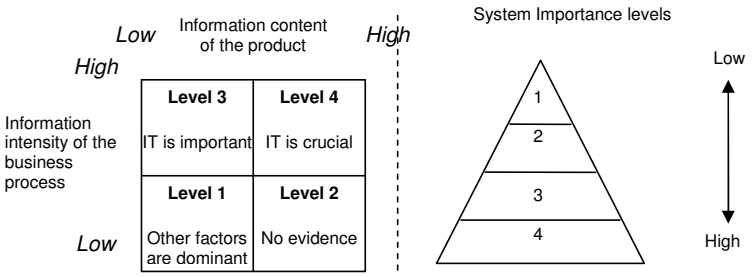

Figure 3.2: The information intensity raster by Porter & Millar (1985)

DeSanctis et al. (1999) suggest the interdependency factor to describe virtual organizations as global networks of internal and external ties, in which relationships between the nodes in a network play an important role. Interdependency is described as 'the extent to which an entity (such as a person, organizational unit or firm) in this global network is determined, influenced or controlled by another entity'. Moving from traditional organizational forms to virtual forms, interdependency has to be carefully reviewed since virtual interdependency requires multidimensional perspectives, and the following changes can be expected:

- Increasing number of interdependencies;
- Increasing external interdependencies;
- Increasing lateral interdependencies;
- Increasing structural complexity;
- Resource exchange will be more knowledge-based;

- Interdependency duration becomes shorter;
- Increasing number of unanticipated interdependencies;
- Dynamic interdependencies.

To summarize, ICT system importance is strongly influenced by the extent of the dependency on the core competences of both partners (DeSanctis et al., 1999); it is also influenced by the impact intensity of the ICT system on the business activities (McFarlan & McKenney, 1992). Thus, it is concluded that the higher the degree of dependency and impact intensity, the higher the degree of ICT system importance to the cooperation; and that ICT system importance is also a basic requirement for the success of a virtual cooperation within international strategic alliances. In this research, five levels of ICT system importance to the alliances will be applied (see table 3.6).

Level	Name	Characterized by
1	Very low	ICT systems are not regarded as useful, traditional communication tools are still in the dominant position.
2	Low	ICT systems are not regarded as important but additional/optional tools; traditional tools are still major channels for communication.
3	Neutral	ICT plays a supportive role, however, no strategic importance.
4	High	ICT systems have been major tools for communication; strategic importance of the systems has been recognized.
5	Very high	ICT systems are central and strategically important to the company.

Table 3.6: Levels of ICT system importance to the alliance used in this research

3.5.3 Degree of virtuality

As discussed in Chapter 2, a virtual alliance should recognize ICT's impact on all areas of business: strategy, planning, operations, finance, law, customers and suppliers, and its implications for customer value and shareholder wealth. However, few alliances have adopted fully-integrated ICT systems or achieved the so-called pure virtual alliance. It is necessary to be able to define the levels of virtuality so that one can classify virtual cooperation at different levels. Measuring virtuality provides an enterprise with a quantifiable link between its organizational use of ICT and its capacity to meet its strategic objectives. For all firms, their virtuality is a matter of degree; a high degree of virtuality implies an extensive dispersion of the workforce and an extensive use of ICT to communicate (DeSanctis & Monge, 1998). Issues that relate to the degree of virtuality have been discussed in Chapter 2, while the relationship between the degree of virtuality and other factors will be analyzed in Chapter 5. In Chapter 2, five levels of virtuality, namely very low, low, neutral, high,

and very high, and related ICT applications have been discussed, and details are provided in Table 2.4.

3.5.4 ICT system quality

According to Hamilton & Chervany (1981), ICT system quality concerns the ability of the information system to fulfill users' quantitative and qualitative needs and expectations. Similarly, Seddon et al. (1999) in defining system quality focus on the performance characteristics of the system under study, and are concerned with whether or not there are 'bugs' in the system, the consistency of the user interface, ease of use, response rates in interactive systems, documentation, and the quality & maintainability of the program code. They suggest that ICT system quality plays an important role in influencing the success of an information system, and the higher the system quality, the higher the degree of success of the information system. Govindaraju (2002) presents a similar view by using different terms to identify the relationship between ICT system quality and the success of an information system. Table 3.7 provides an overview of previous research regarding aspects for measuring ICT system quality.

	Hamilton & Chervany, 1981	Seddone et al., 1999	Govindaraju, 2002
Aspects	Response time Turnaround time System reliability Completeness System flexibility Ease of use	 User interface consistency System reliability Complexity Quality & maintainability/flexibility Ease of use	 User interface Efficiency of the rearranged process Complexity Flexibility Compatibility with users needs/ease of use

Table 3.7: Aspects of ICT system quality

From Table 3.7, system reliability, completeness, system flexibility, and ease of use are suggested by all the academics, and they are selected as variables for measuring ICT system quality. System reliability concerns the extent of system failures; completeness is the degree to which the system matches the needs of users; flexibility relates to the ease of extension of the system; and ease of use is about system functionality. By analyzing these four variables, ICT system quality of cooperating partners in this research will be placed on one of five levels (see Table 3.8), and the fit of ICT system quality between the partners can also be placed on one of five levels namely: strong misfit, misfit, neutral, fit, and perfect fit. The quality of the ICT system is seen as the key to the success of a virtual cooperation within international strategic alliances.

Level	Name	Characterized by
1	Very low	Very slow response time of performed request, very high degree of system failures, very low reliability, inflexibility, very high need of end-user training, very low security level.
2	low	Slow response time of performed request, high degree of system failures, low reliability, inflexibility, high need of end-user training, low security level.
3	Neutral	Acceptable response time, acceptable degree of system failures, acceptable reliability, limited possibilities for adding applications, user training necessary, and start of awareness concerning security setting.
4	high	Quick response time, high system reliability, flexibility / easy to add applications, few system errors, and high security settings.
5	Very high	Very quick response time, very high system reliability, flexibility / easy to add applications, no or very few system errors, and very high security settings.

Table 3.8: Levels of ICT system quality used in this research

3.5.5 Information quality

Fundamentally, information is the glue that holds together the structure of all business, while a company's value chain consists of all the activities it performs to design, produce, market, deliver, and support its product (Evans & Wurster, 1997). Rayport & Sviokla (1995) noted that Porter's Value Chain model treats information as a supporting element of value creation and not as a source of value. For instance, managers often use information that they capture on inventory, production, or logistics to help monitor or control such processes, but they rarely use information itself to create new value for the customers. They further elaborate that a virtual value chain involves a sequence of five activities: gathering, organizing, selecting, synthesizing, and distributing information. The contribution of the virtual value chain concept is that it highlights the informational part of business processes, which is one of the two sides of the value chain – the physical and virtual aspects of the value chain. The relationship between the physical value chain and the virtual value chain lies in the information linkage. A well-known example is Boeing's development of a new engine for its 737 aircraft. Boeing engineers developed the prototype engine as a digitized 'virtual' model that could be tested in a newly developed virtual wind tunnel (Rayport & Sviokla, 1995). Thus Boeing examined the physical processes, including design, digitized these where possible and mirrored them in a digital space and thus created an entirely new cost-effective design paradigm. The use of information and the final outcome of this process effectively illustrate how information can become a tangible asset. Hales & Barker (2003) proposed a virtual value creation model as shown in Figure 3.3.

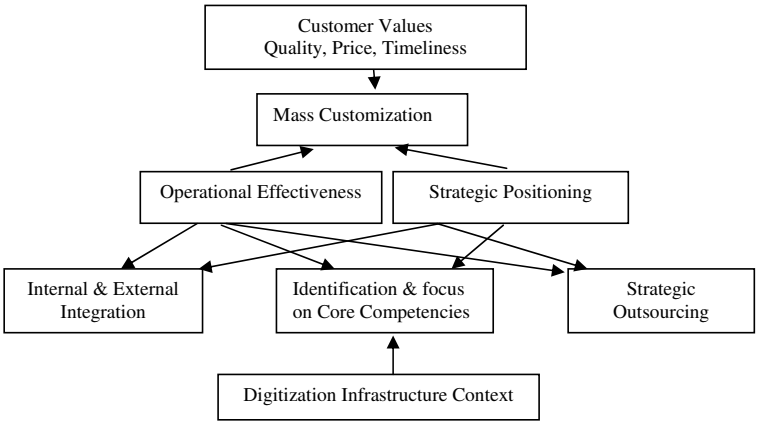

Figure 3.3: Virtual value creation model (Hales & Barker, 2003)

According to Hales & Barker (2003), the involved stakeholders in cooperation need fast, reliable and current electronic access to relevant information. Integration of the information that they require and its presentation through a consistent user interface portal, is an essential daily business need. Information integration is only possible if there are appropriate infrastructure linkages, and if the various internal and external applications can exchange information in a way that can be understood and presented in a consistent consolidated format (Hales & Barker, 2003). In this sense, compared with face-to-face interaction, the social and normative context may be of even greater importance in computer-mediated communication. Given geographic dispersion, coordination is heavily dependent on telecommunications and data networks, rather than physical travel, and therefore the quality of information will certainly influence the trust between the people involved (Kraut et al., 1998). There is a criterion of a minimum system performance necessary for trust. If the ICT system performs above the criterion, users will trust it; if it fails to meet the criterion, users will not. The quality of the information provided by both partners seems to be a highly important element in trust building between partners in virtual cooperation (Fox, 1996).

Various sources provide relevant aspects for measuring information quality. Govindaraju (2002) suggested that reliability, accuracy, format, completeness, and currency are the four major aspects to measure information quality. According to NIST (National Institute of Standards & Technologies in the United States), measuring the quality of information produced by an information system can be based on (1) the utility of the information, (2) the integrity of the information, and (3) the objectivity of the information (NIST, 2003). Redman (1996) stated that the information has to be clear, complete and correct to avoid misunderstandings in interpretation. Bailey & Pearson (1983) argue that information quality can be best measured by the user-satisfaction element. They further provide the aspects and the relevant characteristics that are shown in Table 3.9.

Aspect	Characteristics
Accuracy	The content of the information provided should exactly fulfill the needs of the requesting party.
Precision	The content of the information provided should be *precise* and *complete.*
Currency	The information should be *up-to-date* and usable at the moment of request.
Timeliness	The information provided has to be delivered at the right time, preventing an overload of unnecessary information.
Reliability	The information provided and the data source should be *highly reliable.*
Completeness	The information requested should be *complete.*
Conciseness	The information should be *short but complete.*
Format	The format of the information should be generally used by both partners.
Relevance	The information provided should be *relevant* for the purpose of the request.

Table 3.9 Aspects & Characteristics of information quality (Bailey & Pearson, 1983)

To summarize the various sources, Table 3.10 provides an overview of those suggested aspects for measuring information quality.

	NIST, 2003	Redman, 1996	Bailey & Pearson, 1983	Govindaraju, 2002
Aspects	Helpfulness Availability Usefulness Reliability Accuracy Extent of unbiased provision Ease of use Degree of improper access	Clarity, Composition Obtainability and consistency of values Relevance Accuracy Completeness Currency Format Efficient use Portability Precision / flexibility Consistency	 Conciseness Relevance Reliability Accuracy Completeness Currency Format Timelines	 Reliability Accuracy Completeness Currency Format

Table 3.10: Aspects of information quality

From table 3.10, accuracy, currency, conciseness, completeness, reliability, and format are selected as variables in measuring information quality because they are mentioned by most of the researchers. By analyzing these aspects, the information quality found in this research can be classified using five levels (see Table 3.11), and the fit of information quality between the partners can also be placed on one of five levels namely: strong misfit, misfit, neutral, fit, and perfect fit.

Level	Name	Characterized by
1	Very low	Information provided by the system is always unavailable, not relevant, and not up-to-date; large difference in format and standard of the information; always confusion and misunderstanding caused by the information.
2	Low	Information provided by the system often is unavailable, not relevant, and not up-to-date; difference in format and standard of the information; confusion and misunderstanding caused by the information often occur.
3	Neutral	Information provided by the system is somehow available and relevant, however, up-to-date information is not quick; standard format is used in some functions.
4	High	Information provided by the system is available and relevant, and it is up-to-date frequently; high standard of format.
5	Very high	Information provided by the system is always available and relevant, and it is up-to-date frequently; very high standard of format.

Table 3.11: Levels of Information quality used in this research

3.6 Conclusion

From the literature study, several factors, namely macro-ICT infrastructure, strategic, operational (resource, cultural, organizational, and technological), and related ICT factors (ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality) that influence the success of virtual cooperation within international strategic alliances have been selected. The macro-ICT infrastructure is seen as the external factor while, of the internal factors, strategic and operational fits are mainly drawn from strategic alliance literature, and are used to describe the relationships between cooperating partners, whereas ICT factors come from the information system literature, which are more in the technology area. As this research aims to investigate virtual cooperation within international strategic alliances, the macro-ICT infrastructure, strategic and operational factors act as independent variables, and ICT factors act as intermediate variables that influence the virtual cooperation. The three groups of factors are building blocks for the research model and can be visualized as in Figure 3.4. The relationships between these factors will be discussed in Chapter 5.

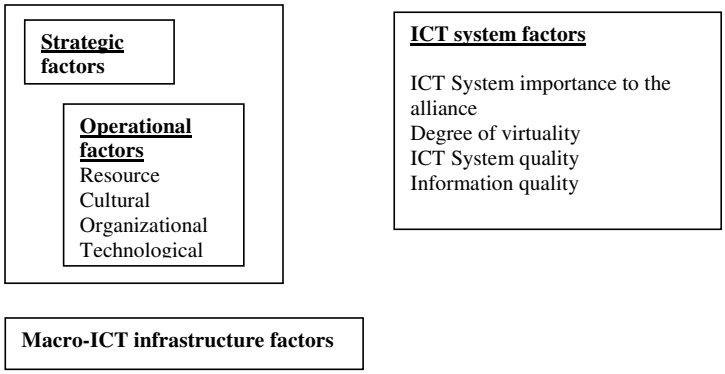

Figure 3.4: Identified building blocks of influential factors to virtual cooperation within international strategic alliances

CHAPTER 4 SUCCESS OF VIRTUAL COOPERATION WITHIN INTERNATIONAL STRATEGIC ALLIANCES

4.1 Introduction

In order to determine the success of virtual cooperation within international strategic alliances, clear measuring instruments must be defined. As discussed in Chapter 2, the term virtual cooperation within international strategic alliances relates to the concepts of strategic alliance and virtual organization. Therefore, the measurements applied in this research will be defined based on the related success of the strategic alliance and the success of virtual organization. However, since the concept of virtual organization is still new, general measures of success for such virtual form are hard to find. Most previous works have focused on the success of information systems, and mainly were describing the use of an information system in a single organization rather than in the inter- or intra-organizational setting. In extending and developing the needed measurements for this research, these previous works on the success of information systems will be used as the basis and be applied to inter- and intra-organizational settings.

4.2 Success of international strategic alliances

4.2.1 Introduction

Speed and scale are important in the Internet economy, and alliances are often a faster and less capital-intensive way to gain access to products, customers, and business capabilities than building them from scratch. However, the first wave of alliances proved to be singularly unsuccessful. They ran into difficulties as a result of pitfalls such as an over-ambitious scope, a failure to contribute assets at the outset, and unworkable governance structures (Ernst et al., 2001). These realities highlight the need for research that can provide insights into factors underlying the success and failure of alliances (Arino, 2003; Taylor, 2005).

According to Gulati (1998), the performance of alliances has received less attention than other areas because of certain onerous research obstacles, which include measuring alliance performance and the logistical challenges of collecting the rich data necessary to assess these issues in greater detail. As a result, it remains one of the most exciting and under-explored areas. Going further, Gulati (1998) argues that an important issue for an alliance is the performance consequences, both in terms of the performance of the alliance relationship itself and the performance of the firms entering the alliance. He suggests two questions that focus on the performance issue:

(1) what factors influence the success of alliances; and (2) what is the effect of alliances on the performance of firms entering them that need to be answered.

4.2.2 Measurements of the success of strategic alliances

To provide an overview of the traditional measures of an alliance, Anderson (1990) developed the 'input-output continuum', which contains five groups of variables namely: the status of the venture organization, learning, marketing intermediate variables, marketing measures of performance, and financial measures (Figure 4.1).

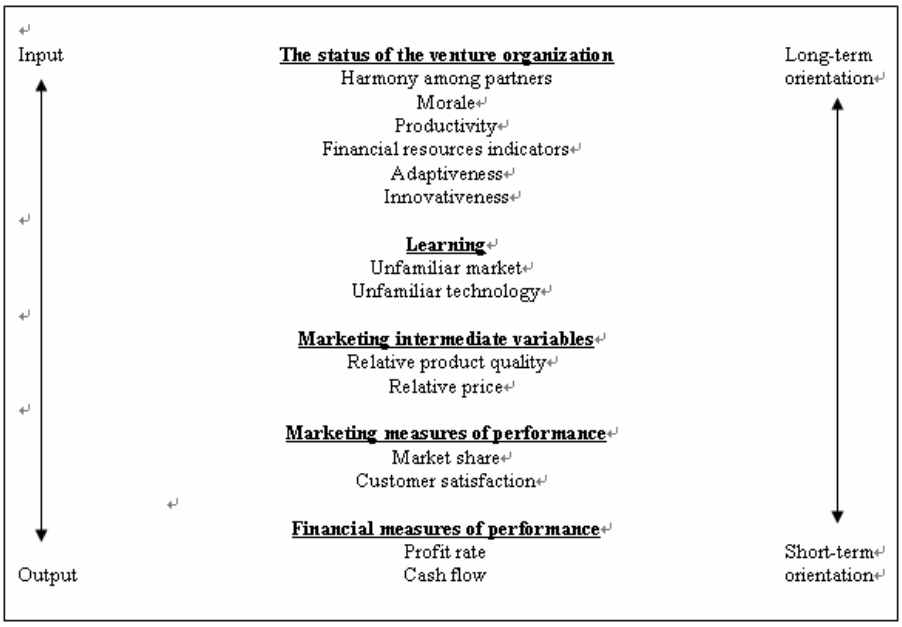

Figure4.1: The Input-output Continuum for an alliance (Anderson, 1990)

Anderson suggested that the traditional financial indicators can be an appropriate measure of strategic alliance performance; however, these have a short-term orientation and all the stages of an alliance must be considered. Therefore, affective measures such as the level of mutual trust, commitment, harmony, and the satisfaction of one party with the other also need to be taken into account with respect to long-term goals (Anderson, 1990).

Anderson's view is supported by Gulati (1998), who states that each strategic alliance naturally has unique characteristics. Therefore, it is virtually impossible to give a prescription for performance appraisal that is valid for more than a limited number of cases. Although many firms evaluate strategic alliances very much in the same way as wholly-owned divisions, such general procedures for measuring organizational performance are likely to be misleading. Traditional short-term-oriented financial measures are not valid because the risky setting in which many

alliances are formed lead to uncertainties which are very difficult to incorporate in the planning process. In summarizing other researchers' works, Gulati suggests that besides financial indicators, measurements such as the achievement of objectives, strategic intents, survival, stability, confidence and trust in each other can also be applied (Gulati, 1998).

Lasserre (1999) concludes that there are two types of measurements to measure one of the alliance forms: joint venture outcomes. One is survival or dissolution through liquidation or acquisition, and the other is the satisfaction of one or both partners. He suggests that in order to assess success, one could try to use objective measurements such as return on investment, growth, market share, or shareholder value. However, this approach has two pitfalls: firstly, it is impractical on a large scale. Secondly, these measures would be biased and incomplete, since, in many cases, tax considerations, transfer pricing practices or simply competitive secrecy would make the data questionable. Therefore, the subjective appreciation of satisfaction or dissatisfaction of the people involved in the management reflects an important dimension of joint venture performance regardless of whether the joint venture is financially or commercially successful (Lasserre, 1999). Lasserre presents five aspects with regard to the international joint venture partners' satisfaction:

- First, is the instrument essential in achieving their objective: i.e., is the joint venture needed for entering the host country market. This is called the utility requirement.
- Second, whether the cooperation cost is minimized; i.e., is the behavior of the local partner aligned with the foreign investor. This is called the alignment requirement.
- Third, whether the local partner's objectives are congruent with the foreign partner's objectives. This is called the strategic fit requirement.
- Fourth, whether the foreign company can exercise control over the governance of the joint venture, this is called the control requirement.
- Finally, whether communication, understanding and trust, between the partners can redress their differences. This is the cultural fit requirement.

Douma (1997) concludes that there are three possibilities that are prominent in the literature regarding measurements of success of strategic alliances: the status of the alliance, the synergy gained, and the degree of goal realization. According to Douma, the status of an alliance would probably be the simplest measure of success, and it mostly appears in terms of stability, and long term survival. Stability was defined as the absence of unplanned or premature events from the perspective of either partner, or a joint deliberation on the respective scope, resource deployment and synergy (Thskur & Srivastava, 2000). On this point of view, researchers suggest that successful strategic alliances tend to be more stable and survive longer, driven by more complete information as partners learn about each other and therefore know how

to behave towards one another (Parkhe, 1993; Sim & Ali, 2000; Thskur & Srivastava, 2000).

Synergy is an abstract concept, often deployed in alliance negotiations (Douma, 1997). Spitholt (1991) defines synergy as "the positive difference between the value of the combined elements, and the sum of the value of the individual elements" (Spitholt, 1991). The idea of gained synergy is supported by extensive literature that regards commitment, collaboration, communication, trust, and conflict resolution as important attributes of alliance relationships (Cummings, 1984; Anderson, 1990; Barney & Hansen, 1994; Zaman & Mavondo, 2001). The existence of these attributes implies that both partners acknowledge their mutual dependence and their willingness to work for the survival and prosperity of the relationship. Commitment suggests a future orientation in which partners attempt to build a relationship that can weather unanticipated problems. A high level of commitment provides a context in which both parties can achieve individual and joint goals without raising the specter of opportunistic behavior (Cummings, 1984). Indications of commitment include investment by the participating organizations, exclusive agreements between the organizations and the absence of major conflicts between the organizations (Anderson, 1990). Committed partners are likely to be more cooperative, communicative and flexible in accommodating conflict issues, and the higher level of commitment to the alliance relationship is positively related to alliance success (Zaman & Mavondo, 2001). Studies also suggest that one critical factor in determining alliance performance is the degree of trust between alliance partners (Bleeke & Ernst, 1993; Smith & Barclay, 1997). Indeed, it has been argued that trust is so important to alliances that it is considered the "cornerstone of the strategic partnership success" (Spekman & Mohr, 1996) since the existence of trust in a relationship reduces the perception of risk associated with opportunistic behavior (Gulati, 1998). When an alliance is global, the cultural issues become more important. Both strategic intent and cross-cultural differences play important roles in shaping the managerial process of forming strategic alliances (Zaman & Mavondo, 2001). The ability to cooperate over time by building trust and by having appropriate interactions on business matters that lead to cooperation and common learning becomes essential. Moreover, Zaman & Mavondo (2001) argue that the more successful alliances will exhibit higher levels of: (a) quality communication; (b) information sharing; and (c) participation in planning (Zaman & Mavondo, 2001).

The degree of goal realization can be used as a qualitative evaluation of the success of alliance (Douma, 1997). Such conclusion is supported by Arino. According to Arino (2003), different types of measure correspond to different levels of performance. Financial measures include various measures of profitability, growth and cost position. Operational measures include stability measures such as longevity of the strategic alliance ownership or contract stability, and survival. The most commonly used organizational effectiveness measure is an overall assessment of the firm's satisfaction with strategic alliance performance, and other organizational

effectiveness measures used include how well the strategic alliance had fulfilled its strategic goals, and the net spillover effects of the strategic alliance on the firm's other activities. In Arino's opinion, we may recognize three levels of performance that depend on the goals under consideration: financial performance, operational performance, and organizational effectiveness. Organizational effectiveness is the most comprehensive of these three, which if profitability is a specific goal, then organizational effectiveness will explicitly include financial performance; and if key operational success factors lead to achievement of organizational goals, then organizational effectiveness will implicitly encompass operational performance (Arino, 2003). This is in line with Gulati's observation that comparing the outcomes with the objectives has been a basic measurement for the performance of an alliance.

4.2.3 Conclusions

Type of Measurements	**Variables**	**Sources**
Objective Measurements	Financial indicators	Anderson, 1990 (profit rate; cash flow); Gulati, 1998 (financial indicators); Lasserre, 1999 (return on investment; growth; shareholder value); Arino, 2003 (profitability, growth, cost position).
	Market indicators	Anderson, 1990 (market share; customer satisfaction; relative product quality; relative price); Lasserre, 1999(market share).
	Status of the alliance	Douma, 1997 (stability; surviving longer); Gulati, 1998 (survival; stability); Parkhe, 1993 (stability); Sim & Ali, 2000 (stability); Thskur & Srivastava, 2000 (stability); Arino, 2003 (longevity, stability, survival).
	Learning	Anderson, 1990 (unfamiliar market; unfamiliar technology); Zaman & Mavondo, 2001 (information sharing).
	Goals/objecti ves realization	Anderson, 1990 (long-term goals); Gulati, 1998 (achievements of objectives; strategic intents); Douma, 1997 (degree of goal realization); Lasserre, 1999 (achieving objectives as utility requirement); Arino 2003 (degree of fulfillment of strategic goals; net spillover effects).
Affective Measurements	Level of trust	Anderson, 1990 (mutual trust); Gulati, 1998 (confidence and trust); Douma, 1997; Zaman & Mavondo, 2001 (trust); Barney & Hansen, 1994 (trust); Lasserre, 1999 (understanding and trust); Bleeke & Ernest, 1993 (degree of trust); Smith & Barclay, 1997 (trust); Spekman & Mohr, 1996 (trust); Taylor, 2005 (openness of the alliance partners); Krishnan & Noorderhaven, 2006 (trust-performance relationship).
	Level of commitment	Cummings, 1984 (commitment); Anderson, 1990 (commitment); Zaman & Mavondo, 2001 (commitment).
	Level of Harmony	Anderson, 1990 (harmony among partners); Cummings, 1984 (conflict resolution); Zaman & Mavondo, 2001 (participation in planning); Rodriguez, 2005 (shared leadership).
	Satisfaction with partner efforts	Lasserre, 1999 (the behavior with the partner is aligned); Zaman & Mavondo, 2001 (appropriate interactions on business matters); Arino, 2003 (satisfaction with the overall performance of the strategic alliance); Taylor, 2005 (adaptability of the alliance partners, and the partners' learning capability during implementation).

Table: 4.1: Summary of suggested measurements for a successful strategic alliance

Literature has suggested various ways to measure the success of strategic alliances. It can be concluded that a successful strategic alliance can be measured by objective and/or affective measurements. Objective measurements mainly concern financial indicators, goals/objectives realization, and knowledge learning/sharing. Affective measurements are largely based on the partners' satisfaction, and this indicator can only be judged or measured by the feedback from alliance partners (Gulati, 1998; Lasserre, 1999; Mulyowahyudi, 2001; Arino, 2003). Table 4.1 summarizes the various researchers' works in relation with the objective and affective measurements. From Table 4.1, it is clear that the objective measurements are related to the alliance, while the affective measurements are related to the partner(s). To apply this to our research, it can be concluded that in order to measure the success of a strategic alliance, two measurements are appropriate: satisfaction with the alliance and satisfaction with the partner.

4.3 Success of information systems

4.3.1 Introduction

According to Karsten (1999), the results of the existing case studies of some ICT use suggest that ICT enhances collaboration only under certain conditions. Similarly, Hossain & Wigand (2004) acknowledge that the relationships with others in their groups in a virtual context are not the same due to the reduced or non-existent face-to-face contact. Several empirical studies suggest that video and audio conferencing groups are nearly as good as face-to-face contact provided that participants engage in various getting-acquainted activities (e.g., text chat) over a network (Zheng et al., 2002). However, the use of ICT such as video and audio for building trust is considered to represent slower progress towards full cooperation and is vulnerable to opportunistic behavior (Das & Teng, 1998). Thus, Hossain & Wigand (2004) suggest that ICT collaboration support systems such as CMC (i.e. email and other computerized conferencing) are usually text-based, asynchronous and have limited social presence. Therefore, understanding the relationship between technology and human behavior is seen as critical for ensuring a higher level of user participation. Systems failure due to the lack of understanding of these social factors during the systems implementation phase has been documented in many research studies and this is also applicable to the case of geographically dispersed collaboration (Hossain & Wigand, 2004).

According to Snow et al. (1999), it is difficult to develop multiple effectiveness measurement for changes from traditional to virtual models. As there are no agreed-upon, universal measures of organizational success, researchers usually choose an "internal measure of effectiveness" such as the virtual team meeting its own goals. However, of greater importance are "external measures that link the team's efforts to the firm's competitive strategy and its broader multi-organizational

objectives". Moreover, traditional time frames for measuring success are likely to be inappropriate since virtual organizations are typically able to act faster than hierarchical organizations. For practitioners, measuring the effectiveness of a change effort should begin with a formal 'Case for Action' for the transformation process that describes why a virtual organization is necessary and how performance will be measured at team, company and network organizational levels. To build knowledge in this area, it is important to relate the circumstances and measures to the key dimensions of the virtual organization being examined: multi-sided, multi-organizational, and/or dynamic (Snow et al., 1999). This section aims to define measures for the success of a virtual cooperation based on the literature on information systems.

4.3.2 The IS success model by DeLone & McLean

In their influential article, DeLone & McLean (1992) reviewed 100 papers containing empirical IS success measures that had been published in seven publications during the seven year period 1981-1987. They classified the huge range of IS success measures they found into six categories, and towards the end of their paper present their six categories of success measures as in the model shown in Figure 4.2. DeLone & McLean (1992) argue that when measuring IS success, researchers should "systematically combine" measures from the six IS success categories namely: Information Quality, System Quality, Use, User Satisfaction, Individual Impact, and Organizational Impact. They state that "System Quality and Information Quality singularly and jointly affect both Use and User Satisfaction. Additionally, the amount of Use can affect the degree of User Satisfaction - positively or negatively - as well as the reverse being true. Use and User Satisfaction are direct antecedents of Individual Impact; and lastly, this Impact on individual performance should eventually have some Organizational Impact." In this model, "system quality" measures technical success; "information quality" measures semantic success; and "use, user satisfaction, individual impacts," and "organizational impacts" measure effectiveness success.

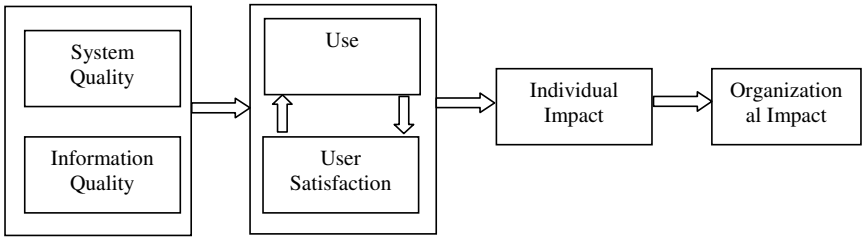

Figure 4.2: DeLone & McLean's Model of IS Success (1992)

DeLone & McLean's paper is an important contribution to the literature on IS success measurement because it was the first study that tried to impose some order on IS researchers' choices of success measures. After this article had been published, nearly

300 articles in refereed journals have referred to, and made use of, this IS success model (DeLone & McLean, 2003). This model was published in 1992, and it was based on theoretical and empirical IS research conducted by a number of researchers in the 1970s and 1980s. However, the role of IS has changed and progressed during the last decade, and similarly academic inquiry into the measurement of IS effectiveness has progressed over the same period. Thus, DeLone & McLean reviewed more than 100 articles since 1993 in order to update the model and evaluate its usefulness in light of the dramatic changes in IS practice, especially the advent and explosive growth of e-commerce. As a result, an updated DeLone & McLean's Model of IS Success is given (see Figure 4.3).

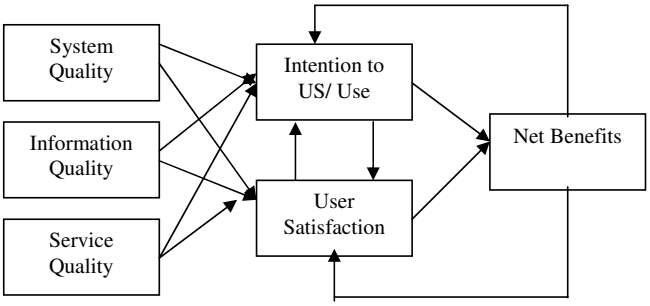

Figure 4.3: An updated DeLone & McLean's Model of IS Success (2003)

According to DeLone & McLean (2003), the updated IS success model includes arrows to demonstrate proposed associations among success dimensions in a process sense, but does not show positive or negative signs for those associations in a causal sense. The major changes of the updated model compared with the original one are:

(1). Service quality has been added as a separate variable. Although DeLone & McLean believe that "service quality" could be merely a subset of the model's "system quality", the changes in the role of IS over the last decade argue for a separate variable---the "service quality" dimension. Each of these quality dimensions will have different weights depending upon the level of analysis. For instance, to measure the success of a single system, "information quality" and "system quality" may be the most important quality component; while for measuring the overall success of the IS department, as opposed to individual systems, "service quality" may become the most important variable (DeLone & McLean, 2003).

(2). "Use" is replaced by "Intention to use" and "Use". "Intention to use" is an attitude, whereas "use" is a behavior. Substituting the former for the latter may resolve some of the process versus causal concerns that other researchers have raised. However, attitudes, and their links with behavior, are notoriously difficult to measure; and many researchers may choose to stay with "use", but with a more informed understanding of it (DeLone & McLean, 2003).

(3). “Individual impact” and “organizational impact” have been replaced by “Net benefits”. As the “impacts” of IS have evolved beyond the immediate user, researchers have suggested additional IS impact measures, such as work group impacts, inter-organizational and industry impacts, consumer impacts, and societal impacts. The choices of where the impacts should be measured will depend on the system or systems being evaluated and their purpose. According to DeLone & McLean, rather than complicate the model with more success measures, it is better to move in the opposite direction and group all the “impact” measures into a single impact or benefit category called “net benefits”. However, this new variable, “net benefits”, raises three issues that must be taken into account: what qualifies as a “benefit”? for whom? and at what level of analysis? According to DeLone & McLean, the original term “impacts” may be positive or negative, thus leading to a possible confusion as to whether the results are good or bad. Also, the inclusion of “net” in “net benefits” is important because no outcome is wholly positive, without any negative consequences. Thus, “net benefits” is probably the most accurate descriptor of the final success variable. Regarding the second issue: benefits for whom, different actors, players, or stakeholders may have different opinions as to what constitutes a benefit to them; thus, it is a must to define the context or frame of reference in order to define these “net benefits”. Finally, the level of analysis must be addressed, which it is must clear that the benefits to be measured from the individual’s perspective, his or her employer, or what of the industry or of the nation (DeLone & McLean, 2003).

DeLone & McLean’s updated IS success model is an extension to the original one, despite the changes, DeLone & McLean believe that the original model still forms a sound basis for IS success measurement even in the e-commerce environment. They believe that the proposed changes in the updated model are largely changes in degree, not in kind. The addition of “service quality” and the collapsing of “individual impacts” and “organizational impact” into “net benefits” still preserve the parsimonious nature of the model (DeLone & McLean, 2003).

4.3.3 Seddon et al.’s fieldwork

In 1996, Seddon & Kiew presented their fieldwork under the title “A Partial Test and Development of DeLone and McLean's Model of IS Success”. A modified version of DeLone & McLean’s model was derived as shown in Figure 4.4. The three differences between DeLone & McLean's model and the model tested are as follows:

- Use in DeLone & McLean's model has been replaced by Usefulness. Seddon & Kiew argue that, as reported by DeLone & McLean (1992), many researchers have used Use as an objective measure of system success. The implication is that if a system is used, it must be useful, and therefore successful. However, non-use does not necessarily mean a system is not useful, it may simply mean that the potential user has other more pressing things to be done.

- A new variable, System Importance, has been added to DeLone & McLean's model to help explain variations in users' perceptions of Usefulness and User Satisfaction.
- The simultaneous causality between Use and User Satisfaction in DeLone & McLean's model has been replaced by one-way causality, i.e., Seddon & Kiew argue that Usefulness causes User Satisfaction, not vice versa.

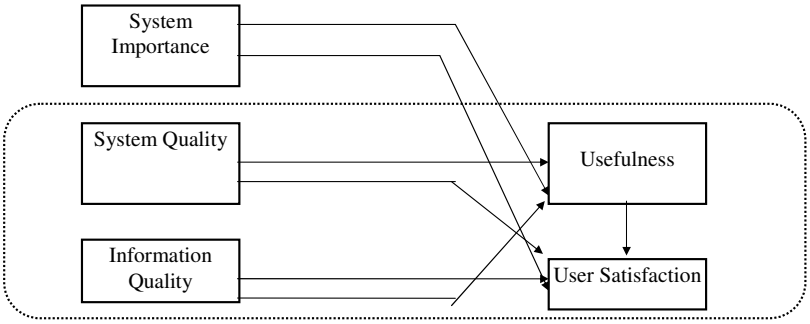

Figure 4.4: The Model of User Satisfaction Tested by Seddon & Kiew (1996)

In this tested model, Information Quality is concerned with issues such as the timeliness, accuracy, relevance, and format of information generated by an information system. System Quality is concerned with whether or not there are "bugs" in the system, the consistency of the user interface, its ease of use, response rates in interactive systems, documentation, and sometimes, quality and maintainability of the program code. The Usefulness of an information system is the degree to which a person believes that using a particular system enhances his or her job performance. Satisfaction is the result of an individual taking the outcomes that have been received and evaluating them on a pleasant-unpleasant continuum. However, the benchmark for judging satisfaction is different by different individuals. User Satisfaction is the net feeling of pleasure or displeasure that results from aggregating all the benefits that a person hopes to receive from interacting with the information system. Each user has a set of expected benefits or aspirations from the information system. To the extent that the system meets or fails to meet these aspirations, the user is more, or less, satisfied. At the very minimum, a tool is expected to be useful. Beyond that, the more useful the tool, the more likely the user is to be satisfied with it. However, satisfaction reflects a wider set of expected benefits or aspirations than mere usefulness (Seddon & Kiew, 1996).

In addition, Seddon & Kiew state “because DeLone & McLean's model was proposed as a way of interrelating various measures of IS success, it does not consider factors that might influence peoples' evaluations of success. However, it seems highly likely that users' opinions about the relevance of the system to their own goals and aspirations will influence their opinions about the value and, hence, success of the system. For example, if what the system does is unimportant to the user, there seems

little chance that the user will perceive the system as useful, no matter how well designed it is, or how easy it is to use. Conversely, if the task the system supports is perceived as very important, a poor system may be perceived as useful, even if it is quite user unfriendly. In this study of success measures, it therefore seems essential to consider the interests of the individuals being asked to evaluate the information system" (Seddon & Kiew, 1996). Therefore, a Respecified Version of DeLone & McLean's Model of IS Success was proposed by Seddon as shown in Figure 4.5.

In their paper, Dimensions of Information Systems Success, Seddon et al. (1999) extend DeLone & McLean's work by analyzing 186 empirical papers from 1988-1996 to define a number of measures of IS success. This paper's first insight is that, in a world of conflicting human interests and vastly different systems, a range of sharply-focused measures of IS effectiveness are likely to be needed for different purposes, and different measures are likely to be needed to assess the impact and effectiveness of a system for different groups of stakeholders. The second insight in this paper is that Cameron & Whetten's (1983) seven questions (see Table 4.2) define the construct space for the IS effectiveness measurement, and that two key dimensions of this construct space are the stakeholder and the type of IT system being evaluated.

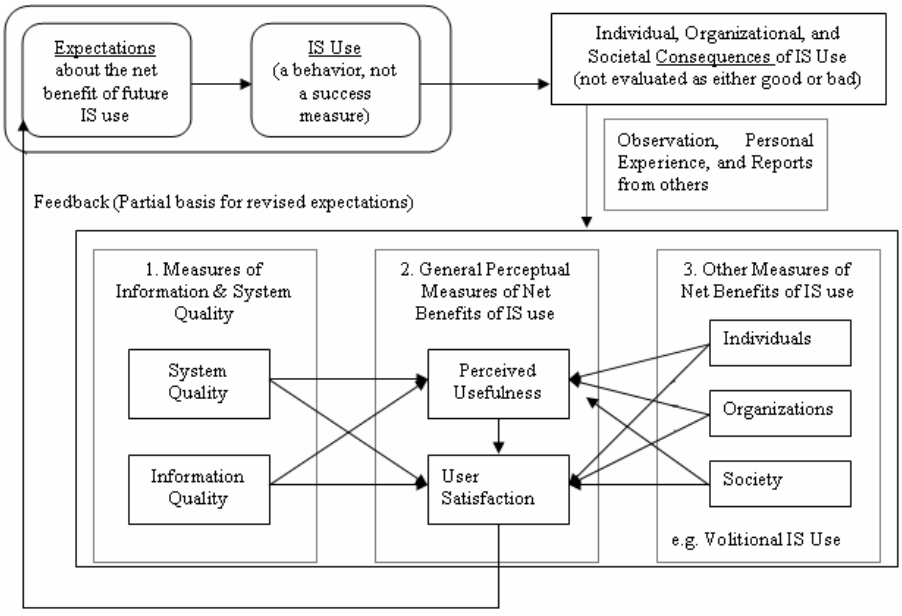

Figure 4.5: Seddon's Respecified Version of DeLone & McLean's Model of IS Success (Seddon, 1997)

1. From whose perspective is effectiveness being judged? 2. What is the domain of activity? (depends on tasks emphasized in the organization, competencies of the organization, and demands from external forces) 3. What is the level of analysis? (individual, subunit, organization, population, societal) 4. What is the purpose of evaluation? 5. What time frame is employed? (short, long) 6. What types of data are to be used? (objective or perceptual) 7. Against which reference is effectiveness to be judged? (effectiveness of this organization compared to: some other organization; some ideal level of performance; stated goals of the organization; past performance of the organization; or certain desirable characteristics)

Table 4.2: Seven questions when measuring organizational performance (Cameron & Whetten, 1983)

Combining the above two insights, they suggest that Cameron & Whetten's seven questions, and the two-dimensional IS effectiveness matrix, provide useful ways of framing most discussions about IS effectiveness measurement (Seddon et al., 1999).

4.3.4 Molla & Licker's E-Commerce Success Model

In e-commerce, as in other spheres of business, alliances are effective vehicles for global growth. According to Ernst et al. (2001), fully 75% of the e-alliances intended to promote geographical expansion created value on announcement, and though it is too early to assess the long-term outcome, many of them appear ready to succeed. Cross-border alliances permit an Internet company with an established business model, technology platform, brand, and management approach to pursue growth opportunities by quickly gaining access to local customers, marketing organizations, and bricks-and-mortar assets. Trying to build such capabilities from scratch is expensive and slow, and acquisitions carry substantial premiums and added risk. Whether the focus is on B2C, on B2B, or on some hybrid market, alliances will continue to be an intricate and necessary part of e-commerce strategies. By heeding the lessons of the past and by understanding a few general principles, companies can increase the likelihood of success. Such success reflects the complementary nature of each partner's contribution. The market regards on-line companies as dynamic — a source of speed, new approaches to marketing, and additional customers. Yet, the incumbents bring most of the assets: brands, products, distribution, supplier networks, customer relationships, and physical sites. As many dot-coms have painfully recognized, these things did count. Often, however, these alliances were structurally flawed: the litany of problems includes poorly chosen partners, inequalities between the risks and the rewards for different parties, an absence of performance requirements or of metrics for assessing performance, and a failure to focus on implementation. Some companies also complained about paying portals for

exclusivity only to find that it turned out to be narrower and less valuable than expected (Ernst et al., 2001). If uncertainty is rife and the bargaining power of a partner is likely to increase, its managers should consider creative structures that get the deal done quickly, flexibly, and in a way that reduces risk. Earlier research indicated that alliances have a long-term success rate of about 50%, measured in strategic and financial terms. Since the long-term success factors for alliances are well known, smart managers can improve the odds. Nonetheless, the stakes have risen for companies entering into alliances. Besides focusing more and more on short-term performance, investors and analysts are closely watching alliance announcements (Ernst & Halevy, 2000). This conclusion was based on the effect of alliance announcements on the share prices of more than 2,100 companies. Ernst et al. (2001) have given some factors influencing the success of e-commerce alliances; however, they have not provided a general picture about e-commerce success.

In their article "E-Commerce Systems Success: an attempt to extend and respecify the DeLone & McLean Model of IS success", Molla & Licker (2001) state that information system success is one of the controversial issues that has eluded IS researchers because *success* is a multidimensional concept that can be assessed at different levels (such as technical, individual, group, organizational) and using a number of not necessarily complementary criteria (such as economic, financial, behavioral and perceptual).

They suggest looking into the DeLone & McLean model from two angles, which they refer to as the left hand and right hand sides. The left hand side of the model establishes the relationships among System Quality, Information Quality, Use and User Satisfaction. They conclude that the model has done a great service in indicating the interdependencies among the variables of IS success measures; and especially Seddon & Kiew (1996) have produced empirical evidence to support the relationships proposed on the left hand side of the model. In addition, the left hand side of the model defines the antecedents to two of the most widely used criteria of IS success, that is Use and User Satisfaction, and organizes the various independent variables that affect user satisfaction (Molla & Licker, 2001). However, they argue that the right hand side of the model, which assumes linear causality between User Satisfaction, Individual Impact and Organizational Impact, is not as strong and informative as the left hand side. Organizational and technological discontinuities and the existence of exogenous factors operating between the different levels militate against such linear assumptions. As a result, a system, which is successful judged by User Satisfaction measures, may not necessarily result in positive individual performance or favorable organizational outcomes. Therefore, there is a need to evaluate the success of e-commerce systems at different levels: system, individual and organizational (Molla & Licker, 2001). Their E-Commerce Success Model is shown in Figure 4.6. Their work is aiming at developing an extended and comprehensive e-commerce success model that spans all the phases of on-line transactions and all the purposes of e-commerce systems. The DeLone & MacLean model is used because of

the relevance of the theorization behind it to e-commerce systems and its potential to allow systematic organization of the various criteria of success in a meaningful way (Molla & Licker, 2001).

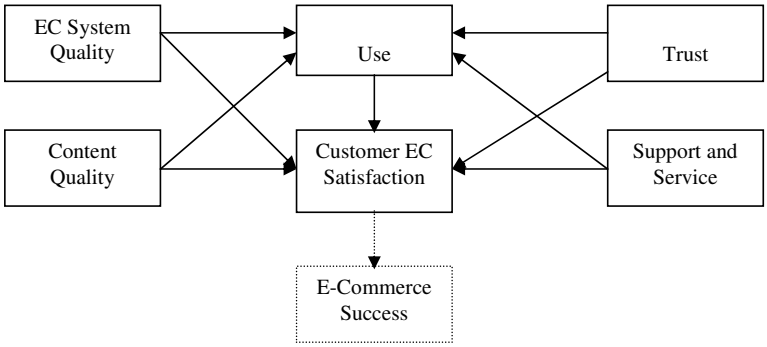

Figure 4.6: E-Commerce Success Model (Molla & Licker, 2001)

The main differences between the extension proposed and the original DeLone & McLean model are:

(1). E-commerce systems and contents require additional constructs not captured by the traditional system quality and information quality measurements. Therefore, the System and Information Quality components are replaced by E-commerce System Quality and Content Quality respectively.

(2). User Satisfaction is replaced with Customer E-commerce Satisfaction. Although Use and User Satisfaction are the most widely used dependent variables in the e-commerce literature, standard and systematic criteria for assessing Use and User Satisfaction of e-commerce systems do not seem to exist. According to Molla & Licker (2001), customer satisfaction has always been assumed to be a necessary condition for the success of organizations. Therefore, using customer satisfaction as a dependent variable might overcome the theoretical difficulty of the relationship of user satisfaction to organizational performance. The concept of customer satisfaction, as discussed in management and marketing literature, is broad and involves a number of issues outside the scope of e-commerce systems. Here, customer e-commerce satisfaction is proposed as a dependent variable to e-commerce success. In addition, depending on the nature of the e-commerce model underlying the system, the product offering and the purpose of the e-commerce system, it is possible to differentiate between two main facets of customer e-commerce satisfaction (a) satisfaction with the core product and service and (b) satisfaction with the process and system used to deliver the core product and service (Molla & Licker, 2001).

(3). Because e-commerce system users mostly are not members of the organization, and do not necessarily share its goals, two additional factors – trust and service – are needed to capture the transactional and customer support components of

e-commerce systems and understand the relationship between use and customer e-commerce satisfaction (Molla & Licker, 2001).

The insight gained from Molla & Licker's work is that they extend the DeLone & MacLean's model to a 'virtual' environment by giving and replacing some meaningful variables such as trust.

4.3.5 Summary

Researchers have proposed various variables to measure the success of information systems. Table 4.3 gives an overview of these ideas, with both independent and dependent variables of information system success listed. As the independent variables were discussed in Chapter 3, this part has focused on the dependent ones. It is clear that the suggested dependent variables are generally consistent: use/usefulness and user satisfaction (Molla & Licker focus on E-commerce systems, so the user satisfaction is replaced by customer satisfaction). Therefore, two variables usefulness (of the system) and user satisfaction will be applied in this research.

Researcher(s)	Independent Variables	Dependent Variables
DeLone & McLean, 1992 DeLone & McLean, 2003	System Quality Information Quality Service Quality	Use/ Intention to use User satisfaction
Seddon et al., 1996	System Importance System quality Information quality	(Perceived) Usefulness User satisfaction
Molla & Licker, 2001	EC system quality Content quality Trust Support & service	Use Customer EC satisfaction

Table 4.3: Summary of suggested measurements for successful Information System

4.4 Conclusion

From the literature on success in strategic alliances and the success of information systems, four measurements emerge: satisfaction with the alliance, satisfaction with the partner, usefulness, and user satisfaction. As this research aims to investigate virtual cooperation within international strategic alliances, an elaboration of these measurements is needed.

Satisfaction with the alliance concerns cooperating partners' views towards the alliance such as resulting financial indicators, achievements of goals and objectives, and the status of the alliance. Even in a virtual cooperation form, this measure is still essential.

Satisfaction with the partner concerns the confidence, trust and views towards partner(s) in an alliance. As this research aims to investigate virtual cooperation within alliances, this variable needs to be focused on the use of ICT systems. This is in line with DeLone & McLean's (2003) updated IS success model, which states that satisfaction with the partner's use of the ICT systems can be regarded as part of the net benefits. Thus, satisfaction with the partner will be replaced by *satisfaction with regard to the partner's conduct with the ICT system in a virtual cooperation* in order to gain insight into virtual cooperation.

Usefulness of the ICT system in a virtual cooperation is the extent to which using a particular ICT system has enhanced the performance of the alliance.

User satisfaction is replaced by *satisfaction with the ICT system in the virtual cooperation*. It is the net feeling of pleasure or displeasure that results from aggregating all the benefits that the partners hope to receive from interaction with the ICT system.

CHAPTER 5

RESEARCH MODEL & OPERATIONALIZATION

5.1 Introduction

The previous chapters have defined the factors that influence virtual cooperation within international strategic alliances and the model of virtual cooperation within Dutch-Chinese strategic alliances; the relationships between these factors need to be studied in order to draw the research model. A case study protocol that contains case study tactics, case selection, data collection, and data processing also needs to be developed. Aimed at the final preparation for case selection and data collection, a pilot case study has been executed. The opportunity to carry out a pilot case study emerged in the early stages of the research project; several factors have been used in analyzing this case study, providing a considerable number of useful insights for developing the research model and methodology.

5.2 Pilot case study report

This pilot case was chosen because it concerns real virtual cooperation, which is unusual compared to traditional Dutch-Chinese strategic alliances, and because of easy access. It represents the most complicated form of cooperation, and all relevant data collection issues could be encountered in this case. This pilot case study is included to refine the data collection plans with respect to the content of the data and the procedures to be followed, assisting the researcher to develop relevant lines of questions and providing some conceptual clarification for the research design.

5.2.1 Approach of the pilot case study

In this study, four sources of evidence have been used: documents, archival records, observation, and unstructured interviews.

The documents include the cooperative contracts, an MBA graduation report, and business plans. The archival records cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies; and financial information of the partners including their turnovers, investments in ICT systems, benefits from the ICT implementations (actual or established), etc. The period of close observation lasted three years, starting with an MBA graduation assignment aiming to support the Dutch-Chinese partnership and conducted in the Dutch company in 1998-1999. Later, during this PhD research, this virtual alliance was researched in order to draw the final research model. Intensive interviews with both partners of the alliance in the Netherlands and China have taken place, i.e. with the general managers, and the

key employees who were responsible for electronic information exchange, business cooperation, and business development.

5.2.2 The Partners and the Product

TradeView is a small IT company with 15 employees in the Internet application software sector located in Enschede, the Netherlands. In 1998, it realized that China, one of the fastest developing economies and Internet markets, could become a huge potential market for its products. Due to a lack of resources and experience, it could not enter this market on its own and decided that it had to find suitable partners to develop the market for its products. *ChinaOnline* is a Chinese enterprise specializing in Internet Services Provider (ISP) operations and related technical support. Its main services include ISP, Internet Contents Provider (ICP), Internet Phone Provider (IPP), Intranet, and Internet Fax. At the end of 1999 its operations covered 108 cities and provinces in China, its total assets were US$ 240 million, and it had 2,360 employees.

TradeView developed an Internet package, *EasyView*, enabling users to create a website complete with pictures, text, and searchable databases in an easy manner. The company believed that this product was the most innovative software worldwide, and that no directly competing products were available on the market. The integrated interactive marketing methods for E-commerce could also be linked to various payment systems. In addition to English, other languages could also be integrated.

5.2.3 The International Virtual Alliance

After several months of searching the Chinese market and negotiating, TradeView with ChinaOnline agreed to set up an alliance to market TradeView products in China. A cooperative venture between the two parties was created on November 24th 1999. It specified that TradeView would develop a new product (*ChinaView*), and transfer the technical knowledge needed for the new venture. ChinaOnline would provide the capital to finance equipment for the operations and to set up an office in Shenzhen, the location of the new venture. It would be responsible for seeking potential customers using its existing business network, and recruiting employees for the new venture. The new product, ChinaView, would be based on EasyView; and whereas the original languages were Dutch and English, the new version would be in Chinese and English. Since the partners were IT-related companies, establishing a purely virtual alliance was considered feasible (see also Tang, 1999). Figure 5.1 depicts the operational structure of this alliance.

The various business activities such as product delivery and information exchange between the two partners, and with their clients, were conducted electronically. The Internet was to be the primary channel for TradeView and ChinaOnline to exchange information and monitor the new portal. In theory, this alliance could be purely virtual based on the definitions and the levels of virtuality already discussed. The business processes can be summarized as follows:

- The partners create a new Internet portal for the new product ChinaView in China, to which both companies and the approved customers would have access at anytime from anywhere.
- The customers in China would pay the purchase fees to ChinaOnline, and could obtain the software package either through the Internet or on a CD-ROM.
- On receiving the payment from its customers, ChinaOnline would transfer an agreed share to TradeView in the Netherlands.
- TradeView would be responsible for managing, updating and maintaining the customer database and the product itself.

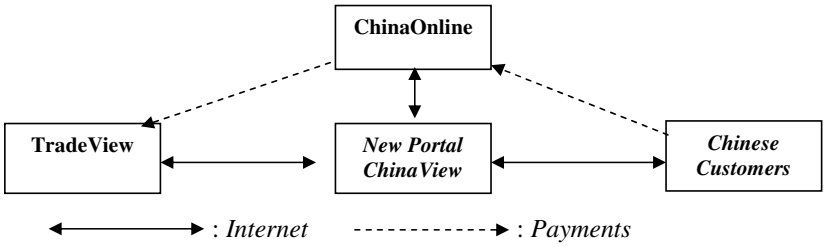

Figure 5.1: The structure of the virtual alliance between TradeView and ChinaOnline

5.2.4 Opposing Views

The alliance was terminated after it had been operational for just one year. The reasons behind its failure were determined in interviews with the involved employees and managers from both parties. The following issues emerged:

(1). TradeView considered the product EasyView as one of its core competencies in the marketplace. ChinaOnline's main business objective was to become a powerful ISP player in China, through increasing its number of users, and then to become a publicly listed company. ChinaOnline considered ChinaView to be only an added service on top of its main businesses offered to customers.

(2). Both parties were reluctant to invest the financial resources necessary for promoting the product due to financial and other reasons. Both were expecting (hoping) that the partner would do this.

(3). TradeView blamed ChinaOnline for only promoting ChinaView in one province (Guangdong, ChinaOnline's dominant province) whereas, according to the agreement, ChinaOnline should have used its whole national network to do so. ChinaOnline accused TradeView of neither sending permanent marketing and technical staff to China, nor providing the software source codes so that ChinaOnline's technicians could quickly respond to customers' requirements and undertake further development. To protect its core competencies, TradeView had refused to provide the source codes.

(4). The Internet had been the main communication tool between the two parties. On the one hand, this resulted in significant cost savings in areas such as business traveling and training. On the other hand, since there was no face-to-face contact,

there was always confusion when one party failed to respond to its partner's requests, especially if the purpose did not fit its own interests.

(5). It was hard for the Chinese partner to understand why the Dutch partner preferred to use English as the formal e-communication language, as two Chinese MBA graduates (one in the Netherlands and one in China) had been employed to act as intermediates, and the Chinese software had already been installed. TradeView claimed that they could not express their ideas or purposes clearly in Chinese.

(6). In the alliance design, both parties could access the new portal. However, TradeView controlled the source code and the key to the customer database, and ChinaOnline was only given the right to open temporary accounts for its customers. TradeView would only give clients permanent accounts after ChinaOnline had received the payment from the clients, and sent part of it to TradeView as specified in the agreement.

(7). Based on its own success story in Europe, TradeView expected ChinaOnline to pay most attention to large corporate clients in China to achieve a quick return on investment. ChinaOnline had a different view of the appropriate target group: it believed that large firms in China had their own 'e' people to create their homepages, but that smaller ones did not and would therefore be a more appropriate target.

5.2.5 Analysis

The defined building blocks of influential factors to virtual cooperation within international strategic alliances described earlier (see Figure 3.4) are used to identify the specific factors behind the failure of the virtual alliance.

The lifecycle of IT products is becoming shorter and shorter. One manager pointed out during an interview that the product ChinaView was only about 3 or 4 months ahead of competing software products in China. Since, for TradeView, time was so important (especially in terms of upgrading products in time), successful and rapid market development and expansion in China were its strategic business priorities. However, based on opposing view 1, it is seen that a strong strategic misfit between the two partners existed from the beginning: this resulted in different expectations and many misunderstandings, and eventually led to this cooperation's failure.

From opposing view 2 and 3, it can be seen that there was also a large gap in the resource fit between the cooperating parties. TradeView, as a small private company, is strong in technology but weak in terms of financial means and experience in China. This weakness resulted in an inability to establish a working team (management and technical) in China and to invest significantly in the promotion and marketing of its product. It could only provide a technical base and limited resources (in terms of people and money) to the new venture, while still hoping that it could quickly obtain a large market share and return in China using its partner's business network and efforts to market the EasyView product. ChinaOnline is a nationwide group of companies, with 80 licenses and more than 100 offices and 2,000 employees

in China. However, in practice, the major business activities of ChinaOnline were focused on Guangdong province and most of its customers are from this region. ChinaOnline is large and, like most other ISPs, is eager to attract external financial sources to promote its new products. It was unwilling to invest without a clear expectation of a significant return. Both parties were hoping the other side would provide the necessary resources to promote the ChinaView product, and neither was willing to do so themselves. This resulted in a limited budget for the ChinaView project, and this led to a difficult and slow marketing process.

TradeView is a Dutch-based company (even though it employed two Chinese staff) and ChinaOnline is a Chinese firm. Opposing views 4, 5 and 6 reflect how cultural variables in information systems and context underlie the many differences in communication styles between the Dutch and the Chinese. The first problem was the language barrier. English was the daily communication language between the two parties but English was neither partner's native language. The second problem was the difficulty in developing a trust-based relationship in inter-organizational exchanges in the electronic network era. Ring & Van de Ven (1994) define trust as 'the confidence that another organization will behave according to its expectations and that it will exhibit goodwill'. A trust-based relationship failed to develop between the two parties, especially from the TradeView side. This is common when the smaller party is in the weaker position in an alliance between small and large companies. The smaller one commonly employs a defensive strategy to protect its rights and position. However, overprotection of interests can result in inefficient operations, and ultimately the loss of trust between the two parties.

The design of the alliance between TradeView and ChinaOnline was relatively simple. ChinaOnline took most responsibility for providing the marketing and technical staff, and TradeView trained these people in the details of the product. In terms of organizational fit, ChinaOnline held a strong bargaining position relative to TradeView. The imbalance in the bargaining positions in the project is due to inequalities and the limited strategic fit between the two parties. In such a situation, there is a good chance that an alliance will only yield advantages to one of the two partners, and this will endanger its stability. Even though almost all of the traditional functions of an alliance were carried out electronically, and this was assumed to represent an advantage, in reality both parties complained about the slow responses from the other side, and this was apparent when serving the customers.

There was no clear evidence of a technology gap between the two partners, although TradeView did blame ChinaOnline for being weak in mastering the product technology. However, from the analysis, it was concluded that these problems were mainly due to TradeView controlling the source code of the product, and ChinaOnline not being involved with the technological content. There was not a technology misfit as such between the two partners since both of them are ICT-related enterprises.

Turning to opposing view 7, it can be observed that both partners had different views with regard to the business process, with respect to the targeted customer

segment and the way to conduct business. The Dutch partner expected to copy its European success story in China, while the Chinese partner believed that its partner lacked insights into the Chinese market. This misfit led to long discussions and accusations between the two parties.

5.2.6 Conclusions from the case study

Neither TradeView nor ChinaOnline had expected this outcome from their cooperation. The factors that led to this failure were first of all, the difference in strategic importance of the ChinaView project. There was an insufficient strategic fit between the two parties. Closely related to this was the resource gap: neither party committed the necessary funding. The cultural gap and the communication problems were not solved, eventually resulting in a complete lack of trust between the two partners, even though TradeView had anticipated such problems with regard to this issue and hired two Chinese MBA graduates. The alliance design in this case was simple, but there was a distinct imbalance in the bargaining positions. There were wide business process differences between the two partners due to their different business experiences and the different environments they were facing. Even though there was no misfit in technology, all the other crucial fits were inadequate. Besides the anticipated cultural gap, the analysis demonstrates that there are several other critical points that require an acceptable level of fit.

The new form of a virtual alliance has theoretically enabled companies to cooperate across borders providing previously unavailable powerful competitive advantages. The real advantage of the virtual form is realized when relationships among electronically-connected people or firms produce new and/or qualitatively different communications that yield product and/or process innovations. In the Chinese-Dutch case, such specific advantages were clearly defined. They involved cost saving, reaching remote customers, and real time joint activities such as maintaining, monitoring, and updating the system. However, it has also been observed that, in this situation, no level of advanced technology could fully replace human interactions in establishing and maintaining business relationships. Information technology provides a powerful platform but it is still the people that make a collaboration work. The importance of the human element, and human connections, cannot, however, be taken for granted, particularly where people are connected virtually. The partners expressed the view that a basic trust needed to be maintained, and that this requires physical contact albeit at a less intensive level than typically would be the case in ordinary alliances. The real challenge is how business partners can cooperate effectively and efficiently without face-to-face contacts, especially when the partners come from different (business) cultures.

The findings from this pilot case study have provided a considerable number of useful insights for this study, and the result has been used in various publications (Wei & De Bruijn, 2002; De Boer & Wei, 2001; Wei & De Boer, 2001; Wassenaar &

Wei, 2001; Wei et al., 2001), in particular because it presented an interesting insight into the factors leading to failure of a Dutch-Chinese virtual alliance.

5.2.7 Conclusions with regard to the research design for this research

Conclusions with regard to the overall research design were made as follows:

(1). Interviewing both partners is an effective way to identify the similarities and differences in the alliance.

(2). Within the operational factors, the business process factor can also be regarded as part of corporation culture.

(3). Besides the strategic and operational factors, attention should be paid to the ICT system and the electronic communication process.

(4). This alliance was easy to define as a 'failure' since the relationship had ended. However, in other case studies, clear measurements of success need to be well formulated.

(5). Observations and the researcher's judgment should also be considered carefully since one partner's judgment of the other might not be true (for instance, TradeView blamed its Chinese counterpart's weakness in technology).

5.3 Research Model

In Chapter 2, a basic model of virtual cooperation within international strategic alliances was given (Figure 2.6 in Section 2.6), indicating factors on the company level together with macro-ICT infrastructure factors that influence virtual cooperation using ICT systems. After gained insights from the pilot case study, and the literature studies, the final conceptual research model for this research can be developed that includes all the relevant factors and the relationships between them to be addressed.

In Chapter 3, the role that the macro-ICT infrastructure plays in using ICT systems and the current situations in the Netherlands and China were identified. The key aspects of the macro-ICT factors identified were: pervasiveness, geographic dispersion, organizational infrastructure, connectivity infrastructure, sectoral absorption, and sophistication of use.

Also in Chapter 3, due to a lack of direct literature, the factors that influence international virtual cooperation were identified from related literature, from the areas of international strategic alliances and information systems. From the international strategic alliance literature, strategic and operational (cultural, resource, organizational, and technological) fits were derived that are used to describe the relationships between cooperating partners. From the information system success literature, four factors, namely ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality, have been selected as the variables to evaluate information system success. As the information system success literature mainly focuses on ICT systems within individual organizations, and the current research mainly focuses on inter- and intra-organization ICT use, it was

decided to regard the independent variables of information system success as intermediate variables in this research.

Both international strategic alliance literature and information system success literature provide several variables to measure the success of a virtual cooperation. In combining and elaborating the similarities from both fields in order to match the international virtual cooperation concept, four measurements namely satisfaction with the alliance, usefulness of the ICT system in virtual cooperation, satisfaction with the ICT system in virtual cooperation, and satisfaction with regard to partner's conduct with the ICT system, have been chosen for this research as the dependent variables (see Section 4.4).

Now that the relevant factors have been defined, the conceptual research model can be elaborated as shown in Figure 5.2.

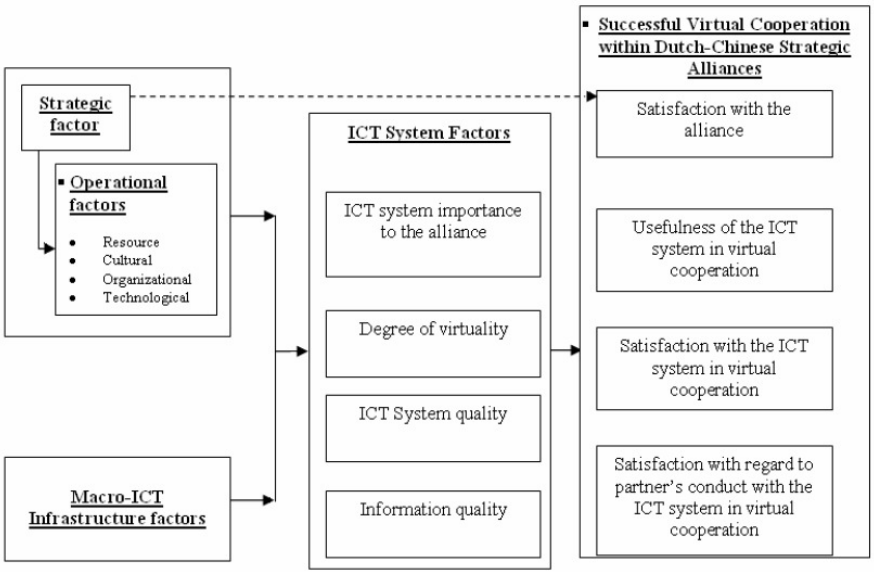

Figure 5.2: Conceptual Research Model

In this model, the strategic factor, the operational factors, and the macro-ICT infrastructure factors are independent variables. ICT systems factors include ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality are intermediate variables. Satisfaction with the alliance, usefulness of the ICT system in virtual cooperation, satisfaction with the ICT system in virtual cooperation, and satisfaction with regard to the partner's conduct with the ICT system are the dependent variables. It is implied that strategic, operational, and macro-ICT infrastructure factors influence the success of an international virtual cooperation through the ICT system factors. Besides, literature indicates that the strategic factor is the starting point for success in an alliance (see Section 3.3) and so, a direct link between strategic fit and the success of an alliance should be included.

5.4 Propositions

To operationalize the research model, the relationships between the variables discussed above need to be determined. As there are five arrows, which are the link between strategic factor and satisfaction with the alliance, strategic factor and operational factors, operational factors and ICT system factors, macro-ICT infrastructure factors and ICT system factors, and ICT system factors and successful virtual cooperation between Dutch-Chinese strategic alliances, the propositions will be based on these links. Since the relationship between strategic factor and operational factors has been frequently demonstrated in many studies, in this research, only four main propositions are formulated using the relationships found in the literature discussed in previous chapters.

Proposition 1: A good strategic fit has a positive impact on the satisfaction with the alliance.

The relevant theory background was given in Sections 3.3, 3.5 and 4.2.

(1). Strategic fit is the degree of fit of the partners' objectives/goals for the alliance, and the implementation of ICT systems in their alliance. Douma (1997) pointed out that it is assumed that a successful alliance is only possible when the partners have similar objectives; therefore, the strategic fit influences the status of an international strategic alliance directly. Five levels of fits will be applied to describe the degree of mutual dependence and compliance of strategic factors between the cooperation partners (see Table 5.1). The level above 3 will be regarded as a good fit.

Level	Name	Characterized by
1	Strong misfit	Very different objectives, goals, motives, and strong imbalance of the strategic importance to each partner
2	Misfit	Different objectives, goals, motives, and unbalance of the strategic importance to each partner
3	Neutral	Basic matching of the objectives, goals, motives between partners, and the alliance is somehow important to each partner
4	Fit	Objectives, goals, and motives between partners match well, and the alliance is important to each one
5	Perfect fit	Strategies, objectives or motives are mutually dependent and compatible, and the alliance is of strategic importance to the partners' competitive position

Table 5.1: Levels of strategic fit used in this research

(2). Satisfaction with the alliance is one of the four measurements with regard to successful virtual cooperation within international strategic alliances (see Section 4.4). Five levels of the degree of this measurement will be applied in this research, and the level above 3 will be regarded as positive (Table 5.2).

Level	Name	Characterized by
1	Very unsatisfied	Failed to meet objectives/goals, conflict between partners, alliance turns to be stopped, no trust between partners
2	Unsatisfied	Objectives/goals gained below expectation, the alliance is not stable, however, still operate-able if some adjustments can be made
3	Neutral	Objectives/goals basically have been met, alliance is somehow stable, partners trust each other, however, complaints regarding partners are still occur
4	Satisfied	Objectives/goals have been met, alliance is stable, partners trust each other
5	Very satisfied	Objectives/goals gained beyond the expectations, alliance is very stable, partners are willing to extend their relationship

Table 5.2: Levels of satisfaction with regard to the alliance used in this research

Proposition 2: Good operational fits have a positive impact on ICT system factors.

The relevant theory background was given in Sections 3.4 and 3.5.

(1). Operational fit includes four variables namely resource, cultural, organizational, and technological (see Section 3.4). Five levels of the degree of the four measurements will be applied in this research, and the level above 3 will be regarded as good (Table 5.3, 5.4, 5.5 and 5.6).

Level	Name	Characterized by
1	Strong misfit	Big difference in size of partners, none of the partners is willing to contribute necessary resources, assets and competences for the alliance and ICT
2	Misfit	Different in size of partners, no partner is willing to provide enough resources, assets and competences or only one partner is willing to contribute for the alliance and ICT
3	Neutral	The resources, assets, and competences input from partners are somehow could make the alliance and basic ICT system work
4	Fit	Both partners have provided necessary resources, assets, and competences into the alliance and implementation of ICT system
5	Perfect fit	Both partners have provided resources, assets, and competences into the alliance and the implementation of advanced ICT systems more than necessary

Table 5.3: Levels of resource fit used in this research

Level	Name	Characterized by
1	Strong Misfit	Corporate cultures differs largely, no trust between partners, always misunderstanding between each other
2	Misfit	Corporate cultures differ, partners do not trust each other much, misunderstandings often occur
3	Neutral	Basic trust has been built, misunderstanding could happen but not often, has set basic way to solve the cultural difference
4	Fit	Partners trust each other, a clear guideline for overcoming cultural difference has been built, misunderstandings only occur accidentally
5	Perfect fit	Mutual trust, and non or few misunderstanding between partners, perfect solution to overcome the cultural difference

Table 5.4: Levels of cultural fit used in this research

Level	Name	Characterized by
1	Strong misfit	Big unbalance in bargain power, no organizational arrangement for the alliance and electronic communication, a lot arguments with regard to management control and decision making
2	Misfit	Unbalance in bargain power, organizational arrangement for the alliance and electronic communication cannot suit the requirements, always arguments regarding management control and decision making
3	Neutral	The alliance design such as bargain power, control, decision making have acceptably arranged; basic organizational arrangement for alliance and electronic communication
4	Fit	The alliance design such as bargain power, control, decision making have been well arranged; good organizational arrangement for alliance and electronic communication
5	Perfect fit	Equal bargain power. Management control and decision making perfectly arranged; organization arrangements for the alliance and electronic communication perfectly made

Table 5.5: Levels of organizational fit used in this research

Level	Name	Characterized by
1	Strong misfit	Both partners do not have IT personnel or related resources, and are very weak in implementing and operating ICT system
2	Misfit	Both partners lack IT personnel and competence, and are not good in implementing and operating ICT systems.
3	Neutral	Both partners have basic IT personnel or mainly dependent on external IT supports, and can implement and operate basic ICT systems
4	Fit	Both partners have IT personnel (IT team or department) and competence, and can implement and operate advanced ICT systems
5	Perfect fit	Both partner are ICT knowledge intensive, have IT department or team

Table 5.6: Levels of technological fit used in this research

(5). The ICT system factors have four aspects (see Section 3.5) variables namely ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality. Five levels of the degree of the four measurements will be applied in this research, and the level above 3 will be regarded as positive (see Table 2.4, 3.6, 3.8 and 3.11).

Proposition 3: A well-developed macro-ICT infrastructure has a positive impact on ICT system factors.

The relevant theory background was given in Sections 3.2 and 3.5.

Foster & Goodman's (2000) framework consisting of six dimensions and determinants is applied for analyzing Internet diffusion in China and the Netherlands. The six dimensions cover: pervasiveness, geographic dispersion, sectoral absorption, connectivity infrastructure, organizational infrastructure, and sophistication of use. Each dimension can be graded on one of five levels, for instance pervasiveness: level 1: nonexistent; level 2: embryonic, ratio of users per capita less than 0.1%; level 3:

nascent, 0.1% to 1%; level 4: established, 1% to 10%; and level 5: common, 10% or higher. Above level 3 will be regarded as a well-developed macro-ICT infrastructure. Since there is an imbalance between the two countries and even between different regions within one country, five levels of fit of macro-ICT infrastructure between the locations of the cooperating partners will be applied in this research, and the level will use the average scores of the locations.

Proposition 4: Positive ICT system factors have a positive impact on the success of virtual cooperation within Dutch-Chinese strategic alliances.

The relevant theory background was given in Section 3.5 and Chapter 4.

The four measurements with regard to successful virtual cooperation within international strategic alliances are satisfaction with the alliance, usefulness of the ICT system in a virtual cooperation, satisfaction with the ICT system in a virtual cooperation, and satisfaction with regard to the partner's conduct with the ICT system in a virtual cooperation (see Section 4.4). Five levels of the degree of the four measurements will be applied in this research, and the level above 3 will be regarded as positive (Table 5.2 (page 85), 5.7, 5.8 and 5.9).

Level	Name	Characterized by
1	Very Low	The system is seldom used; no benefit can be seen
2	Low	The system is only used for basic communication; no sufficient benefit can be seen for enhancing the cooperation
3	Neutral	Partners are using the system fluently to support the communication, the benefit of the system has been proved
4	High	The system is important to the alliance, many business functions have been replaced by the electronic version, and for partners the dependence to the system is high
5	Very high	The system is central to the alliance, most business functions have been replaced by the electronic version, and for partners the dependence to the system is very high

Table 5.7: Levels of usefulness of the ICT system in a virtual cooperation used in this research

Level	Name	Characterized by
1	Very unsatisfied	System is very unstable, a lot of failures, very difficult or complicate to use, and extend functions
2	Unsatisfied	System is unstable, some failures, not easy to use, and extend functions
3	Neutral	System is somehow stable, some failures but not often, not very easy to use and extend functions
4	Satisfied	System is stable, less failures, easy to use, and extend functions
5	Very satisfied	System is very stable, failure nearly zero, very easy to use, and extend functions

Table 5.8: Levels of satisfaction with the ICT system in the virtual cooperation used in this research

Level	Name	Characterized by
1	Very unsatisfied	Partner is very weak in implementing and operating the system, or partner against to use or upgrade the system to suit the alliance needed. Trust's lost or no trusts when using the system; partner's behavior in using the system is not acceptable
2	Unsatisfied	Many improvements in implementing and operating the system, and partner's behavior in using the system need to be made; trust is at low level
3	Neutral	Some improvements in implementing and operating the system, and partner's behavior in using the system need to be made; trust is ok
4	Satisfied	Partner is cooperative in using the system, and could operate the system in proper way, trust has been sustained compare with the traditional way, partner's behavior in using the system is acceptable.
5	Very satisfied	Partner is very cooperative in electronic communication, all information are relevant and trustful, very familiar with the system, mutual trust has been built

Table 5.9: Levels of satisfaction with regard to the partner's conduct with the ICT system in a virtual cooperation as used in this research

5.5 Case Study Protocol

As discussed in Section 1.5, the research method is developed by taking into account the knowledge needed to answer the research questions as well as practical conditions that influence the applicability of specific methods. Five types of knowledge are described by Verschuren & Doorewaard (1999), which are descriptive, explanatory, predictive, evaluative, and prescriptive knowledge. The current research is aimed at generating descriptive and explanatory knowledge. Thus, case study is selected as the research method for generating knowledge on factors that influence the success of virtual cooperation within Dutch-Chinese strategic alliances in the selected companies. This method is selected based on its suitability for building descriptive and explanatory knowledge from the field and it is a preferred approach when 'how' and 'what' questions are to be answered (Ghauri & Gronhaug, 1995; Krathwohl, 1996). Even though case studies have limited external consistency, they can, e.g. through pattern matching, provide a better internal consistency than, for example, survey research (Miles & Huberman, 1994; Yin 1994).

In order to define the procedure for the execution of the case studies and to increase the reliability of this research, a case study protocol has been designed that contains the instrument, the procedures, and the general rules, that include case study tactics, case selection, data collection, and the data processing to be followed for conducting the case studies.

5.5.1 Case study tactics

Yin (1994) states that the quality of the research design can be judged by the criteria of construct validity, internal validity, external validity, and reliability (see Table 5.10).

Test	Case study tactic	Phase of research
Construct Validity	use multiple sources of evidence	data collection
	establish chain of evidence	data collection
	have key informants review	composition
	draft case study report	data analysis
Internal Validity	do pattern-matching	data analysis
	do explanation-building	data analysis
	do time-series analysis	data analysis
External Validity	use replication logic in multiple-case studies	research design
Reliability	use case study protocol	data collection
	develop case study database	data collection

Table 5.10: Case study tactics to meet four quality tests (Yin, 1994)

Construct validity

Construct validity is concerned with choosing the right operational measures for the concepts being studied. Four tactics are available to increase construct validity. The first is to use multiple sources of evidence: this research uses sources from desk research, company internal documents and materials, and interviews. The second is to establish a chain of evidence. Data from face-to-face interviews are primary in this research format. Besides sending closed questionnaires to the interviewees, structured interviews are also conducted with both Dutch and Chinese partners in the cooperation. Various archival records and reports are also gathered and analyzed to provide multiple sources of evidence and to establish a chain of evidence. The third one is, where possible, to improve the construct validity by having provisional reports reviewed by key informants. The pilot case study has also increased the construct validity of the research by improving not only the conceptual research model but also the operationalisation. The fourth tactic is to establish a case study report, which is made during and after each case study.

Internal Validity

Internal validity is concerned with the way in which causal relationships are established, and this is only relevant for causal or explanatory studies. This research is not designed to test theory in a statistical way since only a limited number of cases will be studied. The case study approach implies a high internal validity but a low external validity of the results (Yin, 1994). Pattern matching is applied in this research by using cross tabulation. Also, explanations regarding the propositions, and a set of causal links are applied. Moreover, one of the cases has been followed over a period of 3 years.

External Validity

This test deals with the problem of knowing whether a study's findings are generalizable beyond the immediate case study. A research model is developed and

then a number of case studies are conducted. This leads to a situation of replication logic with analytic generalizability (Yin, 1994). In this research, statistical generalization is not possible, as a case study is not a random sample. The research framework that was formulated before conducting the case studies serves as a template with which to compare the empirical results.

Reliability

A study is considered reliable when it can be shown that the operations in a study could be repeated with the same results. With case studies this means that another researcher, who followed exactly the same case study procedures all over again, would draw similar conclusions. Reliability can be achieved by documenting the procedures followed during the case study. In this research, the case study questions, the factor scales and the procedures for data processing are documented in this thesis as a case study database. It should be noted, however, that in this type of study there is a time element involved. Reproducing the study at another moment will produce different results since the circumstances will have changed.

5.5.2 Case Selection

One of the problems with case study research, and developing research design, is the limited ability to generalize the results. Since the relationships between the variables are developed from in-depth analyses of practical situations it means that only a limited number of practical situations (or cases) can be analyzed. The more situations one analyzes, the more 'solid' the result can be. In this research, the study of multiple cases is the main strategy that has been chosen to increase generalizability.

Ideally, for this research, each case should be a pure virtual alliance. However, very few purely virtual forms exist today. Therefore, cooperation with the degree of virtuality equal or above level 1 (ICT system as an additional tool to traditional communication channels) are considered as potential case companies (see table 2.4).

Not every alliance is suitable for a case study. The objective of the selection criteria is to arrive at a limited number of Dutch-Chinese alliances that are relevant to this research, out of the large number of alliances formed in recent years. On the one hand, these criteria must lead to a sufficiently homogeneous case study population to enable proper mutual comparison; on the other hand, the criteria must be chosen such that, within the population, a sufficient degree of diversity exits, in order to enable the development of a generically applicable framework. It should be noted that given the limited number of case studies undertaken, these could not be fully representative for all Dutch-Chinese companies and all types of alliance.

The criteria for selecting case studies, based on the developed research framework are:

1. Companies involved in an international strategic alliance both in the Netherlands and China.

2. ICT systems have been/are being adopted. Since current applications are generally at a low level, using Internet/E-mail as the main communication tool is the basic requirement.
3. The population must contain both successful and unsuccessful alliances.
4. It must be feasible for the researchers to contact the companies, and follow their electronic information exchange infrastructure. The companies must be willing to cooperate in the research, and they must provide access to the information that is required to conduct the research.
5. Companies, with more than one alliance, have a preference, because the alliances can be compared with each other.
6. As this research aims to investigate inter- and intra-organizational relationships, the partners in each case study should be separate enterprises or business units from the Netherlands and China.

Initially, the researcher was optimistic regarding the case selection since there was plenty of business cooperation between Dutch and Chinese businesses. However, disappointments arose after applying the fixed criteria. After two rounds of identifying suitable cases, partly together with Dutch graduate students, only ten cases including the pilot study fall into the required category, with their degrees of virtuality ranging from level 1 to level 5.

Case number	Companies	Criteria met
1 (pilot)	TradeView and ChinaOnline	1, 2, 3, 4, 6
2	ANT Software and BillionLink	1, 2, 3, 4, 5, 6
3	Scala NV and Scala Shanghai	1, 2, 3, 4, 6
4	Exact Software NV and Exact Shanghai	1, 2, 3, 4, 6
5	QDI Europe BV and QDI (China)	1, 2, 3, 4, 6
6	Eaton Holec NV and Holec Zhenjiang	1, 2, 3, 4, 6
7	Ferm BV and Ferm Global	1, 2, 3, 4, 6
8	Kema Quality and Kema (China)	1, 2, 3, 4, 6
9	Dutchi Motor and Huada Motor	1, 2, 3, 4, 5, 6
10	Philips Lighting and Philips & Yaming Lighting	1, 2, 3, 4, 5, 6

Table 5.11: Selected cases of this research

Considering the types of international strategic alliance (referring to Section 2.2.1 and Figure 2.1), the following can be said. In Case 1, 2, and 9, the cooperating partners are independent companies. The cooperating partners in the other seven cases are either parents and 100% owned subsidiaries (Case 3, 4, 5 and 7) or parents and joint-ventures (Case 6, 8 and 10). The impact this could cause must be taken into account.

According to Gulati et al. (2000), firms can be viewed as connected to each other in multiple networks of resource and other flows, hence, Multinational

Corporations (MNCs) can be regarded as consisting of a network of units. The emerging network conceptualization of the MNC sees a subsidiary unit as a node in a network of internal and external relationships, in which the role of foreign subsidiaries is regarded as crucial bridgeheads for linking the MNC to its external network counterparts (Andersson & Holm, 2002). Also, the relationship between headquarters and a subsidiary can be viewed as a principal-agent relationship (O'Donnell, 2000). In this sense, subsidiaries within a MNC are not just the long-arm of the parent, but they differ in terms of history, contexts, capabilities and organizational roles. MNCs have their objectives in creating subsidiaries, but the subsidiaries themselves have their own objectives that do not necessarily coincide with the objectives of the MNC (Andersson & Forsgren, 1995). To access external knowledge and information, foreign subsidiaries engage in business exchange and develop extensive relationships with local business partners. External relationships may cause a subsidiary to adapt products and processes to different cultural and national requirements concerning technology, operating procedures, and business practices (Andersson et al., 2001). Some subsidiaries in the MNC have a strategic role in the organization that goes beyond the traditional role of exploiting the parent company's firm-specific advantages (Birkinshaw & Morrison, 1996).

Subsidiaries are independent and dependent at the same time. They operate as independent actors in the marketplace where they establish relationships with counterparts like suppliers and customers, but they are also dependent on the strategic decisions within the MNC when it comes to allocation of resources (e.g. investments and the location of production) inside the MNC (Andersson & Forsgren, 1995). A subsidiary with a stock of knowledge that in some capacity is greater than that of other MNC units is likely to be an attractive collaboration partner (Gupta & Govindarajan, 2000). In this sense, the subsidiaries of Case 3, 4, 5, and 7 can be regarded as alliance partners of their parent companies as they have intensive external business relationships and a stock of knowledge.

In Case 6, 8 and 10, the joint ventures are more likely independent companies since the Chinese parents are also playing significant roles in the venture; the relationships between the joint ventures and their Dutch parents can also be regarded as alliances.

5.5.3 Data Collection

For this research, two kinds of data are needed, respectively related to the macro- and to the company level. At the macro-level, the relevant information concerns the development of the ICT infrastructure in the Netherlands and in China. At the company level, to define the influencing factors, and judge and analyze the performance of the virtual co-operations, both first-hand and secondary information are needed.

In order to increase the validity and reliability of the case studies, multiple sources of evidence such as documents, observations, archival records, and structured

and focused interviews will be used. At the macro-level, the main sources are secondary data, mainly gathered from the literature, the media and the Internet. A database is created for adding to and updating the data given the rapid development of ICT infrastructure. For the company level information, the four strategies mentioned below will be used:

- The data or evidentiary base consists of especially first-hand information such as the records of interviews which enable the researcher to develop an initial insight into the area that is being researched. In first instance, the general manager and the IT manager(s) of both partners will be interviewed. If possible, IT-related project managers and personnel will also be interviewed. The interviews will be done together with graduate students who partly joined this research. During the interviews, both structured and open questionnaires are used. For the structured questionnaire, the respondents are asked to rate each question on a scale ranging from 1 (very low) to 5 (very high), or to give an answer "yes" or "no", or to re-arrange the importance of some factors. For the open questionnaire, some questions will be discussed so that some assessments and insights besides the standard questionnaire could be more clearly clarified and obtained. This can also be seen as a further validation of the questionnaire and increased reliability of the respondents' answers. Each personal interview took between one and two hours with conceptual and interpretation problems in the questionnaire being discussed and explained. This discussion time during the interview clearly improved the reliability of the answers collected.
- General information on the partners such as their business scopes, the overview of their business sectors, history of the companies, sizes, organizational structure, and international strategies will be collected.
- Financial information on the partners, such as their turnovers, investments in IT systems, the benefits based on the IT implementations (actual or established), will be gathered.
- The final strategy to be followed in data collection is to maintain a chain of evidence. The aim is being to increase the construct validity of the case study, and is to allow an external observer, e.g. the reader of the case study, to follow the derivation of any evidence from the initial research questions to the ultimate case study conclusions. Moreover, the case study reports should adequately cite the relevant portions of the case study database.

For the structured interviews, questionnaires (see Appendices for further details) and also the scales for the factors are formulated.

5.5.4 Data Processing

In order to process the collected data, clear rating scales must be defined. Rating scales are widely used in management research in order to judge properties of objects without reference to other similar objects. According to Cooper & Schindler, rating scales for factors are designed to inter-correlate items so that their degree of

interdependence may be detected (Cooper & Schindler, 1998, p. 198). In this way, two problems: (1) how to deal with the universe of content that is multidimensional, and (2) how to uncover underlying (latent) dimensions that have not been identified, can be solved. As this research aims to identify the causal relations between variables and factors, clear factor scales need to be defined. Cooper & Schindler also suggest that even though some researchers think that more points on a rating scale provide an opportunity for greater sensitivity of measurement and the extraction of variance, the most widely used scales range from three to seven points. However, a three-point scale with only negative, neutral, and positive agreement leaves little room for interviewees to distinguish the actual status and situation. A seven-point scale has so many levels that it is difficult for interviewees to make a clear and sound judgment (Cooper & Schindler, 1998).

As discussed in Chapter 2, 3, 4 and 5, five-level factor scales are applied to measure all the relevant factors such as the macro-ICT infrastructure, strategic, operational, ICT system, and the success of virtual cooperation within international strategic alliances, and such scales are also applied to the interview questionnaires, in which respondents can choose from one of five levels (1-5). Since the interviews will be conducted with both partners within one alliance, the data used for processing will be the average score from both entities. Also, this research aims to identify the influencing factors, not the importance of different factors, thus, the data processing will take place without weighing these factors and the scores. The details of the coding scheme, i.e. assigning scores between 1 and 5 to each factor in the research model (see Figure 5.2) have been provided in the text above:

- strategic fit: Table 5.1;
- operational fits: Tables 5.3 – 5.6;
- macro-ICT infrastructure: Table 3.2;
- ICT system factors: Table 3.6, Table 2.4, Table 3.8, Table 3.11;
- success factors: Table 5.2, Tables 5.7 – 5.9.

5.6 Conclusion

Based on the literature study in previous chapters and the findings from the conducted pilot case study, the conceptual research model is elaborated as shown in Figure 5.2. In this model, the strategic factor, the operational factors, and the macro-ICT infrastructure factors are independent variables. ICT systems factors include ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality are intermediate variables. Satisfaction with the alliance, usefulness of the ICT system in virtual cooperation, satisfaction with the ICT system in virtual cooperation, and satisfaction with regard to the partner's conduct with the ICT system are the dependent variables. It is implied that strategic, operational, and macro-ICT infrastructure factors influence the success of an international virtual cooperation through the ICT system factors. Besides, literature indicates that the

strategic factor is the starting point for success in an alliance (see Section 3.3) and so, a direct link between strategic fit and the success of an alliance should be included.

To operationalize the conceptual research model, four main propositions are formulated using the relationships found in the literature discussed in previous chapters. These four propositions will be used as the guidance in case studies and cross-case analysis.

A case study protocol that contains case study tactics, case selection, data collection, and data processing also has been developed. Due to the fact that very few pure virtual forms exist, cooperation with the degree of virtuality equal or above level 1 (ICT system as an additional tool to traditional communication channels) are considered as potential case companies (see table 2.4). However, even with the modified criteria of case selection, only ten Dutch-Chinese business cooperation fall into the required category. Moreover, since there are several cases selected that the cooperating partners are either parents and 100% owned subsidiaries or parents and joint-ventures, the justification of this fact has to be taken into account. By adding the relevant literature study, the conditions and requirement that the subsidiary-parent relationship can be regarded as business cooperation have also been addressed.

CHAPTER 6 CASE DESCRIPTION AND ANALYSES

6.1 Introduction

This chapter presents ten case studies that have been carried out in ten Dutch-Chinese business cooperation cases. For all cases, the descriptions and analyses will be given by applying the research model defined in Chapter 5. Each case study report will consist of ten parts:
(1). General information of the cooperating partners.
(2). Approach of the case study.
(3). General information of the cooperation.
(4). A brief description of the history and current status of ICT systems use within the cooperation.
(5). Analysis of strategic factors of the cooperation.
(6). Analyses of relevant operational factors such as resource, cultural, organizational, and technological factors of the cooperation.
(7). The impact of the macro-ICT infrastructure on the use of ICT systems for virtual cooperation.
(8). Analyses of the relevant ICT system factors.
(9). Analyses of the relevant measurements of success of the virtual cooperation within the strategic alliance.
(10). A figure in line with the research model (Figure 5.2) including scores for all relevant factors and a brief explanation of the virtual cooperation are given in order to draw the conclusion of this case study.

6.2 Case Study of TradeView and ChinaOnline

The pilot case study was used for refining the data collection plans with respect to the content of the data and the procedures to be followed. However, as this case represents the most problematic one among the ten cases, it is valuable to take this case as a real case study by using the developed research model. Since information regarding the two companies, and their alliance, has been given in Chapter 5, only the conclusions will be presented in this section.

From Figure 6.1, it can be seen that the two cooperating companies had a strong strategic misfit from the beginning since their objectives and goals towards the alliance were largely different. The alliance is more important for the Dutch party since the Dutch partner has invested its core competence in the cooperation. While for the Chinese party, the alliance is regarded as just an additional service in its own package offered to customers. The imbalance of interdependences between the two parties has resulted in a misfit in some of the operational factors including the

resource, cultural and organizational ones. As a result, satisfaction with the alliance was very low, which in turn led to the eventual ending of the alliance.

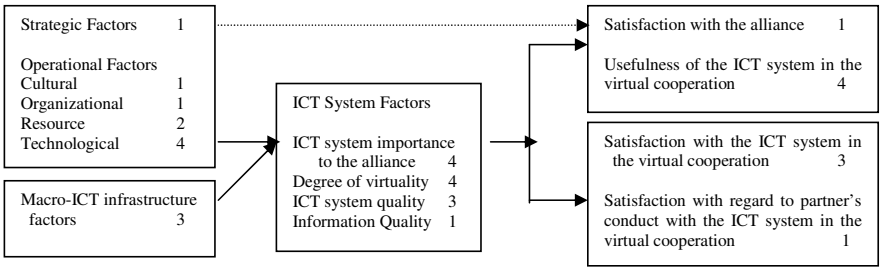

Figure 6.1: Findings from case study of TradeView and ChinaOnline

In terms of operational factors, cultural fit is the major discrepancy in this case. The lack of basic understanding and trust between the two parties has resulted in a number of unexpected actions especially by the smaller partner: TradeView, for instance, was withholding information, especially the source code of the product, not responding if the proposal does not match its own interests, not responding regarding customers' requests unless it has received payment from the cooperating party first. Such culturally related actions have seriously affected the quality of the information exchange. Consequently, neither partner was satisfied with the other one. Only a good fit was found in terms of technology since both entities are IT-related enterprises, which led system quality and degree of virtuality to be rated as neutral to high. The strong misfit in cultural, resource, and organizational areas led to a very low quality of information because both entities regarded the information provided by the other partner as untruthful.

The ICT system importance for this alliance was high due to the nature of both partners: their products and services could be provided via the Internet, and also the macro-ICT infrastructures in both China and Europe could support the use of ICT systems. Both partners did gain some advantages by using the ICT systems, for instance a cost reduction in travel and communication, and some new Chinese customers, and so the ICT system was regarded as useful.

This alliance can be placed at a high level in terms of virtual cooperation because the hard parts, for instance the usefulness of the ICT system and the satisfaction with the system, had reached certain levels. As both parties are IT experts, the net feeling towards the system itself is high. However, the very low quality of information caused the trust between the partners to be totally lost in the virtual environment. As a result the alliance ceased due to a very low satisfaction with the alliance, and very low satisfaction with regard to the partner's conduct with the ICT system in the virtual cooperation.

6.3 Case Study of ANT Software BV and BillionLink

6.3.1 The companies

Advanced Numerical Technologies (ANT) is a young and innovative company specializing in distributing hardware and software for brain research technologies and products. The company has offices in Germany and in Enschede, the Netherlands. In order to reach more customers and to increase sales, ANT decided to move into the Chinese market in the late 1990s.

BillionLink Trading Limited (BillionLink) is a medium-sized Chinese trading company that focuses on medical equipment and related products such as brain research and neurology technology. It was founded in 1998 with its head office in Beijing and several branches or offices in key cities/provinces (Hong Kong, Shanghai, Wuhan and Sichuan) in China. The company mainly serves as a third party in the market for neurology systems for hospitals.

6.3.2 The approach of the case study

In this study, two sources of evidence have been used: archival records, structured and unstructured interviews. The archival records cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies; and financial information of the partners including their turnovers, investments in ICT systems, benefits from the ICT implementations (actual or established), etc. Intensive interviews including structured questionnaire and unstructured interviews with both partners of the alliance in the Netherlands and China have taken place, i.e. with the general managers, and the key employees who were responsible for electronic information exchange, business cooperation, and business development. The scores of each measurement are mainly based on the questionnaire filled and the questions asked during the interviews.

6.3.3 The cooperation

In 2000, following an introduction by ANT's Italian partner, ANT and BillionLink decided to form a partnership. Why did they form the alliance? According to ANT, barriers such as high operating fees, language, the lack of knowledge, experience, and channels in the Chinese market had shown the difficulty for ANT, as a small company, to go at it alone in China. Thus, getting a suitable, strategic, marketing alliance partner could solve this shortcoming. BillionLink believed that to be an agent for ANT's products, which were at that time not available in China, could strengthen its competitive position. Therefore, BillionLink insisted on being the only distributor of ANT in the Chinese market even though ANT had another Chinese distributor (one of BillionLink's major competitors) at that moment. After negotiations and careful consideration, ANT decided to stop the relationship with that company because it believed BillionLink is a stronger player than the former partner in the Chinese

market, even though, according to ANT, a smooth communication and cooperation process with the previous Chinese company had been built up.

The alliance between ANT and BillionLink is simple: ANT is more research oriented, while its Chinese peer is more focusing on distribution. ANT provides software and some hardware, and offers some basic training to BillionLink's staff and customers; while BillionLink is responsible for buying some other hardware to make a complete product package for customers, gaining new orders, training and after-sales support. So it is actually a joint marketing alliance without a formal and strict agreement but a strict price-list for the products between the partners. By the end of 2002, the alliance had 12 major Chinese customers (large hospitals). The structure of such relationship can be viewed as in Figure 6.2:

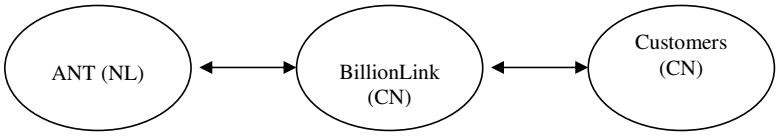

Figure 6.2: Relationship between ANT, BillionLink and their Customers in China

6.3.4 The use of ICT system in the cooperation

Currently, the level of ICT system within this cooperation is low since only email and basic information transfer technology have been used. However, this situation is expected to be upgraded in the future because both partners hope some important, value-added, ICT applications will be implemented due to some disadvantages seen in the current ICT use. For instance, BillionLink functions as an agent to the customers, while ANT remains responsible for after-sales technical support. It is impossible for ANT to react quickly due to the physical and time zone differences. As a result, upgrading ICT systems to satisfy customers is seen as essential. Also, the trust between the two partners has reached a mature level even though both parties regard trust building as the major success factor since the cooperation started in 2000. Thus, an additional video conferencing system could have a positive impact, and the need for business travel and face-to-face meetings between the two companies could be decreased.

6.3.5 Strategic fit

The mission of ANT is 'providing a system to businesses and hospitals, which can be used to do brain research', and the strategic objective is to be the number one in the clinical equipment part and in the research equipment part. ANT regards China as one of the major developing markets for its products, and the company hopes that sales in the Chinese market could increase rapidly and help it to overtake its main competitors. BillionLink's mission is more general and related to the products that the firm distributes. Currently, BillionLink operates with a local orientation, only focusing on a part of China. It hopes to play a more important role in other parts of China by

teaming up with companies who have core competences. In addition, BillionLink also wants to be a player in the international marketplace in the future; thus forming partnerships is a strategic choice towards achieving this goal. As there is a considerable degree of match between both partners' objectives and goals, the strategic fit in this alliance is placed at level 4 (high).

6.3.6 Operational fit

If looking only at the sizes of the two companies, there is certainly an imbalance of resources between the two parties. However, the problem of resource imbalance has been avoided as the alliance actually is a joint-marketing alliance, and it is mostly project-based, which means cooperation is mainly based on customers. In this alliance, ANT provides its core competence (core technologies/products) while BillionLink's inputs are its distribution and services channels in China. Based on the questionnaires filled during the interviews, the match of resource inputs by both partners can be considered as level 3 (neutral).

Communication between the partners on alliance issues occurs roughly once every two weeks, in which the language used is mostly English. One of ANT's employees is a native Chinese, which enables communications in Chinese if necessary. Both partners pointed out some culturally related issues. In BillionLink's view, a surprising fact is that there are always different people from its Dutch counterpart to react to or communicate with. The Chinese believe that a fixed person for the communication process could sustain trust between the partners, but this view is not understood by the Dutch side. An example is: the CEO of BillionLink had made a special agreement regarding prices with 'Frank' from ANT; when 'Frank' was once on holiday, the communication with the CEO of ANT was regarded to be more difficult by the Chinese partner even though the CEO of ANT knew more about the special arrangement of the prices than 'Frank'. ANT did realize that face-to-face contact is of key importance when doing business with the Chinese. Sharing emotions and expressing feelings, and having dinner together or other social events, could help to build and sustain mature trust with the Chinese. However, the Dutch partner blames the slow decision-making process for sometimes making communication more difficult, resulting from the Chinese's centralized formal procedures and decision-making. According to ANT, the contact person in China is always the same one; however, unlike the arrangement in ANT, the contact person from BillionLink is not the decision maker. Because the decision maker was not always present during the communications, some information was missed in between, and the decision-making process was slow to some extent. Another issue is the Chinese's opportunistic behavior, in which the Chinese partner sees the Dutch side as a provider of knowledge, capabilities, and business. If a new potential customer arises, interest could rise sharply from the Chinese side, and in turn communication could become more frequent. Both partners mentioned withholding information by the other side. According to BillionLink, not all the information it needed was provided by the Dutch

side. An example is that once ANT informed BillionLink that a payment should be in Euro, and not US$ as normal, without discussion or giving earlier notice to its partner. The Chinese side regarded this change as a one-off deal; however, it became permanent. Also, in ANT's view, the Chinese sometimes just ignore a question rather than answer 'no'. Both partners agreed that such behavior could hurt trust. According to both companies, the use of ICT systems cannot overcome the existing cultural barriers. Despite these cultural problems, both parties agreed that such problems had not resulted in serious damage to the alliance. Thus, the cultural fit in this cooperation is regarded as level 3 (neutral).

The organizational structure of ANT can be described as flexible and informal. In comparison, BillionLink's organization involves more employee responsibilities, communication often occurs through the same person, and the structure is more formal. When the alliance was formed, no major organizational changes were made at ANT except hiring a Chinese MBA graduate. The same was true at BillionLink except some permanent staff became responsible for the cooperation with ANT. Based on the questionnaires filled during the interviews, despite the differences of the organizational factors, the arrangements for the alliance from both parties were made and planned, thus, organizational fit is regarded as level 3 (neutral).

As the current level of ICT usage within this cooperation is still low, it is unclear how the technological issues related to the ICT use by both partners are matched. As an ICT enterprise, ANT currently has 12 employees in its Enschede office, of which most are experts in software and/or ICT areas. ANT has also built advanced ICT solutions with its European partners, and so it can be said that the ability to master ICT systems in ANT is high. In BillionLink, only three employees are responsible for IT, this number is much lower due to this being a trading company. It can be concluded that there is a technological gap regarding implementing and operating ICT systems between the two parties. However, this gap has not resulted in serious problems so far, due to the low level of ICT systems use. The situation could be improved if BillionLink realizes the importance of ICT and hires more IT engineers. Therefore, the technological fit is regarded as level 3 (neutral).

6.3.7 Macro-ICT infrastructure

ANT blamed the low quality of macro-ICT infrastructure in China, and the lack of willingness to upgrade ICT system use in the alliance by its Chinese partner, as the main causes for the low level of ICT usage in their cooperation. It is believed that the current macro-ICT infrastructure in China and Europe satisfies the current ICT use within the cooperation, which includes email and the Internet in combination with traditional communication tools such as phone and fax since no significant amount of data or information transfer and exchange is needed. Thus, the cooperating partners believe that the fit of macro-ICT infrastructure between China and Europe in this case can be placed at level 3 (neutral).

6.3.8 ICT system factors

As a software developer, ANT regards the use of ICT systems as important (level 4). This view is supported by its own experiences such as online customer services, intra- and inter-organizational information sharing, and online training in Europe. An example was given that once one of its customers in Europe had serious technical problems: by providing an access code to ANT, ANT could connect to the system from its Enschede office and solve the problem in a very short time. According to the CEO of ANT, his company is very small, and thus frequent business travel to China especially by himself is a major additional workload. Also, in order to overcome the time zone differences, and to serve far-reaching end customers quickly, advanced ICT systems especially Internet-based applications, could give this small company significant advantages. Whereas, for the Chinese party, the ICT system is just regarded as an addition tool to the more traditional communication channels (level 2). According to the general manager of BillionLink, "the use of email harms the Chinese's need for personalized communication" and it also hurts trust. More recently, BillionLink has started to realize the importance of the ICT systems and a plan for upgrading and implementing ICT will be drawn up in the future. By doing so, both cooperating parties will become more dependent on ICT systems, which increases the degree of system importance. For the current situation, taking the average score between the two entities, the system importance for this cooperation can be placed at level 3 (neutral).

ICT usage in this cooperation is not high since only email and Internet are in use alongside phone and fax. Thus the degree of virtuality at the current stage is at level 3 (neutral).

Given the low level of ICT use, it is difficult to measure the quality of the system. The Chinese entity does not have an opinion regarding this issue while, for ANT, even though it is satisfied with the current application, the system quality is at a lower level than expected as the macro-ICT infrastructure in China is still under-developed, and formalized procedures are lacking. We place the ICT system quality at level 3 (neutral).

Based on the interviews, both parties commented that basically the information provided by the partners is relevant, good, and truthful. However, some misunderstanding has occurred due to the lack of standardized and structured formats. Also, sometimes information could be withheld, which could hurt the trust between the partners. The communication language is English, which also limits the quality of information since English is not the native language for both partners. To summarize, the information quality in this case is rated at level 3 (neutral) by both parties.

6.3.9 Success of the virtual cooperation

Both parties regarded the alliance as stable and healthy, and that the market development in China was going well. Mutual trust between the two partners has been established. According to the CEO of ANT, ANT wants to grow in system selling in China. In 2002, two systems were sold in China and the number reached five in 2003 (average price for a system is around 100,000 Euro), and both partners did gain sizeable profits from it. So the achievement of the objectives and goals of the alliance is high. However, uncertainties still remain. For example, what if the Chinese company became an agent for ANT's competitor in the future? During the interviews, ANT had expressed this concern; however, switch to another partner would not be desirable by either party since the costs could be high. Thus, the degree of the satisfaction with regard to the alliance is at level 4 (high).

ANT regards the ICT system as useful (level 4) since it could bring advantages such as cost savings on business travel and communications for this small firm. However, for the Chinese partner, the system is not very useful (level 2), as the Chinese prefer face-to-face or personal contact rather than the electronic way. Taking the average, the degree of usefulness of the system for this cooperation is regarded as level 3 (neutral).

Because the level of ICT system use in this cooperation is not high, both partners hold a neutral view towards the degree of satisfaction with the ICT system. In addition, both partners are willing to upgrade ICT systems. The degree of satisfaction with the ICT system is thus at level 3 (neutral).

Both entities regarded their partners' conduct with the system as generally acceptable. However, sometimes behavior such as withholding information or not responding to a request could hurt feelings and trust. Therefore, the degree of satisfaction with regard to the partner's use of the ICT system is at level 3 (neutral).

6.3.10 Conclusion

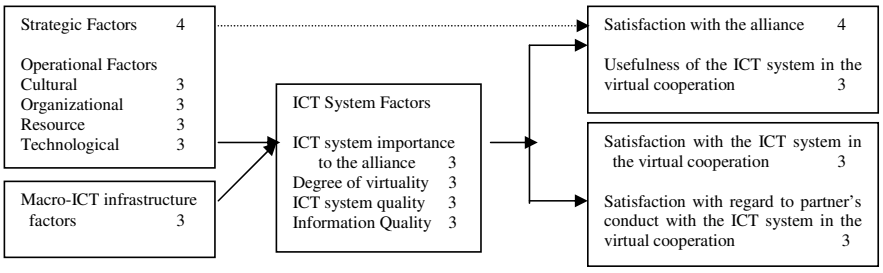

Figure 6.3: Finding from case study of ANT and BillionLink

Figure 6.3 gives an overview of the scores for all the relevant factors. It can be concluded that the alliance between ANT and BillionLink can be considered as

successful since the achievement of a fit of objectives and goals between the two partners leads to the high satisfaction with the alliance.

However, the virtual cooperation between the two partners cannot be regarded as fully successful since other measurements of the status of virtual cooperation are at level 3 (neutral). All operational fits (cultural, organizational, resource, and technological) are at this level, together with the status of the macro-ICT infrastructure, which leads to ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality all being given a neutral status. As a result, both the hard and soft parts of the virtual cooperation are at level 3 (neutral), and the virtual cooperation cannot be regarded as a real success. Based on interviews, it is clear that there is a lack of a common agreed ICT strategy between the two cooperating companies, which caused the low usage of ICT in this alliance. Even in this situation, the quality of ICT system use is not that high due to a lack of trust and non-standardized information. Both companies agreed that they need to pay more attention to building and sustaining mature trust in order to arrive at an agreed and shared ICT strategy. For instance, a shared database for technical issues that would enable the Chinese partner to solve some client problems without guidance from the Dutch side; a standard format and form for information exchange would avoid misunderstanding and increase efficiency; videoconference systems would help satisfy the Chinese need to see emotion during the communication process. Both parties have shown positive signs regarding future ICT use (e.g. videoconference system, online ordering and customer support) in their cooperation.

6.4 Case Study of Scala Business Solution NV and Scala Shanghai

6.4.1 The companies

Scala Business Solutions (below referred to as Scala) is an independent software developer and vendor that offers companies integrated ERP, CRM and SCM software on a web services platform. With 25 years of experience in this field, this company has 600 employees in 25 offices in Europe, Asia and the Americas; and it also has a global partner network covering 70 countries. Its revenue for 2002 was US$ 73.4 million. Its headquarters is in Amsterdam, the Netherlands, the main software development centre is in Moscow, Russia; and all its competency centers are in Europe. In 2002, Scala was ranked the 50th in terms of management applications vendors in the world by Manufacturing Systems Magazine (AMT, 2002).

According to Scala's homepage, the company has been selling and implementing ERP systems in China for more than 15 years. Scala Business Solutions Shanghai Limited (below referred to as SSH) is a fully-owned subsidiary of Scala. Currently there are 40 staff working at SSH, and most of them are marketing personnel. It also has more than 20 partners (distributors) in China. According to International Data Corporation (IDC), SSH was ranked No. 1 ERP vendor in the years 1999 and 2000 in China. In 2000 alone, SSH had a 12% share of all ERP installations

in Mainland China. By the end of 2003, Scala had more than 300 Chinese customers (Reed Business Information, 2004). According to the senior vice-president of Scala, the revenue from China is still mainly from direct channel selling.

6.4.2 The approach of the case study

In this study, two sources of evidence have been used: archival records, structured and unstructured interviews. The archival records mainly are based on desk research since Scala is a public company and based on interviews. They cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies; and financial information of the partners including their turnovers, investments in ICT systems, benefits from the ICT implementations (actual or established), etc. Interviews by using structured questionnaire with the strategic alliance manager in Scala in the Netherlands and with the Managing Director of Scala Shanghai (who is also the head of Scala Asia Pacific and the senior-vice president of Scala) have taken place. The scores of each measurement mainly based on the questionnaire filled and the questions asked during the interviews.

6.4.3 The cooperation

SSH is a fully-owned subsidiary that acts as an independent business unit of Scala, and has full responsibility regarding the Chinese market (e.g. generating revenue, finding and managing Chinese partners/distributors, serving customers in China). Following the discussion in Section 5.5.2, SSH can be regarded as a business cooperating partner of its parent company Scala since it has intensive external business relationships and a stock of knowledge. Thus, this case study will focus on the cooperation between Scala and SSH. Further, the relationship between SSH and its Chinese partners will also be briefly discussed. The structure of such relationships can be viewed as in Figure 6.4:

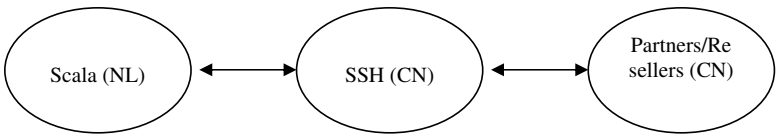

Figure 6.4: Relationships between Scala, SSH and their partners/resellers in China

6.4.4. The use of ICT systems in the cooperation

During the interviews, the current level of ICT use within this cooperation is characterized as high: besides the large amount of public information about Scala's products and services on its homepage, web-based portals and emails have been the major tools used for communication. Brief descriptions of such portals are given below.

Scala World Employee Intranet enables Scala employees worldwide to access this portal and to exchange information at any time. To access it, users need to login

by using Scala email accounts and passwords. The information on this portal is mainly product related such as pricing, technical support, and some schedules about promotions. Information on employees' details and activities for instance work planning, are not included. In this sense, this intranet is more like a database, which provides up-to-date product related information to every employee.

Partner Portal is also mainly used to provide product related information especially on technical issues. Scala's partners can access this portal by registered user-names and passwords. Even though this portal is managed by Scala, Scala offices worldwide can all access and maintain it so that Scala as a whole can respond to partners' questions and requests immediately despite the time zone differences. In this way, a real 24x7 platform for communicating with partners is established.

Scala Customer Centre enables every customer to obtain online technical assistance, a wide range of support documents and materials, and a software release library from which they can directly download hot fixes, patches and service packs. This centre also includes Discussion Forums so that users worldwide can talk and exchange information with each other. Sometimes problems or questions may also be forwarded to Scala's partners and further actions can therefore be taken.

Scala University is a corporate 'university'; it is dedicated to the training and development of its employees, partners, dealers, and clients. The training and education is copped at in two ways: firstly by providing courses for consultants, sales people, and end users to increase their effectiveness in their jobs. Secondly, Scala University, as an integrated part of R&D increases productivity by setting and delivering education targets as part of a project plan. It uses a variety of course delivery methods such as classroom training, workshops, and web-based training. The most used method is long distance training, aiming to spread course locations geographically while minimizing travel for course participants.

6.4.5 Strategic fit

According to one of Scala's alliance managers, the head office of Scala is a very small administration centre; the main business activities are done by its business divisions and units. SSH belongs to the Scala Asia Pacific division, however, as the managing director of SSH is also the head of Scala Asia Pacific and the senior-vice president of Scala, the connection between Scala and SSH can be regarded as very direct. As a fully-owned subsidiary of Scala, SSH does not have any strategic conflicts with its parent. Thus, the strategic fit between the two is at level 5 (a perfect fit).

6.4.6 Operational fit

As part of one family, the resource fit between Scala and SSH should be very high. However, based on desk research, an interesting finding is that despite the success over some years in the Chinese market, the size of Scala's operations in China has not increased. As Scala is in the process of merging with Epicor due to its financial difficulties (Rethink IT News, 2003), this evidence indicates that any additional

resource input from Scala to China for enlarging in operations is not likely. Thus, the resource fit between the two entities can be regarded as fit (4).

Based on interviews, Scala's culture has been transplanted to SSH and the culture of the two entities fit well. Communication between Scala and SSH is very frequent. Besides the web-based employee portal, communication via phone and email occurs about 20 times per day, and the language used is English. Misunderstanding between the two entities may occasionally occur. Normally such misunderstandings are related to Chinese employees' inability to master English. According to the interviewees, despite the misunderstandings, cultural conflicts between the two entities are manageable since the head of SSH also serves as SVP of Scala. Therefore, the cultural fit between the two can be regarded as a level 4 (fit).

The organizational structures of both Scala and SSH can be described as formal. Except for sending activity reports to Scala, SSH enjoys a certain freedom in operating in China. Also, as both entities are IT enterprises, the organizational arrangements such as for ICT use, communication, and cooperation are in good order. Therefore, it is concluded that the organizational fits between Scala and SSH is at level 5 (a perfect fit).

As Scala is an IT vendor, and all members of its network are IT or IT related companies, the ability to master ICT systems of these entities are very high. Thus, the technological fit between the entities can be regarded as level 5 (very high).

6.4.7 Macro-ICT Infrastructure

Based on the interviews, the macro-infrastructure in the Netherlands is well developed while, in China, in the so-called first tier areas/cities such as Beijing, Shanghai, Guangzhou, Shenzhen, and Wuhan, connection to the Internet is quite good, which means the success rate for accessing Scala's web-based portals can be 95% or higher. However, in the so-called second tier areas/cities, the rate is lower but acceptable; and, in the rural areas, the infrastructure is far more under-developed. Currently, SSH and most of Scala's Chinese partners are in the first tier areas, and, therefore, the macro-ICT infrastructure between the Netherlands and China can be rated at level 4 (high).

6.4.8 ICT system factors

Scala as a software applications vendor sees ICT systems such as its website and web-based portals are central to its business. With these systems, together with email, phone, and fax, Scala can reach and connect electronically to its employees, partners, and clients worldwide. Thus, the system importance for Scala and its network can be put at level 5 (very high).

Since, as described, web-based portals have been used in Scala's business network; the degree of virtuality might be very high. However, such systems have not been fully integrated; for instance, the planning, ordering, and financial functions have not been included, and phone and emails still dominate the daily communication

process except for product related technical issues. Thus, the degree of virtuality is rated as level 4 (high).

According to the interviewees, these portals and systems are operated and maintained by Scala engineers worldwide on a 24x7 basis, so the chance of failure is very low. Also such portals are seen as easy to use and with a perfect interface, and it is easy to add new functions. As a result the ICT system quality can be regarded as level 5 (very high).

Based on the interviews, most information exchanged and stored through the web-based portals are product, and especially technical, related, while other information is mostly exchanged using other means, for example email and it is mostly not standardized and structured. Also, the information exchanged between SSH and its Chinese partners is in Chinese, while the communication between Scala and SSH is in English, the two processes could not thus integrate automatically. Thus, the information quality in this case is put at level 4 (high).

6.4.9 Success of the virtual cooperation

The Chinese market has been regarded as very important for Scala (Source: Scala Homepage), and SSH has been very successful in that market. Thus, the satisfaction regarding the achievement of the objectives and goals of the cooperation is undoubted is at level 5 (very high).

Based on the interviews and Scala's homepage, the ICT systems are regarded as very useful due to the following advantages: 1) central library/databases for information sharing; 2) instant technical assistance; 3) overcoming time zone differences, and 4) reduced travel and communication costs. Therefore, the degree of usefulness of the ICT systems is rated at level 5 (very high).

The ICT systems are rated of very high quality and useful by the interviewees, so the satisfaction with the ICT system can be placed at level 5 (very high).

The abilities in operating ICT systems by Scala, SSH, and their partners are very high because they are IT companies or IT consulting firms. However, due to the language problem, misunderstandings can sometimes occur. Thus, the degree of satisfaction with regard to partner usage of the ICT system is put at level 4 (high).

6.4.10 Conclusion

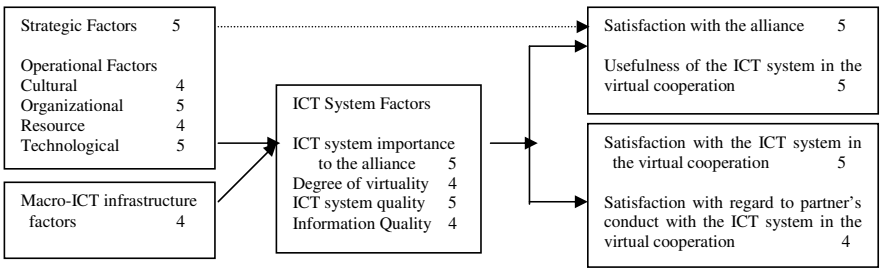

Figure 6.5: Findings from case study of Scala and Scala Shanghai

Figure 6.5 gives an overview of the scores for all the relevant factors. It can be concluded that the alliance between Scala and SSH can be considered as successful since both entities have great satisfaction with the achievements of the objectives and goals.

The virtual cooperation between the two parties can also be regarded as successful since all the measurements are at level 4 or above. Thanks to its nature, ICT systems use in Scala and SSH is very intensive. During the interviews, no misfit or conflict in strategic and operational factors was mentioned. The reason is mainly that the two entities are in the same family, even though SSH is a registered independent limited company in China. Unlike other companies, Scala seems to have several business centers, each operating individually. For instance, SSH is under the supervision of Scala Asia Pacific with the regional headquarters in Singapore. At the first glance, the distance between Scala and SSH could be great. However, since the main interviewee of this research has three different titles, senior vice-president of Scala, and general manager of both Scala Asia Pacific and SSH, the relationship between Scala and SSH is close. Being the 'most successful ERP vendor in China' gives SSH its strategic position within the Scala family. The fact that Scala is divided into several operation centers explains why, as an ERP vendor, with its own quality applications and abilities, the degree of virtuality in this network does not reach the highest level (full integrated network). In this sense, the cooperation between Scala and SSH, and between different Scala business centers/units in actual operation seems not that close due to the fact that only product related issues are placed on the Internet, even though it is believed that fully-integrated systems that include ordering, planning, and financial functions could bring greater advantages or more efficiency to the network. The reason for this is Scala's organizational design and structure. However, based on currently available information, it is unclear what structure would be more suitable for this network.

As IT enterprises, the ICT system is very important to the cooperation, and this leads to the high degree of usefulness of the system. The nature of the involved parties, their substantial investment, together with the matching of the macro ICT-infrastructures in both countries have resulted in a high degree of virtuality and ICT system quality, which in turn leads to a high satisfaction with the system. The transfer of 'Scala culture' to SSH, together with the organizational arrangements for cooperation and electronic communication have resulted in high quality information transfer and, in turn, high satisfaction with regard to partner's conduct in using the ICT system.

6.5 Case study of Exact Software NV and Exact Shanghai

6.5.1 The companies

Exact Software NV (below referred to as Exact) is a manufacturer of software for accounting, HRM, CRM, e-business, and ERP. It was established in 1984 and has been listed on the Euronext Amsterdam Stock Exchange since June 1999. With its head office in the Netherlands, the company now has more than 60 offices/subsidiaries with more than 2,000 employees worldwide. In 2002, Exact was ranked as the 26th management applications vendor in the world by Manufacturing Systems Magazine (AMT, 2002). In 2003, Exact had Euro 206.4 million revenues, of which 40% were from the Netherlands, North America added about 30%, and the rest of the world contributed the remaining 30%. Exact is not large enough to be one of the so-called first tier Big5 management applications vendors such as JBOPS (JDE, Baan, Oracle, People Soft, SAP) and, on the second tier, it mainly focuses on medium sized companies who cannot afford the applications provided by first tier producers.

On June 20th 2000, Exact officially opened its Chinese office in Shanghai called Exact Software (Shanghai) Co. Ltd (below referred to as ESH) and, since then, ESH has made great progress in developing the Chinese market. ESH is aggressively expanding its presence in China. In 2003, two additional offices, one in Beijing and one in Guangzhou, were opened (under the control of the Shanghai office), and at least ten more offices are scheduled to be set up in the near future. ESH is a fully-owned subsidiary of Exact, and operates in the Chinese market by cooperating with nine Chinese partners/resellers.

6.5.2 The approach of the case study

In this study, two sources of evidence have been used: archival records, structured and unstructured interviews. The archival records mainly are based on desk research since Exact is a public company and based on interviews. They cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies; and financial information of the partners including their turnovers, investments in ICT systems, benefits from the ICT implementations (actual or established), etc. Interviews by using a structured questionnaire with the senior marketing manager in Exact in the Netherlands and with the vice general manager and the assistant to the general manager of ESH have taken place. The scores of each measurement are mainly based on the questionnaire filled and the questions asked during the interviews.

6.5.3 The cooperation

As with SSH and Scala in the previous section, ESH is a fully owned subsidiary of Exact that takes full responsibility for the Chinese market (e.g. generating revenue, finding and managing Chinese partners/resellers, serving customers in China). Following the discussion in Section 5.5.2, ESH can be regarded as a business cooperating partner of its parent company Exact since it has intensive external business relationships and a stock of knowledge. Thus, the investigation will be focused on the partnership between Exact and ESH, and some attention will also be paid to the relationship between ESH and its Chinese partners. The structure of such relationships can be seen in Figure 6.6:

Figure 6.6: Relationships between Exact, ESH and their partners/resellers in China

6.5.4 The use of ICT systems in the cooperation

The current level of ICT usage between Exact and ESH can be characterized as very high, with almost all information and business activities being done electronically. A brief description of the history of ICT use and the Exact portals is given. Initially Exact used Microsoft Outlook for electronic communication. However, this had some disadvantages:

1. When someone deleted mail, the history of communication between this person and others was lost.
2. When people traveled, their mailboxes were not accessible, which meant the communication was broken.
3. Information could only be shared by people involved; there was no database for everybody to share information (while information sharing is seen as very important). The most used way to achieve this was the use of Notice-note.

Therefore, Exact developed its own solutions, such as e-ERP and the latest e-Synergy, which are used internally and also with customers. E-Synergy is a comprehensive business process management solution that provides organizations with real-time financial, multi-site reporting, and relationship and knowledge management capabilities. Employees, customers and partners are provided with real-time access to information across the entire organization. With e-Synergy, businesses can define and manage all processes, such as workflow, document management, sales and reporting. Utilizing Web technology, e-Synergy links all aspects of an organization's employees, documents and customers in a single database platform. Within the e-Synergy system that Exact uses, there are four portals namely customer, reseller, supplier, and employee. Different groups can use these portals to find relevant information or

solutions. For instance, customer support is on a 24x7 basis. Exact's website has a list of FAQ. From this list, basic questions/problems can be answered. Next, there is an online form for sending requests so that service centers in locations around the world can react. The interviewee gave an example to the idea: finding a solution to a problem could take time, for example, when the customer could only speak and understand Chinese, and it is midnight in China and a Chinese speaking employee to help cannot be found. Every customer has a login name and password, so they can login to the system and try to find someone who can help. In the employee portal, the communication between Exact and its subsidiaries is also continuous. Everyone's job-related activities and profiles are in the system, so nothing can be hidden. Because the communication between Exact and every subsidiary is the same, there are no special things for Exact and China. The basic steps are:

(1) Every morning, every employee can first view the news page which includes important events within the corporation;
(2) Then they check e-mails through the system and take action; these mails or posts are grouped by degree of priority;
(3) Then gather the information they need from the system and take follow up actions;
(4) In addition, there is an online log-book for every task so that everyone can see the progress.

6.5.5 Strategic fit

Even though ESH operates independently, its daily activities and all the information are monitored and controlled by Exact through the web-based network. The link between Exact and ESH can be regarded as a direct relation. As a fully-owned subsidiary of Exact, ESH does not have any strategic conflict with it parent. As a result, the strategic fit between the two is at level 5 (very high).

6.5.6 Operational fit

No data could be obtained on how much resources Exact have invested in China. From the fact that Exact is rapidly expanding its presence in China, and both Exact and ESH are in the same family, it can be concluded that the resource fit between the two entities should be at level 5 (strong fit).

As a wholly-owned subsidiary, ESH has had Exact's culture transplanted. Communication between the two entities is very frequent. The main communication tool is its own product: e-Synergy. Through e-Synergy, every employee around the world can access and check certain information (for security reasons, Exact sets 99 control levels). The official language of Exact is English, and all information exchange within the network must be in English so that everyone can understand. Based on the interviews, misunderstandings between the two entities are rare because most of the Chinese employees have good English skills. Exact also has a policy that every three months the managers (more than 80) from every subsidiary should come to Delft, the Netherlands, for a 1-2 day meeting. The meeting has a fixed agenda, and

every employee can see what has been discussed through the network. Exact believes that sharing information should be the core of a good corporate culture. Further, Exact has set up fixed guides, policies, and procedures for managers, employees, partners, and also customers to follow so that people easily find the way of for doing things and less misunderstandings should happen. As a result, the cultural fit between the two can be clarified as level 5 (strong fit).

The organizational structures of Exact and ESH can be described as formal. ESH enjoys certain freedom in operating in the Chinese market. However, all its activities and related information must be included on the employee portal (e-Synergy), and open to all employees worldwide. The organizational arrangements in the two entities seem in very good order. For example, there are staff that take different responsibilities such as for sales, direct channel and indirect channel management, alliance management, administration, and finance. Therefore, it can be concluded that the organizational fit between the two parties is at level 5 (very high).

As Exact is a software application vendor, and all of its partners/resellers are IT companies or IT consulting firms, the ability to master ICT systems by all these entities is very high. Therefore, the technological fit between the entities can be regarded as at level 5 (very high).

6.5.7 Macro-ICT Infrastructure

So far, Exact's activities in China (subsidiaries and partners) are mostly in the so-called first tier cities/areas such as Shanghai, Beijing, and Guangdong. The macro-ICT infrastructure in these regions is well developed, which supports electronic communication using e-Synergy (E-Synergy, as a simple online application, only requires a basic connection to the Internet), and therefore the macro-ICT infrastructure between Europe and China can be rated at level 4 (fit).

6.5.8 ICT system factors

The ICT system is at the center of this corporation since all their business functions/processes have been replaced by electronic versions. For instance, in HRM, there is a dictionary of staff that includes every employee/manager's profile, contact information, work plan and so on. As someone said 'in this company/network, nobody can fool or be fooled no matter whether he/she is an employee or high profile manager and which ever location he/she is in'. For instance, from the system one can see whether a person is online or not; can see when he/she received a mail or post, and when he/she read it; can see if someone has time for some tasks or is already fully booked or on vacation; can use a search engine to find people suited to a certain task (e.g. Japanese or Chinese speaking) no matter their location; can see the login history of every stakeholder. On the marketing side, every reseller, partner, and even customers' profile, contact persons, contracts, invoices, and all other details are in this system, and every employee can view it. Moreover, there is a special team in the marketing department searching for information on Exact's customers' suppliers,

partners, and customers to produce a customer and potential customer database. When a letter is sent from the headquarters to a potential customer, the subsidiary closest to the potential sale receives the same letter at the same time so that follow-up action can be taken. Therefore, it can be concluded that the system importance for Exact and its network is at level 5 (very high).

As described, various web-based portals are used in Exact's business network, together with the fully integrated ICT system, which enables most business functions to be done electronically, thus, the degree of virtuality is at level 5 (very high).

These portals and systems are operated and maintained by engineers from Exact worldwide on 24x7 basis. The likelihood of failure is very low. Also, the system is very easy to learn and use, and it is easy to add new functions. There is even no internal training course provided about the system, most people have learned how to use it on their own or by exchanging experiences with colleagues. Therefore, the system quality can be regarded as level 5 (very high).

Exact has put information sharing as its central policy; and, also, information within this network must be standardized and structured. Moreover, all job related information is online. Such information includes: profiles, workflow, and schedules of every employee and key people in partners and customers; the status of orders and payments; potential clients; and technical issues. All this information can be accessed, based on security levels (rights), of the people involved. In such an open system, everyone can get relevant and up-to-date information. The information quality can be classified as level 5 (very high).

6.5.9 Success of the virtual cooperation

Exact's market development in China is going very well, and Exact is expanding its operations and activities rapidly in China. It can be concluded that the satisfaction regarding the alliance is at level 5 (very high).

The ICT system is at the center and is regarded as very useful for the whole network. Advantages mentioned during the interviews are: 1) sharing information at every level; 2) overcoming time zone differences; 3) instant communication and customer support; 4) travel and communication costs have been reduced; 5) most business activities/functions can be done through the system. Therefore, the degree of usefulness of the systems can be put at level 5 (very high).

According to an interviewee, initially, most people did not like to use the system as they regarded their privacy (to some extent) had been destroyed. After a period of using the system, most people are now used to it. Firstly, the system is simple and easy to master. Secondly, people can get information they need at once, which makes their work easier and more efficient. In addition, they believe it is fair that 'bosses' can watch them while they are also watching the 'bosses'. Nowadays, the satisfaction with the system can be placed at level 5 (very high).

Exact and ESH are linked by an ICT system. As most of the relevant information is open to all entities by highly structured, fixed, and standardized forms,

trust between the two parties has been built up and sustained. The same is true of Exact/ESH and their external business partners. Also, as Exact is a software developer and its partners are IT companies or IT consulting firms, their abilities to operate ICT systems are very high. Thus, the degree of satisfaction with regard to partners' use of the system is at level 5 (very high).

6.5.10 Conclusion

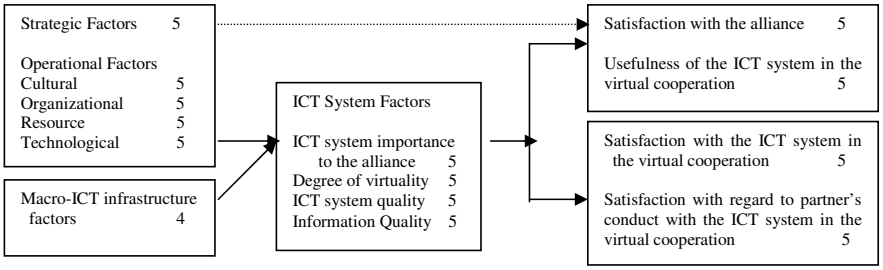

Figure 6.7: Findings from case study of Exact and Exact Shanghai

Figure 6.7 gives an overview of the scores for all the relevant factors. Among the 10 case studies, Exact is the only one case that gives all factors the highest rate (except the macro-ICT factor). ESH is a registered limited company in China, and could be regarded as a business partner of Exact. However, unlike its close competitor Scala, Exact's management and business functions have all been Internet-based using its own product. From this viewpoint, it appears that Exact requires all its business units to cooperate closely by means of ICT systems. During the interviews, the interviewees were very proud of the company's culture, with the open sharing of all information seen as the most important part. The company believes, under its shared strategies, that sharing information could build and sustain mature trust between stakeholders, and overcome cultural barriers, since everyone has to follow the roles, procedures, formats, and standards in providing and accessing information. This is in line with Chesbrough & Teece (1996) who agree that the successful virtual companies are those that have demonstrated staying power at the center of a network. In this case, Exact is at the center of its network, in which it stipulates all the necessary requirements regarding the Internet-based information exchange, and other members are forced to follow.

It can be concluded that the alliance of Exact and ESH is very successful as both entities gain great satisfaction with the achievement of objectives and goals. Also, Exact's expansion moves in China provide further evidence of this conclusion.

As all the measurements have resulted in very high scores, it is clear that this virtual cooperation is very successful. This case is the only one where (with the exception of the macro-ICT infrastructure) all factors both strategic and operational received the highest scores, which resulted in a very high degree of system

importance, virtuality, ICT system quality, and information quality, leading to very high satisfaction with all aspects. As a pure virtual alliance, it can be seen as an example for companies to become more virtual and successful in the future.

6.6 Case study of Legend QDI Europe BV and Legend QDI

6.6.1 The companies

Founded in 1988, Legend QDI (below referred to as QDI) is the contract manufacturing business unit of Legend Group Limited (the largest IT company in China), and deals mainly with component-level motherboards and card products. QDI is one of the five major main board manufacturers in the world, and the largest motherboard manufacturer in Mainland China. So far, QDI has branch offices in more than ten countries and has over one hundred distributors in Europe and America.

Legend QDI Europe B.V. (below referred to as QDI NL), established in 1996 with 50 employees, is part of QDI. Initially it set up its headquarters in Rotterdam, but has since moved to a new location, Ridderkerk (1,500 sq m warehouse and 750 sq m office), in view of future expansion plans. QDI chose the Netherlands as the most efficient base for distribution across other European countries that include their key markets such as the U.K., Germany, France, Spain, Austria, and Italy. The cost effectiveness of the Netherlands' logistics and transportation infrastructures, as well as the absence of import VAT for the re-export business were also decisive factors. QDI NL is re-organizing its structure, from covering both commercial and distribution functions, to a single Legend distribution centre for Europe, and so the size of this company has been reduced to a work force of about 20 personnel.

6.6.2 The approach of the case study

In this study, two sources of evidence have been used: archival records, structured and unstructured interviews. The archival records mainly are based on desk research, and cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies, etc. Interviews by using structured questionnaire and open questions with the business development manager in QDI NL in the Netherlands and with the Communication Manager of QDI in China have taken place. The scores of each measurement mainly based on the questionnaire filled and the questions asked during the interviews.

6.6.3 The cooperation

Besides acting as the distribution centre for QDI in Europe, QDI NL is also responsible for some marketing and customer services functions. Following the discussion in Section 5.5.2, QDI NL can be regarded as a business cooperating partner of its parent company QDI since it has intensive external business relationships and a stock of knowledge. In this business network, QDI generates information on orders

from other QDI subsidiaries in Europe, or from resellers/partners or customers, by fax or through its E-commerce portal and internal ERP system. After received shipments from QDI, QDI NL delivers the products to the customers directly (QDI also can see the inventory level at QDI NL and any new orders through the systems). Financial payments will be sent to the QDI financial center in Hong Kong. The basic structure of the network can be in Figure 6.8:

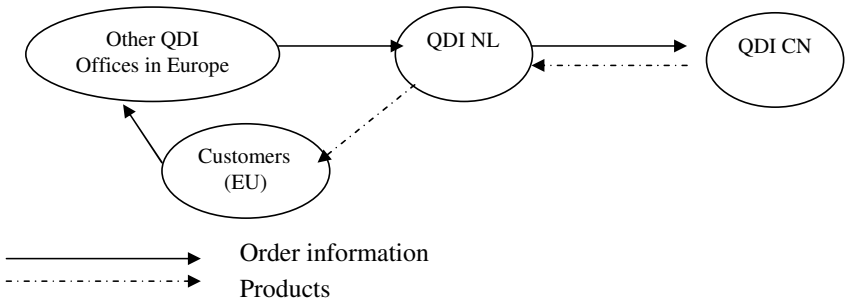

Figure 6.8: The structure of the QDI network

6.6.4 The use of ICT system in the cooperation

The current level of ICT usage between QDI NL and QDI CN can be characterized as high: an E-Commerce portal and an integrated ERP system have been implemented and are in use. The history of ICT use in the cooperation is as below:

From 1994 to 2001, only email had been used in this network. The information exchanged via email mainly concerned orders, shipments, and technical-related issues. To improve the efficiency, QDI started to implement an ERP system plus an E-commerce portal developed in-house. In the E-commerce portal, all QDI products could be found, and customers could order online by completing electronic forms. Technical issues concerning products could also be found there. Further, an online discussion forum had been created so that customers, resellers, and employees from QDI could discuss various issues concerning QDI products. In the back office, there is an ERP system that links with the E-commerce portal. Information such as orders generated by that portal could be directly transferred to the ERP system. The ERP system is only for internal staff and it has various set levels, and only certain functions can access some areas/information. Through this ERP system, all business functions of QDI such as production, marketing, financial, and logistics have been linked together.

6.6.5 Strategic fit

QDI NL is a registered in the Netherlands, and it acts as a distribution centre in Europe for the QDI group. As a fully-owned subsidiary of QDI, QDI NL does not have any strategic conflicts with it parent. However, with the economic downturn, the business scope of QDI NL has been narrowed and some disagreement between the two entities has occurred. As a result, the strategic fit between the two is put at level 4 (fit) by the interviewees. The same applies to the fit between QDI NL and other QDI subsidiaries/offices in Europe.

6.6.6 Operational fit

In the first years of QDI NL being founded, QDI put substantial resources into establishing its network across Europe. However, due to the economic downturn, QDI has had to narrow its operations in Europe and, as a result, the size of QDI NL has been halved, and the restructuring process is still on-going. Thus, according to the interviewees, the resource fit between the two entities is at level 4 (fit).

As most employees of QDI NL are Chinese speaking (three were sent from China and others recruited in the Netherlands), language and other cultural issues are not a major problem for the two sides. Based on the interviews, information sharing and cooperative working have been put as the centre of the corporation's culture, and essentially such aims have been achieved in the network era. In line with this policy, working procedures have been established. For instance, when QDI NL receives orders from customers from another European country, it passes such information to the QDI office in that country so that follow up actions can be taken despite no reward being given. The interviewees regard the cultural fit between the two entities at level 4 (high).

The organizational structures of QDI NL and QDI can be described as formal. The organizational arrangements in QDI NL have been well planned so as to act as an important business function of QDI. For instance, there are employees that take different responsibilities such as for commerce, checking orders, checking shipments, quality control, and after sale services on both sides. The arrangements for electronic information exchange are also in good order although not perfect (according to the interviewee). Therefore, the organizational fit between the two parties is put at level 4 (high).

As QDI is an IT enterprise, the IT-related personnel in both cooperating entities are in the majority, and thus the technological fit between the two entities is at level 5 (very high).

6.6.7 Macro-ICT Infrastructure

The production centre of QDI is in China's Guangdong province, an area which is regarded as a well-developed IT region (first tier area). According to one interviewee, the internally developed ERP system and the E-commerce portal used in QDI and

QDI NL operate smoothly, and therefore the macro-ICT infrastructure between Europe and China can be rated at level 4 (high).

6.6.8 ICT system factors

ICT systems are regarded as very important to the network since many important business functions have been linked by them. One interviewee pointed out: every business unit of QDI has to now rely on these systems since much information such as orders, inventories, shipments, financial and technical issues are passed and exchanged through them; and one step is always dependent on another. When someone delays something, or the connection is bad or lost, other people have to stop work and wait. However, the interviewee added, not all business functions have been replaced by ICT, some tasks can still be done by hand without the systems. It can be concluded that the system's importance for QDI NL and QDI is at level 4 (high).

A web-based E-commerce portal and an integrated ERP system have been used in this network. However, according to the interviewee, even though many business functions have been replaced by electronic versions, traditional tools such as fax are still necessary. For example, although customers can place an order through the E-commerce portal, a fax has to be sent to QDI as confirmation. The reasons why the whole ordering process cannot be done completed through the Internet are: (1) the number of different QDI products is very high, and they are frequently updated; as a result, to avoid possible mistakes and conflicts, paper-based confirmation is needed; and (2) digital signatures have not been legally approved. Thus, paper-based contract is needed. The same applies to the other QDI units. Therefore, the degree of virtuality in this network is put at level 4 (high).

For QDI NL, the initial cost of implementing the ICT system was high due to the high costs of the virtual private network (VPN) connection and other components. These costs were planned and invested by QDI, and the status of the network in use is regarded as good. The E-commerce portal and the ERP system is mainly operated and maintained by QDI, and the QDI offices in different countries provide additional technical support given the time zone differences. The chance of failure is low, but does occur. Based on the interviews, the ICT system quality can be regarded as level 4 (high).

Information sharing is very important in this network, and information regarding orders, finances, and logistics generated by the ICT systems in QDI are standardized and structured. However, other information generated with these systems is not always relevant and clear, and further tasks are needed. This fully integrated system is not very 'open' as only certain people can access certain information (for instance, sales people cannot check payment directly even it is urgent). Thus, the interdependence between different departments and business units regarding information is high. When information exchange is not going smoothly (e.g. a poor Internet connection or delay), some network tasks have to be stopped or delayed. Based on the interviews, the information quality can be regarded as level 4 (high).

6.6.9 Success of the virtual cooperation

Due to the economic downturn, the size of QDI NL has been halved, and its business functions have also been narrowed. However, as a very important center for QDI in Europe, QDI NL will be retained and might be strengthened when the macro situation improves. Additionally, the two entities are in the same family, and thus the satisfaction with regard to the alliance is put at level 4 (high).

Based on the interviews, the advantages of using such systems are sharing information, generating up-to-date information using the systems, cost saving, and 24x7 based portal for services and support. However, the disadvantage is the process of information exchange through the system has to be very smooth, since any delay or error could cause other delays or errors in the whole network. The degree of usefulness of the systems can be placed at level 4 (high).

Initially, some people did not like to use the system since they were familiar with the old ways (hand/paper), and it was uncomfortable when one had to learn and use a totally new system. After the system had been implemented for some time, most staff are used to the system, and they are heavily dependent on it. However, the zero error or delay target of the system is virtually impossible to achieve, so most people have had a few unhappy experiences. As a result, the satisfaction with the system is placed at level 4 (high).

QDI NL and QDI are closely linked by the system, some of the relevant information is highly structured and standardized, and trust between the two entities is quite high. Also, since QDI is an IT enterprise, the abilities in operating ICT systems on both sides are very high. Based on the interviews, the degree of satisfaction with regard to partner conduct with the system is put at level 4 (high).

6.6.10 Conclusion

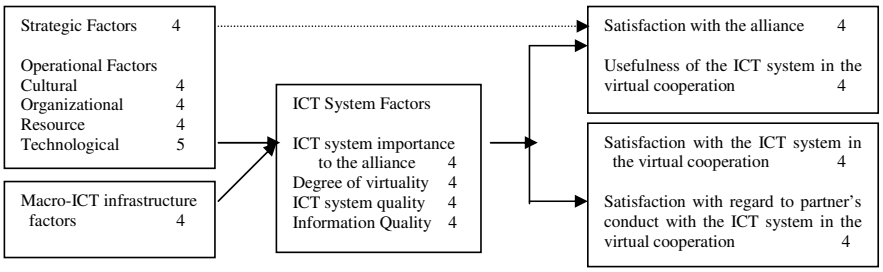

Figure 6.9: Findings from case study of QDI and QDI NL

Figure 6.9 gives an overview of the scores for all the relevant factors. Even though QDI BV is founded in the Netherlands, it is more like a Chinese company than a European enterprise. Since most employees in QDI NL are Chinese or of Chinese origin, Chinese culture and the corporate culture of QDI dominate this enterprise. The advantage of this is that there is little cultural conflict between the two entities.

However, on the other hand, there is also a disadvantage: very formal structure and hierarchy in the organization. Different departments can only access certain information through the ICT system. For instance, sales people cannot check payments directly even if it is very urgent. If information is not provided by related departments, some tasks can be delayed or problems created. In this sense, the degree of operational efficiency is less than it could be.

As ICT-related enterprises, the ICT systems are regarded as very important to this network. The degree of virtuality is also high. However, even though QDI can and also needs to implement fully-integrated ICT solutions, traditional tools especially fax are still necessary for many business functions. One of the interviewees explained that this was because of the large number of different QDI products, with most of them having a very short life cycle, and the still not legally recognized digital signature. The interviewee added that, even in the future, the totally e-based partnership or E-Commerce would not succeed for this company since this would require a huge change in the organization's own structure and also in the whole network. Only when information sharing within the network becomes more intensive, could the degree of virtuality of this cooperation move a step higher.

It can be concluded that the alliance between QDI and QDI NL can be considered as successful since QDI NL has functioned well in acting as QDI's distribution center in Europe, and as such the objective and goal of this cooperation have been achieved.

The virtual cooperation between the two parties can also be regarded as a success since all the measurements are at least at level 4. The nature of the entities, the substantial investment, together with the matching of the macro-ICT infrastructure of both countries, have resulted in high degree of virtuality, and high system quality, thus leading to high satisfaction with the system. As IT enterprises, the system is very important to the cooperation, and this leads to a high degree of usefulness of the system. Also, most employees of QDI NL are Chinese, which together with the 'copied' QDI corporate culture has resulted in a high level fit of cultures. Thus the information quality is high which leads to a high satisfaction with regard to partner's conduct with the system.

6.7 Case Study of Eaton Holec NV and Zhenjiang Holec

6.7.1 The companies

Eaton is an American industrial group with a workforce of more than 48,000 worldwide and annual sales of 7.2 billion Euro. As part of the Eaton Group, Eaton Holec Electric N.V. (below referred to as Holec) is an electrical switchgear manufacturer in the Netherlands with over 1,200 employees. The annual turnover of Holec exceeds 130 million Euro. Holec develops, produces and supplies switchgear

systems and components for medium voltage and low voltage distribution networks, as well as for the power supplies of industrial processes.

Zhenjiang Holec (below referred to Zhenjiang) is a joint venture created in 1996 between Holec and Jiangsu Changjiang Electronic Group (below referred to Changjiang). Changjiang was founded in 1965 and it has been one of the main players in the electronic field, with more than 180,000 square meters of factory, in China. In 2002, the total capitalization of Changjiang reached 1.5 billion RMB, and the turnover was 1.18 billion RMB. It has ten subsidiaries, and the Zhenjiang joint venture is one. Zhenjiang Holec is located at the east factory area of Changjiang electronic group, in Jiangsu province. The total investment in Zhenjiang was US$ 15 million; each partner has 50% of the venture. Currently, Zhenjiang has 246 employees, 22,000 square meters of production area, and a production capacity of 3,000 units.

6.7.2 The approach of the case study

In this study, two sources of evidence have been used: archival records, structured and unstructured interviews. The archival records mainly are based on desk research, which cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies; and financial information of the partners including their turnovers, investments in ICT systems, benefits from the ICT implementations (actual or established), etc. Two rounds of interviews together with two groups of students had been conducted by using structured questionnaire and open questions with the strategic alliance manager in Holec in the Netherlands and with the Managing Director and high profile managers (both Dutch and Chinese) in Zhenjiang, China. The scores of each measurement are mainly based on the questionnaire filled and the questions asked during the interviews.

6.7.3 The cooperation

In the Zhenjiang joint venture, Holec is responsible for quality, production and technology, while Changjiang is responsible for sales, marketing, acquisition and facilities (buildings, personnel etc). Zhenjiang produces switchgear, 90% of the components of its products are made locally, while Holec makes the rest in the Netherlands and exports these parts to China. These parts are the so-called key components, or core technologies in making high quality switchgear. To protect its core competency, Holec insisted on making these key components by itself. As a result, Holec is both one of Zhenjiang's parents, and also one of Zhenjiang's suppliers. Thus, Zhenjiang can be regarded as a business partner of Holec, and the main focus will be on the cooperation between Holec and Zhenjiang in this research.

This cooperation offers high quality products that include parts made in China and core components made in the Netherlands to customers. Zhenjiang uses the latest designs and technologies of Holec, and its technicians and some workers have been trained at Holec. Further, to ensure that the quality of Zhenjiang's products are at the

same level as Holec, there are always four experts from Holec that work in Zhenjiang and are responsible for quality control. For the development of the Chinese market, Holec realized that their relationship with various levels of Chinese government was very important since the company would be mainly dependent on orders or some large infrastructure projects where the authorities have a major influence. Therefore, it was foreseen that Zhenjiang could use Changjiang's network to build and sustain such relationships. The basic structure of the network can be described as in Figure 6.10:

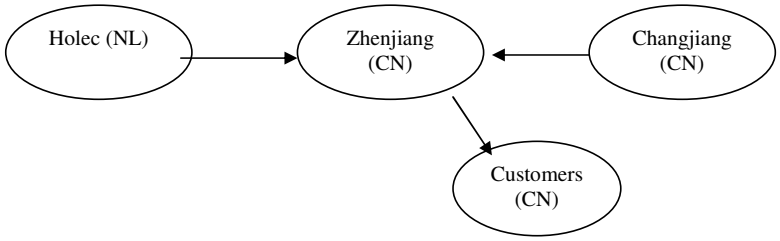

Figure 6.10: Relationships between Holec and Zhenjiang Network

6.7.4. The use of ICT systems in the cooperation

In general, the cooperation between Holec and Zhenjiang can be characterized as having a low level of ICT linkage, even though both entities have ERP systems in use. Due to the lack of management support, both parties have paid little attention to the use of electronic communication within the alliance. A brief history of ICT use in the cooperation is given below.

1996-1998: the ICT applications used were simple communication technologies such as phone, fax and email. Due to a lack of interest and management support, an overall IT strategy was missing. Even though information/data had been digitized with the aim of improving efficiency from the beginning, the lack of standardization of documents lowered the quality of information. During the interviews, both parties commented that misunderstandings between the entities frequently occurred.

1998–2003: as a result of the development of the Internet and its applications, Holec introduced a central Internet and email system in 1998, and it also introduced a BAAN ERP system that integrated purchasing/logistics, sales, engineering, and warehouse management activities. In 2000, Holec started to develop an IT policy, and certain procedures became standardized and more formal regulations came into use. However, Zhenjiang was not involved in this process; instead it introduced a simplified Chinese ERP system by itself. The reason for this, according to Holec, was that the specific local circumstances demanded a different system and settings to those used in The Netherlands. Holec considers the Chinese ERP system to be somewhat weak, and it is not clear whether the Chinese system will eventually be connected to the system in the Netherlands. During this period, information such as product

drawings, and financial and purchase information were digitized and stored on servers, and then put onto CDs and DVDs.

From 2003 onwards: globalization and the worldwide division of expertise required an integrated solution to combine all the knowledge available in the whole of Holec. When the interviews were taking place, the use of E-commerce was still on a small scale and only in some divisions of Holec. According to Holec, the whole Holec family would eventually be connected to the Eaton network. Secondly, a well established ICT strategy and policy would be implemented across the whole family. In this sense, information must become more transparent, and the integration of business processes needs to be established. Further, Holec must be able to use each entity's products internally and offer internal contract servicing. As a result, the BAAN application will be used as the central ERP system, and Zhenjiang will be connected to it in the future. Moreover, Virtual Design Teams will be established, enabling geographically dispersed project teams to develop products using advanced cooperative design software and communication technologies. According to Holec, video conferencing would be one of the important tools in these virtual project teams, raising the quality of information dramatically. By using such applications, sample products could easily be shown and virtual meetings would to some extent replace the traditional cooperative environment.

6.7.5 Strategic fit

Basically, the cooperating entities do have a strategic fit since they are in the 'same' family, work together, and have the same goal: production and sales of switchgears in China. However, from two studies conducted in 2000 and 2003, an interesting finding is that even though Holec was the parent of Zhenjiang until its own takeover by Eaton, Holec did not pay much attention to the long-term strategy of Zhenjiang (even though Zhenjiang's short-term corporate strategy and competitive approach were defined and guided by Holec). The reason is that the joint venture is largely independent, and also the differences in organizational structures and cultural backgrounds were significant. Another reason is that the joint venture was seen as a personal prestige project of the CEO of Holec, and it was not fully accepted within Holec. Also, Zhenjiang believes that having all parts of the products made in China could lower the costs. However, Holec has always kept a tight control regarding the core technologies and production as it is afraid that its Chinese counterpart could copy such core competences or lower the quality of the products. As a result, Zhenjiang has to purchase these parts from the Netherlands, and sometimes the delay in delivering parts or a change in design that has not been informed in time can lead to delays in Zhenjiang's production. This causes higher costs and decreases of customer satisfaction, and conflicts between the parties. Therefore, in this cooperation, the strategic fit between the two is put at the level 3 (neutral) by the interviewees.

6.7.6 Operational fit

Holec did invest substantial resources in Zhenjiang. However, the control over core technologies that Zhenjiang sought was not granted. From Holec's point of view, Zhenjiang/Changjiang have not applied all of their business networks to market Holec products, and the sales results are below expectations and target. Therefore, the resource fit between the entities can only be regarded as level 3 (neutral) even though Holec and Zhenjiang are in the same 'family'.

There is a managing board for the joint venture that consists of two Chinese and two Dutch people. The board members meet twice per year to discuss strategic issues relating to Zhenjiang. In the relationship between Holec and Zhenjiang, communication occurs daily. From Holec's perspective, the information exchanged consists mainly of technical issues; while for the Chinese, marketing and logistics information dominates. There are also four Dutch staff working in Zhenjiang, and the communication with Holec mostly takes place using these Dutch people. As a result, culture-related problems in communications are much less than could be expected. However, when Chinese managers or engineers do communicate with Holec directly, the language can be a problem. According to Holec, the shared commercial interests in the cooperation ensure sufficient communication between the entities and a high level of 'business trust'. However, there is still a large cultural gap or distance between the two organizations. Even though Holec is the parent company of Zhenjiang, Holec still considers itself as structurally different from Zhenjiang. For example, during the interviews, when talking about Zhenjiang, the managers from Holec mostly used 'them' and not 'us'; whereas the Chinese regarded Holec as a family member and felt the Dutch people should be very familiar with them. Overall, the cultural fit between the two is regarded as level 3 (neutral) by the interviewees.

Regarding the organizational fit, on the one hand, as a subsidiary, Zhenjiang's strategy and competitive approach are defined and guided by Holec and Changjiang. On the other hand, Zhenjiang has the freedom to play in the marketplace, and the relationship between it and Holec can somehow be regarded as also a supplier/buyer one. Several Dutch managers/experts have been sent to Zhenjiang to fill the need for cooperation and communication. From this perspective, organizational arrangements on both sides have been made. However, not all processes have run smoothly. For example, messages were not always sent to the Chinese side on time when there were changes in the designs of products in the Netherlands or when people responsible for certain functions were on holiday. This could cause delays in production and shipments to the market. Moreover, ICT implementation has not resulted in large organizational changes on either side especially in Zhenjiang. Currently there is no IT department in Zhenjiang (there is one at Holec). Following the implementation of the BAAN application, an IT manager has been employed who is responsible for hardware and software issues in Zhenjiang. In summary, the organizational fit between the two parties is put at level 3 (neutral).

As mentioned before, Holec has an IT department and almost all Holec companies/divisions are linked by an internal intranet. A clear IT policy has been developed, and certain procedures have become standardized and more formal regulations put into place. Due to the Eaton Electric takeover, Holec is now situated within the Eaton organization and therefore also involved in the Eaton intranet. While in Zhenjiang, except for one IT engineer, no IT department exists. Therefore, the technological fit between the two entities is put at level 2 to 3 (misfit to neutral) by the interviewees (average score is 2.5).

6.7.7 Macro ICT Infrastructure

During the interviews with Holec and Zhenjiang, even though the macro-ICT infrastructure in China was regarded as insufficient for high-speed information exchange, neither entity saw the infrastructure as a problem for the cooperation. Moreover, both parties had high-speed Internet connections. Therefore, the macro-ICT infrastructure between the two parties can be rated at level 4 (high).

6.7.8 ICT system factors

Even though Holec has set the future strategy and direction of ICT use in the whole family, so far, the system has not been regarded as important to the cooperation between Holec and Zhenjiang. As a result, it can be concluded that the system importance for this cooperation is only at level 2 to 3 (low to neutral). The average score is 2.5.

ERP systems have been used in both entities; however, integration has not taken place. The electronic communication between the two parties is still at a low level. Therefore, overall, the degree of virtuality in this network is put at level 3 (neutral).

As ICT use for communication between the entities is at a low level, the quality of the system is unclear. It is assumed that the system quality can be put level 3 (neutral).

During the interviews with both parties, an issue raised by the interviewees was that even though digitization of most of the information was started from the very beginning, little information was standardized because of the lack of a related policy, and that most people working in Zhenjiang are weak in English except for the Dutch managers/experts. As a result, misunderstandings could frequently occur. Thus, the average information quality of this cooperation is regarded as level 3 (neutral) by the interviewees.

6.7.9 Success of the virtual cooperation

Based on the interviews, and only considering the business activities, the cooperation could be regarded as successful since the entities are in the same family. However, Holec was not fully satisfied with the financial results of Zhenjiang as the quantity of units sold was below the expectation when forming the alliance. Currently there are

many competitors in the Chinese market, and Zhenjiang/Holec has gained about 2% of the market share. To strengthen its position in China, Holec is considering purchasing Changjiang's shares in Zhenjiang in order to gain 100% control of Zhenjiang. Combining the two issues; the satisfaction with the alliance in this case is put at level 3 (neutral) by both parties.

Both parties have expressed some advantages of using the ICT system. For example, many Chinese in Zhenjiang prefer to use email to communicate with their Dutch colleagues rather than the telephone because it gives them longer time to think about the content with their weak English. However, the level of ICT use within the cooperation is low, and not all the advantages have been fully recognized. As a result, the degree of usefulness of the ICT systems in this case is placed at level 3 (neutral).

Both entities have implemented ERP systems, and they are satisfied with their own systems. However, the two systems have not been integrated. The ICT use for communication between the two parties is limited to email. Based on the interviews, improvements to the systems and integration are needed, and the satisfaction with the ICT system is placed at level 3 (neutral).

Even though the lack of a standard format and the integration of systems is mainly due to the lack of a shared ICT policy and strategy, Holec considers the ERP system used in Zhenjiang to be weaker than its own. Also, misunderstandings often occurred when electronic communication was between the Dutch in Holec and the Chinese in Zhenjiang. As only email is in use in the cooperation, we see the degree of satisfaction with regard to the partner's conduct with the ICT system to be at level 3 (neutral).

6.7.10 Conclusion

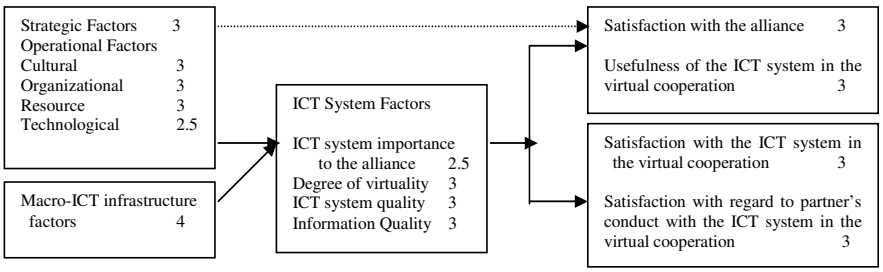

Figure 6.11: Findings from case study of Holec and Zhenjiang

Figure 6.11 gives an overview of the scores for all the relevant factors. In this case study, the first feeling is that even though the two parties are in the same family, the strategic fit between the two entities is not perfect. The main reason is that Zhenjiang is a 50-50 joint venture between Holec and Changjiang. As both parents play important roles in the joint venture, and in order to protect its core competence, Holec refused to transfer its core technology to Zhenjiang even though production of the

core components (10% of the total product) in China could lower prices of the products and increase operational efficiency (sometimes Zhenjiang has to delay delivering products due to a delay in shipments from the Netherlands). Also, within Holec, this joint venture was considered to be a personal project of the former management, and some people, including some middle-management of Holec, do not regard Zhenjiang as one of its family members (in the interviews, people from Holec always call Zhenjiang 'they', while in Zhenjiang, people consider that they are in the Holec family and that people from Holec should be very familiar with them). Since, in China, most of the products are sold to government-funded or involved projects, a good relationship with the Chinese government is essential. From Changjiang's view, Zhenjiang is only a small part of its overall production. According to Holec, Zhenjiang (or rather Changjiang) has not used its whole network to promote Holec products, and the number of units sold to end users is well below expectations and below what the Chinese partner promised. As a consequence, Holec is considering buying Zhenjiang's other shares, from the Chinese partner, to have full control over the venture.

The entities do not have a shared ICT strategy. Holec's ICT infrastructure is quite sound and some advanced applications such as BAAN ERP system have been in use. Conversely, Zhenjiang uses its own simplified Chinese ERP system. Only recently has the integration of the two systems been put on the table. Even though the degree of virtuality of both sites is high (according to the interviewees), ICT use in the cooperation is very low, with only email being used. In integrating the ICT systems, the two parties must also set up the roles, formats, and standards for electronic information exchange. By this way, this alliance could upgrade the hard and soft parts of the virtual cooperation.

It is concluded that the alliance of Holec and Zhenjiang is not that successful as both partners maintain neutral positions regarding the achievement of the matched objectives and goals. This result is due to the lack of well-matched strategic views towards the joint venture by the two parent companies, which has led to protection of core technologies and business networks.

The virtual cooperation between the two partners also cannot be regarded as a success as the measurements of the status of the virtual cooperation were put at level 3 (neutral). As all the operational fits (cultural, organizational, resource, and technological) are at level 3 (neutral), lead ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality are all given neutral status. As a result, both the hard and soft parts of the virtual cooperation are placed at level 3 (neutral), and, as such, the virtual cooperation is not a success.

6.8 Case study of Ferm BV and Ferm Global

6.8.1 The companies

Starting as a one-man business in 1966, Ferm has grown into an international business enterprise with more than 70 employees in its head office in Genemuiden/Zwolle, the Netherlands. Ferm concentrates on the import and export of machines and electric tools for the Do-It-Yourself (DIY) and semi-professional market. Among the businesses that buy from Ferm are DIY retailers, superstores, department stores and supermarkets throughout Europe.

As one of the first to become involved, at the end of the 1980s, Ferm has built up a long-lasting working relationship with Chinese manufacturers and was one of the first importers of DIY tools made in China. To guarantee the quality of its products, to optimize the business, and to achieve the right purchase price, Ferm has since 1994 had its own organization in the fastest growing economy in the world: Ferm Global. Ferm Global is a 100% subsidiary of Ferm, and about 40 (mainly Chinese) employees work there. Ferm Global has offices in Hong Kong and Shanghai, the main operation centre is in Shanghai and it is a legally registered entity under Chinese law with its own export license.

6.8.2 The approach of the case study

In this study, two sources of evidence have been used: archival records, structured and unstructured interviews. The archival records mainly are based on desk research and internal documents from the companies, which cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies; and financial information of the partners including their turnovers, investments in ICT systems, benefits from the ICT implementations (actual or established), etc. Interviews by using structured questionnaire and open questions with the CFO and IT manager of Ferm in the Netherlands, and with the Managing Director of Ferm Global in China have taken place. The scores of each measurement are mainly based on the questionnaire filled and the questions asked during the interviews.

6.8.3 The cooperation

From the beginning of the 1990s, the two largest markets for Ferm, Europe and the United States, were becoming saturated and growth was limited to a mere 3-4% per year due to increasing competition and mature markets. Therefore, Ferm set up Ferm Global in Shanghai, aiming to enter the Chinese market and also lower the costs of its products. However, after Ferm realized that DIY products are not as popular in China as they are in the European market, the main focus of Ferm Global was fixed on sourcing. In this relationship, Ferm Global serves as a product supplier, product quality manager and product quality controller for Ferm; a function as a marketing

channel in China could be added in the near future. From this, it is clear that by following the discussion in Section 5.5.2, Ferm Global can be regarded as a business cooperating partner of its parent company Ferm since it has intensive external business relationships and a stock of knowledge. Thus, the investigation will be focused on the partnership between Ferm and Ferm Global. The main structure of the business relationships of involved entities can be seen in Figure 6.12.

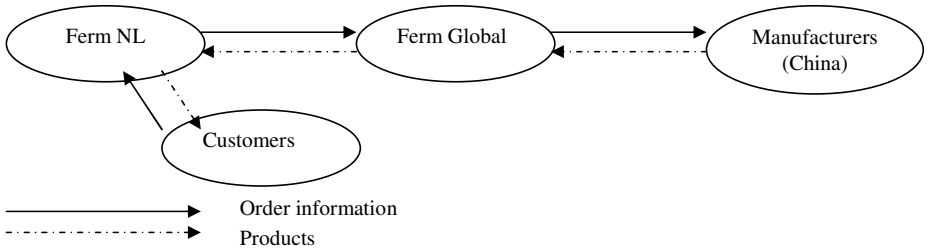

Figure 6.12: The relationships of Ferm and related entities

6.8.4 The use of ICT systems in the cooperation

The current level of ICT usage in this cooperation is characterized as high. The recently implemented ERP system (Microsoft Navision) focuses on the integration of existing individual applications and serves as a protocol that ensures communication between two parties goes smoothly and efficiently. The history of ICT use in the cooperation is as follows.

1993–1998: communication mainly took place by telephone; product orders were handled by fax; and documents were transferred physically. At this stage, only office information technologies were used and mainly focused on text processing and planning activities. The inefficiency in data storage and communication in these years led to a decrease in information quality and the need for a sound solution. Face-to-face contact played a very important role in the process of trust building.

1998–1999: users became more familiar with the Internet (e-mail applications), and this process stimulated management support for ICT use in the cooperation. Starting from the beginning of 1999, important documents that used to be sent by fax were sent by email as attached unstructured documents in the form of Word and/or Excel files. At the heart of this move was the process of digitalization or the so-called paperless office. Both parties followed the same trend in development, and email dialogues took place without problems.

1999–2003: in this period, a strong need for process-supporting applications led to the evolutionary development of an applications portfolio. Since both entities differed in strategy regarding ICT use at this stage, the need for and development of ICT in this cooperation showed different paths. The IT Manager at Ferm, characterizes this process of automation as the development of fragmented solutions. In 2001 the problems of fragmentation, dissatisfaction with the existing system and

the lack of company-wide harmony in terms of an ICT strategy finally led to dissatisfaction between both entities. Frustrations grew and individual applications were implemented based on individual strategic needs. For instance, Ferm made use of sales, office and inventory related applications, while Ferm Global independently developed purchasing and product development software. These individual solutions were recognized as too laborious: the business units within Ferm seemed to operate and execute their tasks in an individual way, and the individual ICT strategies finally led to a process of 'island automation'. Furthermore, the general manager of Ferm Global characterized this period as a cooperation totally running on Excel sheets. After many rounds of negotiation, Ferm Global suggested investing in a tailored ERP system, integrating the company-wide application portfolio and increasing the efficiency of data storage.

From 2003 onwards: in 2003, Ferm implemented a video conferencing system aiming to enable members from different locations to hold virtual meetings. However, Ferm Global is dissatisfied with the system. The video conferencing system needs to be improved. Another important IT project is the company-wide ERP system.

6.8.5 Strategic fit

As a fully owned subsidiary of Ferm NL, Ferm Global's (Hong-Kong & Shanghai) mission has been stated as: 'to be an optimum facilitator for the parent company Ferm Holland and to become a sought after partner for Direct Imports of Chinese-made power tools in cooperation with Ferm Holland.' From this viewpoint, it is clear that the match of goals/objectives between the two entities is very high. From Ferm's website, the following statements also show the relationship:

"There is intensive, daily contact between the Dutch and Chinese organizations about all the aspects of Ferm's product mix - the quality, the price, product improvements, product renewals, and service. Technically highly qualified staff work in both the Dutch and the Chinese organizations, and together anticipate the wishes of the international market in a professional manner. Because of this, Ferm has become a successful company, whose market share and turnover have grown substantially in the last four years".

As a result, the strategic fit between the two is put at the level 5 (strong fit) by the interviewees.

6.8.6 Operational fit

As one of the first to set up in China, Ferm has put substantial resources into establishing its operations in China, although the detailed amount is unknown. Regarding ICT system implementation, beyond the 'old' electronic communication channels, a new Navision ERP package has been successfully introduced in both entities. The total budget for this project was about 300,000 Euro, of which Ferm contribute two-third and Ferm Global the rest. This substantial investment gives

evidence to conclude that the resource fit between the two entities can be regarded at level 4 (high).

According to Ferm Global, many 'frictions' occur between the two entities. The reasons are partly cultural differences but more due to the fact that their business processes and approaches are very different. Often when one party suggests changing procedures, the other party refuses or hesitates to follow. An example is when Ferm decided to implement a videoconferencing system, which could make communication between the two entities smoother and with emotions shown. However, the Chinese partner was hesitant to use it because the cost of such a system was too high, the quality was not good enough, and not everyone could speak English well. However, Ferm Global agrees that the trust between the two entities is high. From Ferm's viewpoint, cultural differences between the Chinese and Dutch entities have almost completely disappeared. In order to ensure effective communication between the Chinese and their Dutch counterparts, Chinese language packs have been installed to facilitate their usage of the various information and communication systems. However, the need for face-to-face contact is still very high and cannot be eliminated by the use of ICT. The management teams from both entities meet approximately nine times per year to discuss important issues. Overall, the cultural fit between the two can be regarded as level 4 (high) by the interviewees.

Ferm is responsible for marketing, sales and setting the strategic direction of the network. The organizational arrangements regarding these business functions are well planned and implemented. However, there is no IT department although an IT manager has been appointed. Ferm Global acts as a financially independent trading company, with the following functions: purchasing, sales, logistics, finance, and quality control. Also, Ferm Global has neither an IT department nor an IT engineer; the general manager and the financial manager are responsible for ICT-related issues. Ferm Global enjoys a certain freedom in decision-making. The General Manager is a German with long experience in Asia. According to him, Ferm Global has developed a strong face of its own. However, the general manager added that major changes in Ferm Global are always discussed and co-developed with the head office as both sides are in the same family. This is expected if a major organizational change or arrangement is planned such as the ERP system being implemented. Overall, the organizational fit between the two parties is put at level 4 (high) by the interviewees.

As noted, Ferm does not have a separate IT department but has appointed an IT manager together with an engineer to take full responsibility for ICT use. According to the IT manager, by cooperating with IT consulting companies and ERP vendors, most technical problems can be solved. Ferm Global has neither an IT department nor an IT engineer, it mainly depends on external support for ICT use, and there is no sign that this situation will be changed in the near future. As a result, the technological fit between the two entities is put at level 3 (neutral).

6.8.7 Macro-ICT Infrastructure

In the interviews, no complaints regarding macro-ICT infrastructures were mentioned regarding data transfer and information exchange. However, Ferm Global is dissatisfied with the quality of the video conferencing system used in the cooperation, which it blames on the poor quality and motion of the video pictures, which is mainly due to the low Internet speed. From this comment, the macro-ICT infrastructure between the two parties is rated at level 3 (neutral).

6.8.8 ICT system factors

In the early stages of ICT use, ICT system was seen as a cost factor by the cooperation. However, after some years of experience, the management team has now recognized the importance of ICT. Based on the interviews, ICT systems are regarded as important to the network because of the need to:

- integrate the currently existing financial administration, calculation, and logistics and order registration systems;
- decrease the flow of hard copies, manual data input, and the redundancy of data in the system;
- centralize data storage, making detailed information quickly available to the user; making management data quickly available to the management; and gaining insights in the activities and the responsibilities of business units;
- automate purchase proposals; moreover, suppliers of Ferm Global were already using Navision ERP (ease of connection); and
- increase efficiency in the cooperation; orders were becoming more complex, and a more efficient business process was needed (Source: Ferm internal document).

By achieving these goals, Ferm believes it could gain and sustain competitive advantages. As a result, it can be concluded that the system importance for Ferm and Ferm Global is at level 4 (high).

For degree of virtuality, as described, besides email and the Internet, a video conferencing system and an integrated ERP system have been used in this network. Therefore, the degree of virtuality in this network is at level 4 (high).

Regarding the video conferencing system, Ferm Global has shown dissatisfaction. The low quality in use of this system is partly due to the macro-ICT infrastructure in China, and partly due to the quality of the system itself. The ERP system was implemented not long ago, and it is difficult to judge the quality in such a short time. According to Ferm Global, the procedures and business processes in trading companies such as Ferm are never the same, so a generic ERP system can never be effectively used in such a situation, a tailored system seems to be the only solution, but one must realize that the requirements analysis has to be carefully carried out since this will be responsible for future system satisfaction among the end-users. However, based on interviews with Ferm Global, the system has caused some dissatisfaction by failing meet the proposed requirements after just one month of

implementation. As a result, a redefinition of requirements is needed and the system has to be redesigned, leading to higher costs than planned. The ICT system quality can only be regarded as level 3 (neutral).

On the transformation to a paperless office in the late 1990s, another problem occurred: the flexibility and ease of use led to the quality of information decreasing. Based on interviews with both sides, the cooperation mainly exchanges information by using Excel sheets and Word files. Most of those documents were not structured or standardized. Also, the available information via these ICT systems was very limited. Thus an ERP system was needed. However, since the integrated ERP system was only just implemented when the interviews took place, although it is undoubted that the quality of information can improve, the actual degree is unclear. Therefore, the information quality is put at level 4 (high).

6.8.9 Success of the virtual cooperation

From Ferm's website, it is clear that Ferm is very satisfied with its operations in China. Ferm's business has shown a growth of 20-30% in the past few years; and, in 2002, Ferm's managing director was named one of the nine most successful entrepreneurs in the Netherlands (Ernst & Young). As a supplier of Ferm, Ferm Global has performed very well to support its parent's healthy growth. The satisfaction with the alliance is at level 5 (very high).

Both interviewees regarded ICT system as useful. However, an ERP system for a trading company needs to be tailor-made, which involves high costs and responsibilities. Currently, the integrated system does not meet all the requirements, and redefinitions are needed. Thus, the degree of usefulness of the ICT systems in this case is placed at level 4 (high) by the interviewees.

Both entities have experienced four stages of ICT development in their organizations. In the earlier stages, such systems were seen as supporting, or additional, tools for information exchange. The process of digitizing information had taken place. However, the lack of standardized documents and a centralized database has negatively influenced the efficiency and effectiveness of the systems. Also, from Ferm Global's viewpoint, the use of a video-conferencing system was not a success due to the macro-ICT infrastructure in China and also partly the quality of the system itself. The latest development in ICT use in this cooperation is the implementation of an integrated ERP system. Based on the interviews, some redefinitions are needed. In summary, the satisfaction with the system is put at level 3 (neutral) by the interviewees.

From interviews with both sides, most arguments are related to the strategic intent regarding the ICT systems and the systems themselves. It is unclear how both parties feel about each other's conduct with the ICT systems. The integrated ERP system had only just started to be used, and the external IT consulting company who did the planning and implementation would provide training for the employees. Thus

we conclude that the degree of satisfaction with regard to partner's conduct with the system is at level 3 to 4 (neutral to high). Taking average score is 3.5.

6.8.10 Conclusion

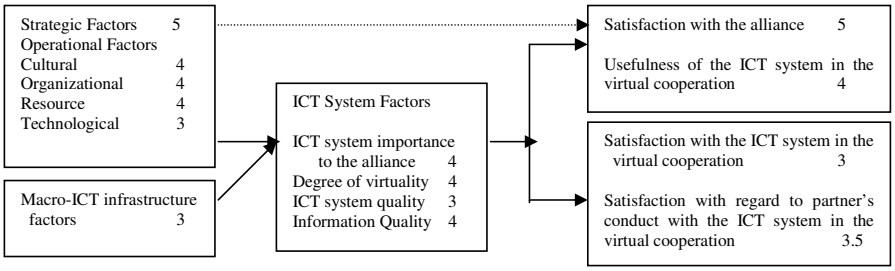

Figure 6.13: Findings from case study of Ferm and Ferm Global

Figure 6.13 gives an overview of the scores for all the relevant factors. Although Ferm Global is a fully owned subsidiary of Ferm, it does have its own strong face and acts as an independent enterprise. For instance, Ferm Global has the freedom to make its own decisions regarding its organizational structure and business functions, and it only has to notify Ferm of such changes. As a result, the organizational structure of Ferm Global is strong and flexible. Further, during the interviews, the IT manager from Ferm did point out that even though an overall plan for ERP system implementation had been prepared, the plan had not been activated because the management of Ferm Global has not been convinced.

Initially, when Ferm Global was founded, its objectives included outsourcing production and developing the Chinese market. However, as Ferm's products, DIY tools, are not popular in China due to the very low labor costs leading Chinese people to prefer to use professionals for construction work, Ferm Global mainly acts a purchasing center for Ferm, while Ferm is responsible for the marketing tasks. The distinct business processes in the two entities has resulted in certain gaps in some areas such as organizational and cultural factors. According to the interviewees, both sides had strongly resisted some organizational changes and many discussions to reach an agreement were needed. In order to limit such resistance or conflicts, every six weeks a face-to-face meeting between the two entities is held. Also, as the cost of implementing the advanced ERP system was high (300,000 Euro), Ferm Global was hesitant to agree. Thus, Ferm decided to pay the majority of the investment costs and the amount that Ferm Global paid involved special arrangements. In this way, the implementation process went smoothly.

It is concluded that the alliance of Ferm and Ferm Global can be considered as very successful since the achievement of the objectives and goals are apparent.

The virtual cooperation between the two parties can be regarded as somewhat successful since two measurements are above level 3 and the remaining one is neutral.

The resource input, and the organizational arrangements have resulted in a high degree of virtuality, and since both entities recognized the strategic position of the ICT system, the usefulness of the system is also high. However, as the technological fit is not high together with the unsatisfactory macro-ICT infrastructure in China, the ICT system quality is only judged neutrally, as a result, the satisfaction with the system is not high. The high cultural fit leads to the high quality of information, and both parties express their satisfaction regarding the other's conduct with the ICT system.

From this case study, it is clear that the successful implementation of ICT systems requires management support at all levels. If top management can make the strategy favor all the involved parties, resistance could be removed and this would increase the degree of ICT system importance and the degree of virtuality. Even in the same family, face-to-face meetings to identify and solve the various issues and opinions, and to sustain trust are still needed.

6.9 Case Study of Kema Quality BV and Kema Quality (China)

6.9.1 The companies

Kema Quality (below referred to as KemaQ) is a division of KEMA NV that provides companies and organizations with professional expertise through cooperation and assistance with the realization of the desired level of quality for products, services, processes, and systems. KemaQ assures reliable and recognized assessments worldwide. KemaQ's most important activities lie in rendering internationally recognized testing and certification services.

KemaQ is growing fast, especially its Hong Kong and other Asian offices. In 1996, Kema Quality Hong Kong Limited (below referred to as KHK) was established as a joint venture with China Inspection Company Ltd. (CIC). CIC belongs to the State Administration for Inspection and Quarantine of China. On 20 January 2003, Kema opened new laboratory facilities in Hong Kong. Currently, KHK has two representative offices in Shanghai and Guangzhou, and works under the quality system of KemaQ and, as such, has accreditation from the Dutch Council for Accreditation (RvA). As a member of the KemaQ Network it can also issue a number of international certifications. Currently KHK has total 80 employees. To extend the cooperation, a subdivision of CIC, Shanghai Inspection Company, formed a joint venture with the KEMA Shanghai office (below referred to as KSH) in 2004. This new venture will enable the Shanghai office to conduct business in the Shanghai region and contact clients without the direct involvement of the head-office in Hong Kong. The shares in the new venture will be divided KSH 51%, KHK 29%, and CIC the remaining 20%.

6.9.2 The approach of the case study

In this study, two sources of evidence have been used: archival records, structured and unstructured interviews. The archival records mainly are based on desk research and internal documents from the companies. They cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies, etc. Interviews by using structured questionnaire and open questions with the Senior Vice President and IT managers of KemaQ, and with the Managing Director and other senior managers of KSH in China have taken place. The scores of each measurement are mainly based on the questionnaire filled and the questions asked during the interviews.

6.9.3 The cooperation

The cooperation between KemaQ and CIC is largely the result of a legal, regulatory requirement because a foreign company is not allowed to set up a fully owned subsidiary in this industry, and so cooperation with a state-owned company is the only choice. However, there are also benefits for both parties by forming an alliance. CIC can earn profits from the alliance, and access overseas markets through its foreign partner because, while Chinese governmental bodies are locally very strong, they have limited competences overseas. KemaQ through its strong Chinese partner, it could access the Chinese market and expand its businesses easily and quickly. In addition, CIC is also involved in quality testing, but is active in areas that differ from KemaQ. As a result, an alliance between the two could offer a broader range of services to customers.

However, the daily interactions between KemaQ and CIC are at a very low level. If communication between the two takes place, it is purely informative and always focused on strategic issues. As a joint venture between KemaQ and CIC, KHK operates independently in China by cooperating with both parents but especially KemaQ. Therefore, in this research, the cooperation between KemaQ and KHK and KSH will be the main focus. Basically, KHK acts as a regional sale office, and cannot quality test components. As a result, most testing activities are carried out by KemaQ in the Netherlands. KSH has an even smaller business scope; its main task is assisting clients with the testing processes. Currently there are 24 staff working at KSH, the general manager works part-time and she is also the deputy manager of CIC Shanghai. The certification process in this network takes place as follows: Shanghai regional clients sign contracts with KHK, and while the testing process is assisted and supported by KSH, the actual testing is done by KemaQ, and KemaQ is also responsible for issuing the final certificates. From this, it is clear that by following the discussion in Section 5.5.2, KSH/KHK can be regarded as a business cooperating partner of its parent company KemaQ since it has intensive external business relationships and a stock of knowledge, and the other parent CIC also plays an important role in this venture. Thus, the investigation will be focused on the

partnership between KemaQ and KSH/KHK. The relationships of KemaQ and the related entities can be seen as in Figure 6.14.

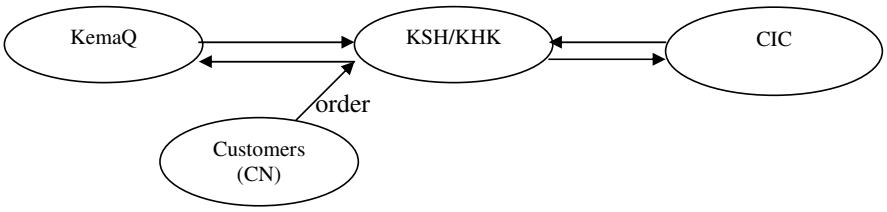

Figure 6.14: The relationships of KemaQ and related entities

6.9.4 The use of ICT systems in the cooperation

Even though the ICT infrastructure in KemaQ is very high, the level of ICT system use within the cooperation between KemaQ and KHK/KSH is relatively low. The everyday communications between the entities is still mainly supported by phone, fax, email, and the weekly-used videoconference system. A brief description of the history of ICT use in the cooperation is given below:

1996-1998: KemaQ and KHK/KSH use low-level communication technologies, which can be characterized as minimal ICT support in the form of an office system. The communications mainly concerned quality certificate requests. In 1996, KemaQ introduced a videoconferencing system. However, due to technical problems regarding ISDN connections in Hong Kong and Shanghai, this system failed to function well. Also, data storage was not centralized; data redundancy and complexity in data retrieval were recognized as serious problems.

1998-1999: from 1998 onwards, the entities started using email to replace the old and inefficient fax process. According to both sides, the efficiency of the cooperation dramatically increased once communication improvement was realized. Also, reports were sent in standardized formats and phone conversations were partly replaced by email contact. However, during the interviews, KSH pointed out that culture-related misunderstanding were the main problems at this stage. Face-to-face contact was still a major success factor for the cooperation, since several entities were involved, and trust could be easily harmed in the digital communication process. The importance of the ICT system did not increase dramatically since digitalization of communications was regarded as only a 'natural process of evolution'. The use of email improved the efficiency of communication, but document storage was still inefficient.

1999-2003: in 1999, KemaQ introduced the Citrix communication system--an application linked to the KemaQ server where intelligence is located in a central database. Citrix uses a low bandwidth and local installations or upgrades are not needed. Citrix contains several applications such as financial supporting applications, standardized report applications and secure certification applications. Also KemaQ insisted that, from 2000, videoconferencing was being used on a more frequent basis

between the entities. During the interview with KemaQ, the advantages of such a system in a multinational organization were described as: control, personal visual contact (cultural importance), an increase in trust and a drastic decrease in traveling costs. The interview was conducted during the period of the SARS outbreak in China, and most business trips from Europe to China had been delayed or cancelled. KemaQ was benefiting from the videoconferencing system, since delayed or cancelled trips/meeting could be replaced by this system. However, when interviewing the Chinese side, the system was not regarded as very effective since the photo motion was not good due to the low speed of the Internet, and also the high cost of implementing such a system.

From 2003 onwards: in the near future a Virtual Private Network will be set up in order to increase the safety and speed of the Internet connection. Also, the implementation of an integrated ERP system is still under discussion since the technology gap between the cooperative entities is still too large. The intention of using such an ERP system is to standardize business processes and reports, and reduce data redundancy. Also, the centralized database, especially in China is expected to double in size in a few years. Moreover, customer relationship management is another major driver for the near future. Currently, customers need to send their certification-related data physically to the supporting office in China. In order to increase customer satisfaction, customers will be able to check and follow the status of their projects as the result of an interactive website being introduced. As such, a 24/7 office environment could be created, with a worldwide office environment, where simultaneous workflow will become a strategic issue.

6.9.5 Strategic fit

As mentioned earlier, the motive for forming the joint venture between KemaQ and CIC was mainly due to Chinese regulations. Besides, both parties could benefit from such cooperation. As a result, the strategic fit between the two companies can be regarded as high. In the cooperation between KemaQ and KHK, and between KemaQ and KSH, as a subsidiary of KemaQ, KSH is largely dependent on the business strategies and targets set by KemaQ. According to the three entities (based on the interviews), the strategic links between the three are regarded as strong. Thus, the overall strategic fit is as level 4 (high).

6.9.6 Operational fit

Regarding China as a major competitive market, KemaQ has invested substantial resources in establishing its operations in China. Even though the details are unknown, such a judgment could be made based on the new laboratory facilities installed in Hong Kong, and the new joint venture and laboratory facilities in China. Thus, the resource fit between the two entities can be regarded as level 4 (high).

There is intensive daily communications between KemaQ, KHK, and KSH; especially the KemaQ-KHK and KHK-KSH pairings. Communication between

KemaQ and Chinese clients may also occur but only because these are not KHK customers or because there are some special technical issues. Communication between KemaQ and KHK is mainly in English, and it is mostly business process or product certification related. Misunderstandings between the two entities do occur, but not often. To strengthen trust, face-to-face contacts between the two entities occur on a regular basis. Managers from KHK pay about ten visits a year to KemaQ, while KemaQ visits Hong Kong about once a year. According to the Vice-President Asia Pacific of KemaQ, in order to have effective communication, initial face-to-face contact between the entities should be seen as very important as building mutual trust is mainly dependent upon it (90%) and electronic communication only counts for the remain 10%. As a result, the mutual trust between the two entities is ranked as high by the Dutch partner. Communication between KHK and KSH is mainly related to KSH factors, such as financial issues and human resources. Even though the language used is mostly Chinese, misunderstandings still occur due to Cantonese-Mandarin differences. However, according to KSH, the frequency of misunderstandings with KHK is lower than with the head-office in the Netherlands. Overall, the cultural fit in this network can be regarded as level 4 (high).

The loose relationship between KemaQ and KSH has resulted in large differences in organizational structure between the entities. Although KemaQ has had influence in many areas such as strategy development at KSH, most issues regarding KSH organization design were led by KHK. Also, the Shanghai operation was set up according to local standards, which differ to the form in the Netherlands. Based on the interviews, even though there were some misfits in the shared vision on alliance design and compensation for strategic conflicts, due to the shared strategic objectives, the organizational fit between the entities can still be regarded as level 4 (high).

KemaQ has its own IT department that takes full responsibility for implementing and maintaining the electronic information exchange systems. KHK and KSH have not recruited IT-related personnel, and they are dependent on external support for ICT use. As a result, the technological fit between the entities is put at level 2 (low).

6.9.7 Macro-ICT Infrastructure

In the interviews, the Chinese side complained about the low transfer speed of the Internet that led to dissatisfaction regarding the use of some ICT systems, for instance, the videoconferencing system; the Dutch side did not have such a complaint. Taking the average score, the macro-ICT infrastructure between the two parties can be rated as level 3 (neutral).

6.9.8 ICT system factors

The ICT systems had been rated highly by KemaQ; however, the Chinese side still considered such systems as cost factors or just the natural process of evolution. The lack of agreement over strategic goals regarding ICT use had resulted in a slow

development in ICT utilization between the partners. Therefore, on average, ICT system importance to the cooperation was put at level 3 (neutral).

As already described, email, database, and videoconferencing systems have been used in this network. Therefore, the degree of virtuality in this network is at level 3 (neutral). It is expected to be raised to level 4 when the integrated ERP system and virtual private network have been introduced.

It is assumed that the use of emails between the entities was good since there were no complaints from both entities. However, regarding the video conferencing system, KHK/KSH has indicated its dissatisfaction. The low quality in the use of this system is partly due to the macro-ICT infrastructure in China, and partly due to the quality of the system itself. To conclude, the system quality can be regarded as level 3 (neutral).

Information exchanged between the entities is mostly non-standard. Also, during the different periods of ICT development in this cooperation, a fact mentioned several times by the Chinese side is that misunderstandings could happen frequently due to cultural differences. However, as the documents were progressively converted into English, the communication between the entities became more effective and fewer misunderstandings occurred. Therefore, the information quality can be regarded as level 3 (neutral)/level 4 (high). Taking average score is 3.5.

6.9.9 Success of the virtual cooperation

As described, the entities have all expressed satisfaction with regard to the cooperation; therefore, the satisfaction regarding the alliance is put at level 4 (high).

For KemaQ, ICT systems are seen as useful, especially the use of the videoconferencing system during the SARS outbreak. However, its Chinese counterpart has a somewhat different opinion. As an average score, the degree of usefulness of the systems in this case is put at level 3 (neutral).

Both entities have experienced four stages of ICT development. In the earlier stages, ICT systems were regarded as supporting or additional tools for exchange information. The process of digitizing information has been taking place. However, the lack of standardization in documents and of a centralized database has negatively influenced the efficiency and effectiveness of the systems. Also, from KHK/KSH's point of view, the use of a videoconferencing system was not a success due to the weak macro-ICT infrastructure in China and also the high cost of this system (even though KemaQ was very satisfied with the videoconferencing system). Overall, the satisfaction with the ICT system is put at level 3 (neutral).

From interviews with both sides, most arguments have been related to the strategic intent regarding the ICT systems and the systems themselves. Thus, we put the degree of satisfaction with regard to partner's conduct with the ICT system at level 3 (neutral).

6.9.10 Conclusion

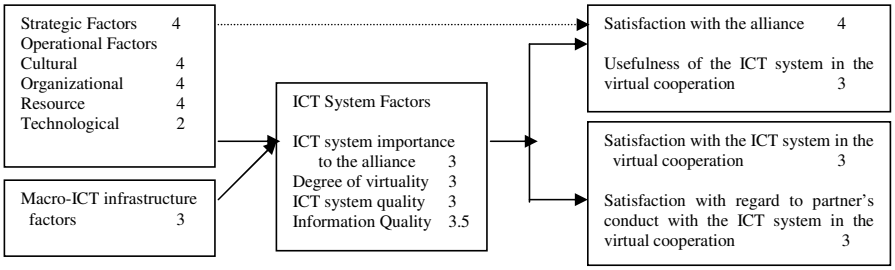

Figure 6.15: Findings from case study of KemaQ and KSH

Figure 6.15 gives an overview of the scores for all the relevant factors. The ICT infrastructure in KemaQ in the Netherlands is very good; however, the use of ICT in the cooperation between KemaQ and KHK/KSH is at very low level. According to the Vice-President of KemaQ, building and sustaining trust with the Chinese partner is 90% based on personal contact, and only 10% on other means such as email. Regular face-to-face meetings are very important, and about ten times per year people from China come to the Netherlands, and once per year KemaQ visits China. In this VP's opinion, apart from physical contacts, the videoconferencing system could be an ideal solution for long distance meetings since people can see emotions on the screen. The advantages of using videoconferencing and other ICT systems was especially recognized in 2003 when SARS forced many businesspeople to cancel trips to China. KemaQ could still have long distance meetings with its Chinese counterpart while sitting in the offices in the Netherlands. However, the Chinese side did blame the macro-ICT infrastructure for causing poor images when using the videoconferencing system.

It can be concluded that the alliance between KemaQ and KHK/KSH can be considered as successful because the achievement of the objectives and goals are well recognized.

However, the virtual cooperation between the two parties cannot be regarded as highly successful since all the measurements regarding the status of the virtual cooperation were at level 3 (neutral). Good fits in terms of culture, resources, and organization have been recognized, where the information quality and degree of virtuality could reach a high level. However, the imbalance in technological abilities between the two sides, together with the unsatisfactory macro-ICT environment (according to the interviewees) has limited the quality of the ICT system, and also the degree of virtuality. Further, the ICT system has not been recognized as of strategic importance to the cooperation. Overall, these findings led to the neutral status for virtual cooperation.

The nature (testing house/services) of KemaQ and its network requires advanced ICT systems, which means that many business functions can be replaced by

electronic versions. Also, much of the information exchanged such as drawings, test results and certificates can be structured and standardized. By using integrated ICT systems such as a centralized database, EDI, and integrated ERP they could increase the operational efficiency, as has been recognized by KemaQ's own experiences in Europe and North America. However, the Chinese side still regards the ICT system as a cost factor or a natural process of evolution. For this alliance to move one step further to virtual cooperation requires agreement between the involved parties. Since KHK/KSH is not fully owned by KemaQ, the Chinese parent still plays an important role in the joint venture. Thus, how to remove the resistance from the Chinese side is the main task for this alliance if it wants to form a higher-level virtual cooperation.

6.10 Case Study of Dutchi Motors BV and Huada Motors

6.10.1 The companies

Dutchi Motors B.V. (below referred to as Dutchi) is a manufacturer of electric motors. It is part of Dutchi Holding N.V. The motors are produced in Asia, Africa and Eastern Europe, and are distributed from the headquarters and logistics center in Arnhem to over 60 countries worldwide. Besides outsourcing from China, Dutchi has a factory in Arnhem that produces special motors, and carries out development, modification and test work. Dutchi has its own sales organizations, importers and representatives in Western-, Eastern- and Southern Europe, in Scandinavia, the Middle-East, Africa, South America, Asia, and also in Oceania. Dutchi is regarded as the largest inventory holder of low voltage electric motors in Europe, with an average inventory valuation of 7 million Euros.

Huada Motors Co., Ltd. (below referred to as Huada) is located in Wuxi City, China. It was originally set up in 1958, since 1993, CITIC (China International Trust and Investment Corporation) has controlled it after buying 55% of the shares from the local government. Thus Huada has become one fully owned subsidiary of CITIC. The total assets of Huada are worth 30 million US$, and it has 150,000 m2 production area, and more than 400 sets of manufacturing equipment/machines. The annual capacity exceeds 3 million KW and Huada is now one of the largest electric motor manufacturers in China. Consistent with its high quality standards, Huada received ISO9001 certification in 1997. Currently, 45% of the products are exported to Europe and North America, and 55% are produced for the domestic market.

6.10.2 The approach of the case study

In this study, two sources of evidence have been used: archival records, structured and unstructured interviews. The archival records mainly are based on internal documents and materials. They cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies; and financial information of the

partners including their turnovers, investments in ICT systems, benefits from the ICT implementations (actual or established), etc. Interviews by using a structured questionnaire and open questions with the CEO and operations managers of Dutchi in the Netherlands, and with the General Manager, vice General Manager and the key persons who are responsible for the cooperation with Dutchi of Huada in China have taken place. The scores of each measurement are mainly based on the questionnaire filled and the questions asked during the interviews.

6.10.3 The cooperation

Having worked with various other Chinese companies for some time, Dutchi selected Huada, from six possible partners, as its only supplier in China in 1997 because Dutchi believed that Huada could offer high quality products and short delivery times. The alliance between the two companies is simple: Huada produces motors based on designs and orders from Dutchi, and delivers the products to Dutchi or to end users. Ninety percent of conceptual development of new products takes place in the Netherlands; and technical development takes place in China. Currently, 70% of Huada's export capacity is used for Dutchi products. The relationship of Dutchi and Huada can be seen as figure below:

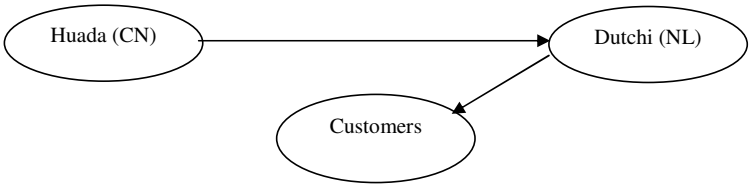

Figure 16: The relationship between Dutchi and Huada

6.10.4 The use of ICT systems in the cooperation

Until 2003, neither Dutchi nor Huada considered ICT systems as important. The level of ICT usage in their cooperation was limited to the use of phone, fax and email technology (around 10 emails per day). Communication between the two partners mainly concerned orders, technical data and designs. The history of ICT use in the cooperation is:

1997-1998: from the start of the alliance in 1997, basic communication tools such as phone and fax have been used to communicate and to transfer data between the two partners. Product orders were specified in semi-standardized fax documents and phone usage was high.

1998-2003: once email was introduced, the efficiency of communication improved. E-mail is also used as the medium to communicate on design issues and to send drawings created using CAD/CAM software. However, because of a lack of integration possibilities between the email application and the resource database, it is often cumbersome to send the data needed by a partner. Dutchi uses text-based e-mail;

and therefore it is difficult to transfer data from the database to Microsoft-based systems. Orders are also put into the e-mail program and sent to the partner, and this is very cumbersome. As a result, the traditional fax tool is still very popular. Concerning the usage of fax and e-mail, Dutchi commented that although sending more-detailed information via email is much easier than with a fax or post, the information quality decreases. This is because one makes much less effort to personalize the information for the customer. Therefore, an investigation was made into the possible use of an automated order system. It would be possible to create a system, but the problem is that there are too many variables to accurately determine future needs. A hampering factor in investing in ICT systems in this period was the fact that no system existed that could exactly meet Dutchi's needs, and that the costs involved were regarded as too high.

From 2003 onwards: Dutchi and Huada have realized the need to improve the efficiency of their cooperation, given the huge inventory in Dutchi, and the increasingly fierce competition. Both partners are considering investing in ICT systems. For Dutchi, it could involve a commercial site where customers could order motors online and view stock information. An important requirement stated by the company regarding any future system is the time for implementing this system must be minimized. Meanwhile, at Huada, an ordering system has been introduced that enables the company to forecast required inventory. Also, an ERP system may be implemented in the future. Both partners agree that the communication process could be improved by implementing Internet-based videoconferencing system. However, the current bandwidth in Wuxi cannot meet the needs of such a system, and the equipment is very expensive. Therefore, such a system will only be implemented if it becomes economically and technically feasible.

6.10.5 Strategic fit

From Dutchi's point of view, Huada can deliver high quality products quickly that meet Dutchi's requirements. Currently, the competition in this sector in China is very high as there are more than 3,000 manufacturers, and the price of Huada motor is not the lowest. However, Huada believes that its high quality products can demand higher prices. Dutchi accepted this view.

Huada's mission is 'developing top products for top markets', and it aims to become more competitive in both the domestic and international markets. However, while Huada was strong domestically, it was weak in the international market. Therefore, the Dutch company Dutchi, with a business network and channels, large inventory capacity, situated close to the largest port and distribution centre in Europe, and with long term experience in China had been the first choice for Huada in establishing a cooperative venture. Additionally, Huada, as one of the largest electric motor manufacturers in China, has strengthened its competitive position.

During the interviews, both companies regarded their strategies as fitting well. Even though Dutchi did point out that the switching costs to Dutchi would not be high

if they changed partner, mutual trust between the two partners has been built up and so it is unlikely that the alliance would be ended. Both parties put the strategic fit at level 4 (high).

6.10.6 Operational fit

Huada has used a large part of its capacity to fulfill Dutchi's requests, while Dutchi has applied all its business networks and channels to market the products. In this sense, both partners have provided the resources necessary for this cooperation. However, both partners are hesitant to invest in ICT infrastructure. Therefore, the resource fit between the two entities can only be regarded at level 3 (neutral).

Dutchi has a long experience in dealing with 'socialist' countries, unlike many other western companies, and it has learnt that personal relationships and trust are one of the most important issues in building a successful cooperation. It believes that once trust has been built, it can be kept on a sustained level. In Dutchi's point of view, the trust relationship with its Chinese partner can be regarded as good, and so regular face-to-face physical contacts/meetings are not so necessary. From Huada's point of view, face-to-face contact is preferred rather than electronic communication. According to Huada, misunderstandings between the two parties do sometimes occur, especially regarding technical issues; however, such misunderstandings have not had a big impact on the cooperation. Even though Huada rated the communication process with its Dutch partner as much faster than with its US partner, the Chinese company still had the opinion that not all of the information needed was provided by the Dutch side effectively and efficiently. Also, for the Chinese people, it is unwelcome when another person (and not the initial one responsible) reacts on a subject without notice, and this further emphasizes that personal relationships are very important in cooperation. According to Huada, cultural differences between the two partners do exist, but it still has full trust in its Dutch partner. Overall, the cultural fit between the two can be put at level 4 (high).

The two companies have different organizational structures. Although both companies belong to large groups (Huada to CITIC and Dutchi to Dutchi Holding NV), Dutchi has a more informal and integrated structure with a flat hierarchy and high flexibility. Huada has many departments with different management and ICT systems, the respect for hierarchy is high and responsibilities are clearly defined, and so the structure of Huada is relatively inflexible. The Chinese company is much bigger than the Dutch one in terms of departments and personnel. Both companies have departments that are responsible for import and export, and these communicate with each other. However, the impacts of this alliance on the two parties were different. For Dutchi, the impact was low: compared with the period before this alliance, the business this company operated remained the same. In comparison, Huada had to create a new department to take care of the business with Dutchi. So far, neither company has a separate IT department (Huada is expected to have such a department in the future) so no organizational changes on either side have been made

to meet the electronic communication requirements. Overall, the organizational fit was rated as level 4 (high) by the two parties.

Currently the ICT usage by both parties is very low, and it is unclear how good the technological fit is between the two. During the interviews, Huada had shown its intention to create a separate IT department in the future, while Dutchi was still hesitating. Also, looking at the two companies' websites, Dutchi's only lists some very general information, while the information provided at Huada's site is much more intensive and online selecting and ordering is possible. Therefore, it is believed that the technological ability at Huada is stronger than at Dutchi. As a result, the technological fit between the two entities is put at level 2 (low).

6.10.7 Macro-ICT Infrastructure

During the visit to the location of Huada, we found the speed of Internet access in that area slower than in Beijing and Shanghai. As phone and fax still dominate communications between Dutchi and Huada, email is only used as an additional tool and even though no party has complained about the macro-ICT infrastructure regarding electronic information exchange, it is unclear exactly what the situation is. Therefore, we assume that the macro-ICT infrastructure between the two parties is at level 3 (neutral).

6.10.8 ICT system factors

Both parties have realized the importance of ICT systems. For instance, the inventory level of Dutchi could be decreased. However, currently an ICT system is still seen as a cost factor, and just regarded as an additional communication tool by the cooperation. Neither company has invested sizeable amounts in ICT infrastructure, and this situation will not be improved in the near future. Therefore, the ICT system importance for this cooperation is put at level 2 (low) to 3 (neutral). Taking average the score is 2.5.

Both entities have started to use some ICT systems, such as an ordering system has been introduced at Huada that enables the company to forecast the required inventory. However, within the cooperation, only emails, as an additional tool to phone and fax, for communication has been used. Therefore, the degree of virtuality of this cooperation is put at level 2 (low) to 3 (neutral). Taking average the score is 2.5.

The ICT usage is at very low level, and it is unclear how the ICT system performs. Thus, we assume the system quality is at level 3 (neutral).

Based on the interviews, most of the information exchanged between the partners concerns orders, and technical and logistics issues, and are mostly request/react type. Such information is mostly unstructured and standardized. Thus the information quality of this cooperation is at level 3 (neutral).

6.10.9 Success of the virtual cooperation

Both partners have expressed their satisfaction with the alliance, since they believe that the goals and objectives in forming this alliance have been achieved. Even though Dutchi did point out that the switching costs for the Dutch partner would not be very high if it selected another Chinese partner, the alliance is very stable. Therefore, satisfaction with the alliance is put at level 4 (high).

As mentioned, even though some ICT systems have been used, only email has been used in this cooperation, and this is just regarded as an additional tool to the phone and fax for exchanging information between the partners. Therefore, the degree of usefulness of the systems in this case can be placed at level 2 (low) to 3 (neutral). Taking average the score is 2.5.

As the use of ICT systems is at a very low level in this cooperation, it is difficult to measure the performance of the system. Therefore, we assume the satisfaction with the system is at level 3 (neutral).

Based on the interviews, it is clear that both partners are weak in implementing and operating ICT systems and have a lack of IT personnel and strategies. It is unclear how the parties feel about each other's conduct with the ICT systems. Thus we conclude that the degree of satisfaction with regard to the partner's conduct with the system is at level 3 (neutral).

6.10.10 Conclusion

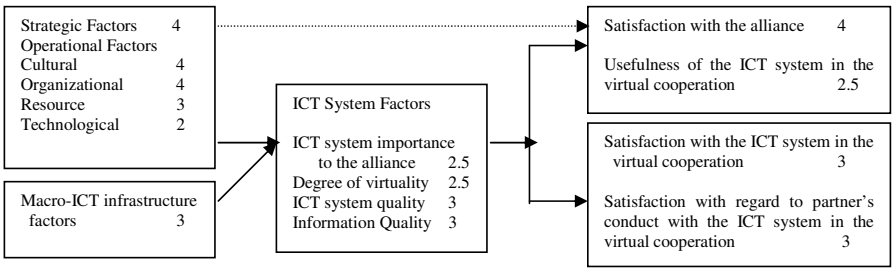

Figure 6.17: Findings from case study of Dutchi and Huada

Figure 6.17 gives an overview of the scores for all the relevant factors. In this case study, the Chinese party is more dependent on the Dutch entity since 70% of its products exported go to Dutchi. Dutchi has a long history of doing business in socialist countries; it knew how to deal with Chinese companies. From the beginning of the alliance, trust has been built up. According to the partners, face-to-face meetings are preferred by both partners, but are not always necessary. The organizational structures of the two companies are different; Huada is more formal whereas Dutchi is informal and flexible. After the cooperation started, Huada did make changes, and a separate department was created to deal with its Dutch partner,

while no change occurred in Dutchi. Based on the interviews, the information exchange between the two entities has gone well. Huada even commented that information exchange with Dutchi is much faster than with its US partner. However, Huada also pointed out that not all the information it needed had been provided by Dutchi. Also, as with other Chinese companies, Huada would prefer it if Dutchi had a fixed employee for the communication process or permanent personal contacts.

Neither company regarded the ICT system as strategically important, and this led to the low degree of virtuality in this alliance. However, Dutchi, despite being a small trading company, has huge inventory valued at 6 million Euro in its warehouse in order to respond quickly to customers' needs. By using an advanced ICT system, such as ERP, Dutchi could lower the level of stocks, and improve its financial results. Dutchi has an internal database, but Huada does not have access to it. At Huada, thanks to the changes in the management team not long ago, a new younger generation of managers had initiated a more modern management style. Recently, a basic E-commerce function has been developed on Huada's website, including an ordering system which enables the company to forecast the required inventory. Further, an ERP system may be implemented in the near future.

From their previous experiences, both parties mentioned the advantages and disadvantages of using low level ICT systems such as email. Although information quality increased due to the possibility of sending more and more-detailed information than via fax or post, the information quality could also decrease because people put less effort into writing emails, and so misunderstandings could occur. Also, at Dutchi, it is difficult to transfer data from its database to Microsoft-based systems automatically, and some semi-standardized information is still better sent by fax.

During the interviews, both parties did agree that the communication process and operational efficiency could be improved by implementing Internet-based systems, especially a videoconferencing system. As the two entities are manufacturers, in order to establish higher-level virtual cooperation, the parties should first increase the role of ICT systems in their overall strategies. A clearly defined and agreed ICT plan between the two companies could lead to further upgrading of their ICT systems. Moreover, structured and standardized information and a central, shared database are urgently needed.

It can be concluded that the alliance between Dutchi and Huada is successful since both parties are satisfied with the achievement of objectives and goals.

However, the virtual cooperation between the two parties is a failure since all the measurements regarding the status of virtual cooperation are at level 3 (neutral) or below. Even though there are cultural and organizational fits, due to the lack of resources input into the ICT system, and the weak ICT ability on both sides, together with the lack of management support for ICT, the ICT system importance to the alliance is considered as low, and the degree of virtuality is also low. As a result, the ICT system is not useful for this alliance, and the satisfaction with both the system and the partner has a neutral status.

6.11 Case Study of Philips Lighting and Philips Yaming Lighting

6.11.1 The companies

Headquartered in the Netherlands, Philips employs approximately 125,500 employees in more than 60 countries worldwide. With sales of EUR 30.4 billion in 2005, the company is a market leader in medical diagnostic imaging and patient monitoring systems, energy efficient lighting solutions, personal care and home appliances, as well as consumer electronics. According to Philips, its lighting division is number one in the global lighting market. This division's products include a full range of incandescent and halogen lamps, compact and standard fluorescent lamps, high-intensity gas-discharge and special lamps, fixtures, ballasts, lighting electronics and automotive lamps. Currently Philips Lighting (below referred to as Philips) employs some 47,000 people worldwide, with manufacturing operations located in 16 countries (Source: Philips Website). As one of the first foreign companies to invest in China, Philips has so far set up 24 joint ventures or fully-owned subsidiaries with over 25,000 employees there.

Established in 1923, the first lamp manufacturing enterprise in China, Shanghai Yaming Lighting Co., Ltd. is a manufacturer of an extensive range of lamps, lighting fixtures and ballasts for indoor and outdoor, domestic and industrial uses. In 1993, Philips & Yaming Lighting Co. (below referred to as P&Y), the joint venture between Philips and Yaming was created in Shanghai. The reason for Philips to choose Yaming as its partner was the fact that Yaming was/is a state-owned enterprise that could help Philips' business expansion in China, and also Yaming has been one of the largest and most innovative lighting producers in China. Yaming had initially been in talks with both General Electric and Philips. After rounds of negotiations, Yaming selected Philips as its partner because Philips had much more experience with the Chinese market. Starting in 1996, four factories were created in different areas of Shanghai. By 1999, the joint venture had integrated these four factories into a single entity located in the Malu district of Shanghai. The total registered capital of this venture is 128.75 million US$, of which Philips takes 60% and Yaming the remaining 40% of the shares. P&Y is the leading manufacturer in China of High Intensity Discharge lamps, Compact Fluorescent Lamps, incandescent and halogen lamps for the domestic and export markets. In 2001, it was the third largest bulb producer in China with a total revenue of 658 million RMB (Fried Net, 2003), and its market share was 12%. Currently, the company employs more than 1,600 employees.

6.11.2 The approach of the case study

In this study, two sources of evidence have been used: archival records, structured and unstructured interviews. The archival records mainly are based on desk research since Philips is a public company and internal documents and materials. They cover general information of the partners such as their business scopes, an overview of their business sectors, history of the companies, sizes, organizational structures, and international strategies; and financial information of the partners including their turnovers, investments in ICT systems, benefits from the ICT implementations (actual or established), etc. Interviews by using a structured questionnaire and open questions with the IT managers and alliances managers in Philips Lighting in the Netherlands and with the IT managers and other high profile managers of P&Y in China have taken place. The scores of each measurement are mainly based on the questionnaire filled and the questions asked during the interviews.

6.11.3 The cooperation

Even though Philips and Yaming both have stakes in the joint venture P&Y, as Philips has the majority of shares in that venture, the day-to-day operations and management controls are mainly under the responsibility of Philips. To date, 60% of P&Y's products are for the Chinese market, and the other 40% are for Europe and America. In this sense, P&Y acts as a supplier to Philips since Philips has moved almost all its lighting production from the EU to low wage regions such as Asia and East Europe, and its operations in China have been its largest source. However, P&Y also needs to compete in the Chinese market and, therefore, many high-tech components that Philips produces in Europe are exported to P&Y. Further, Philips has transferred some technologies and competences to P&Y so that certain high-tech components can also be produced in P&Y. So the partnership between Philips and P&Y can be seen as a parent-subsidiary relationship, and also as a supplier-buyer cooperation (both being buyers and suppliers). From this, it is clear that by following the discussion in Section 5.5.2, P&Y can be regarded as a business cooperating partner of its parent company Philips since it has intensive external business relationships and a stock of knowledge. Thus, the investigation will be focused on the partnership between Philips and P&Y. The main structure of the business relationships of involved entities can be seen below figure:

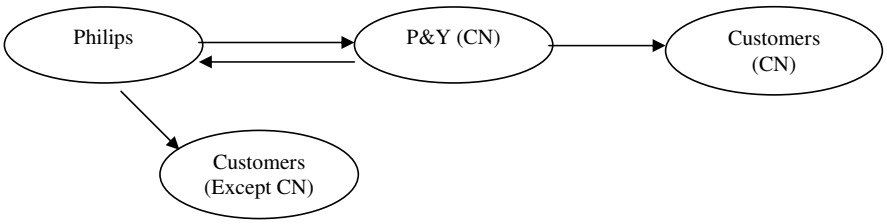

Figure 6.18: The relationships of Philips and P&Y

6.11.4 The use of ICT systems in the cooperation

The use of ICT systems in the cooperation can be characterized as high. From the early use of individual applications through to an ERP system, and to the new and widely used SAP system that standardizes business processes and user interfaces, this cooperation has experienced several stages of ICT development. The companies also plan to integrate the information systems and services of the total value chain in order to optimize stock levels, improve the service level for customers, increase the internal speed and the speed to the dealers, and finally increase the transparency of information. A brief description of this development is given below:

1993-1999: P&Y was focusing on internal issues as its operations were located in four different areas, and internal communications took more effort than communication with its Dutch parent. In this period, phone and fax were mainly used, plus email; and with an internal intranet, data storage, retrieval, and exchange was efficient. Also, individual applications such as Comar (for standardizing financial reports), Phiger (collecting and sending purchasing data), and Orce (internal purchasing) were also used in order to increase effectiveness and efficiency.

1999–2002: P&Y moved its four factories onto a single site. With the creation of a single ICT department, integration of the different ERP systems began. However, this integration did not go smoothly as the four ERP systems differed extensively and it was not possible to create a generic system. Despite the fact that internal efficiency at the business units had drastically improved due to the ERP systems, data redundancy and the loss of organizational control were seen as negative aspects of this development. The need to standardize data such as invoices, orders, and delivery records was addressed during the interviews. The integration of P&Y's ERP system with its Dutch parent was also impossible at that time. While continuing to use phone, fax, and emails, instant communication applications such as MSN messenger have also been used. Further, workflow management and digital agenda management applications were also implemented and used during this period.

2002–2003: the ICT department changed to a Shared Service Centre (SSC) in P&Y aiming to reduce the complexity and inefficiency of the former separately developed ERP systems. Since Philips had defined the standardizations of financial, informational, and logistic procedures as the target of its ICT strategy, the SSC's main task in this period was to introduce an integrated SAP system. The SAP system aimed to adjust bargaining power among suppliers, to increase standardization of administrative procedures, and to reduce the redundancy of information.

From 2003 onwards: since the introduction of the SAP system, the cooperation between the factories and the Sales & Marketing departments has been optimized through the standardization of finance, information, and logistical activities. However, the future requires a broader perspective. During the interviews, value chain integration and CRM were both mentioned as highly desirable for the cooperation's future ICT strategy. The currently existing value chain entities can be illustrated as: (1)

suppliers, (2) factories, (3) dealers and (4) customers. With the planned integration, the following advantages should be achieved in short-term:

- Optimization of stock levels (materials/ basic goods);
- Improvement in service level to customers;
- Increase in delivery speed (internal/ to dealer);
- Increase in transparency of information company-wide.

According to Philips and to P&Y, this improvement can be achieved by implementing several individual solutions. By integrating all the areas mentioned, the overall value chain will rise in efficiency and costs will be automatically reduced. For instance, in order to optimize inventory, the suppliers will be integrated and linked to the system. Therefore, an e-supply chain planning solution could be implemented so that suppliers are informed automatically when factories reach critical stock levels. Also, orders could be automatically generated and JIT product delivery established. Furthermore, product dealers, especially long-term partners, will also be connected to the so-called 'mini-ERP' systems. Customer satisfaction has been regarded as the main driving factor behind these plans, and they should ensure that products will be constantly available at the dealers. In order to improve customer relations even further, CRM activities such as data mining will be realized in the near future.

6.11.5 Strategic fit

In order to keep costs low, Philips has moved most of its production to low wage regions. In this, China has benefited the most because of its low skilled-labor costs and the huge local market. Philips has become the number one provider of lighting and lighting equipment to consumers and businesses in the world, and it has also become one of the largest manufacturers in the Chinese lighting industry (its joint ventures/operations in China include the third largest by profits - Philips Yaming Luminant Co; the second largest lighting accessories company-Philips Lighting Electronic Co; and the third largest bulb producer-P&Y) (Fried Net, 2003). As Philips has majority control of the joint venture, P&Y's strategies and objectives are set and guided by the former. Therefore, P&Y will not have major strategic conflict with Philips. As a result, the strategic fit between the two entities is rated as level 5 (very high) by the interviewees.

6.11.6 Operational fit

Since its first step into China, Philips has invested huge amounts in China (it has been regarded as one of the largest foreign investors in China). As one of its successful operations, P&Y has seen sizeable resource inputs from Philips (e.g. capital and technologies). Also, based on the interviews, both entities have invested substantial amounts in implementing ICT systems. Therefore, it can be concluded that the resource fit between the two entities is at level 5 (very high).

Both entities pointed out that cultural issues play an important role in the cooperation. Even in face-to-face situation, and the management team of P&Y

consists of Dutch and Chinese people, misunderstandings do occur, but not frequently. According to Philips, because of its long experience in the Chinese market, it is able to react and handle these cultural challenges quicker and easier than other foreign companies. For instance, it has advanced in the localization of its management positions: currently more than 30% of senior positions of Philips (China) are Chinese-filled (45 out of 145 posts in its 35 ventures and 60 offices), and the rate is expected to exceed 50% by 2007; and for other positions, the percentage of Chinese managers is even higher. Also, as Philips has a major influence on the design at P&Y, even though the joint venture incorporates many Chinese elements, some aspects and core values of the Dutch organization were transferred and included at P&Y. By doing this, Philips believes it is well ahead of most of its competitors in solving cross-cultural problems. Therefore, the cultural fit between the two entities can be regarded as 5 (very high).

Currently P&Y employs 1,600 permanent and 200 temporary workers, and the structure of its departments is basically similar to Philips. The management team of P&Y consists of 10 managers with members from both Philips and Yaming. However, as Philips has a majority share in this joint venture, the day-to-day operations of P&Y are under their control and guidance, and Yaming has much less influence. As a result, the design of P&Y could be thoroughly set and adjusted to the structure required by Philips. Also, the special arrangements to suit the introduction of several ICT systems, which integrated some business functions such as purchasing, finance, ordering, and logistics, in P&Y were made so that the joint venture could function in the same way as its Dutch parent in a virtual environment. Therefore, it was concluded that the organizational fit between the two parties is at level 4 (high).

Philips (as a group) is an intensive ICT user, with all its divisions, business groups and units electronically linked. Philips has a corporate IT department with over 100 employees. This department functions as the IT centre responsible for the company-wide Diamond system (Lotus Notes) that provides e-mail, agenda, planning, and other applications to all 250,000 employees worldwide. Under this center, each business group, division and unit has its own IT department. The IT department of Philips (Lighting) has two main tasks:

- Maintaining and upgrading ICT infrastructure and applications;
- Biz Tech services: Providing one-off technological services to employees for special needs (e.g. a special database program).

With factories in four locations in Shanghai, each P&Y entity had its own IT department or IT team. Since mid-2002, the four P&Y entities have combined their IT teams to a single one known as the IT Shared Service Centre (IT SSC). The IT SSC consists of ten IT experts and provides a broad range of services for P&Y, and also carries out some assignments/projects for third parties. A major change of SSC, compared with the old IT departments, is that it has become a cost/profit centre through offering consultancy services. This change has resulted in some financial

independence for the IT SSC, and the number of employees has been reduced. Similar new structures are expected to be applied in Philips worldwide.

Based on interviews, both entities have shown strong IT capabilities, and the technological fit between the two entities was rated at level 4 (high).

6.11.7 Macro-ICT Infrastructure

As Shanghai is one of the so-called first tier cities/areas in China, both Philips and P&Y have not complained that the ICT infrastructure in Shanghai has limited the use of electronic information exchange systems during the interviews. Rather, they noted that the electronic communication process was performing well. Therefore, the macro-ICT infrastructure between Europe and China can be rated at level 4 (high).

6.11.8 ICT system factors

In the early stages of the cooperation, ICT systems were not regarded as a strategic tool. However, according to Philips, since the late 1990s, the situation has changed, and the problem of island automation is regarded as the main driver for the development of ICT. For instance, along with the Philips (group) hierarchy, the various business divisions, groups, and units all have their own IT sections, which are headed by Central Information Officers (CIOs), and these have gained much power in ICT issues and report to their respective CEOs directly. Both organizations have set strategies and policies for their use of ICT. As already mentioned, emails, instant message exchange, SAP, and other systems have been used in this cooperation. Since some of the key business functions (financial, information, and logistical) have been replaced by electronic versions, and the future shows a strong need for value chain integration and customer relations management, the ICT system importance in this cooperation is put at level 4 (high).

As described, various ICT applications such as email, instant message exchange, and ERP/SAP systems have been used in this cooperation. Thus, many of its business functions (not all) have been replaced by electronic versions and, therefore, the degree of virtuality in this network is put at level 4 (high).

In the early stages of the cooperation each entity had its own ICT applications, and this made it difficult to standardize the communication process. As the integration of these systems, and the introduction of the SAP system, has taken place, the electronic information exchange between the two entities has become smoother. During the interviews, both parties had no complaints regarding the quality of the ICT systems. Therefore, the ICT system quality can be regarded as level 4 (high).

As mentioned, Philips had defined the standardization of financial, informational, and logistical aspects as the target for its ICT strategy. By using integrated systems, a large part of the information exchanged within the cooperation is relevant, standardized, and structured. However, the entities see further scope for information standardization, for instance to link suppliers and distributors together by the system. The information quality was clarified as level 4 (high).

6.11.9 Success of the virtual cooperation

Based on the interviews, it is clear that both parties' competitive positions have been strengthened in both Chinese and overseas markets, and that both entities are satisfied with the achievements of the cooperation. However, several concerns were also addressed:

- China is no longer the cheapest country of production.
- The costs of labor and others inputs in Shanghai, where P&Y is located, are some of the highest in China, and this causes P&Y's products to be less competitive in terms of price.
- P&Y's employment structure has also resulted in high labor costs compared with its competitors. It has 1,600 permanent and 200 temporary workers, while its competitors tend to use contract workers (Fozhou hires 8,000 contractual and 30 permanent workers; GE has 7,000 contractual and 30 fixed employees).

Overall, the satisfaction with the alliance is at level 4 (high) to 5 (very high). Taking average score is 4.5.

Both entities have highlighted the advantages and the strategic importance of using ICT systems. Therefore, the degree of usefulness of the systems can be placed at level 4 (high).

Both entities had rated their satisfaction with the system as high. However, some issues were also raised during the interviews. At the beginning of the cooperation, neither company was fully satisfied with the systems. For example, before Diamond was introduced, there were 27 different email systems used in Philips; and several different ERP systems were even used in the four factories within P&Y. This resulted in a lot of disadvantages and costs. At this stage, Philips noted that, compared to its Consumer Electronic Division, P&Y's IT costs were relatively high, and could be 2.5 times the industrial average in some cases. With the integration of these systems and the introduction of new ones, such disadvantages could be solved. Therefore, satisfaction with the ICT system can also be placed at level 4 (high).

According to the interviewees, both entities are in the same family; also both parties are well prepared for electronic communication, together with the standard format and structures for information exchange, the degree of satisfaction with regard to partner's conduct with the system is high. Thus, the rate of this measurement is put at level 4 (high).

6.11.10 Conclusion

Figure 6.19 provides an overview of the scores for all the relevant factors. Philips was one of the pioneers that realized the strategic importance of ICT systems in the first place. Because of its manufacturing nature, not every business function can be done electronically, but many important aspects of the two businesses have been replaced

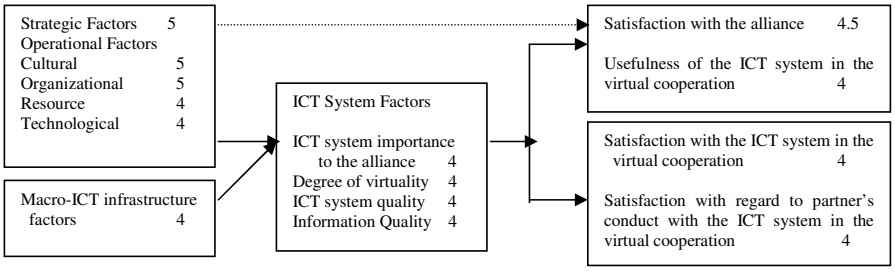

Figure 6.19: Findings from case study of Philips and P&Y

by electronic versions in order to optimize stock levels, improve services, increase delivery speed, and increase the transparency of information. The advanced ERP and CRM systems were implemented through the IT Shared Service Center (IT SSC). This separate center aims to serve the whole network effectively and efficiently. The lessons learned from this case study for forming a virtual cooperation are:

1. Even for manufacturers, a clear ICT strategy should be included in the company's and the network's strategy;
2. A separate IT department or center is needed to deal with all the IT-related issues;
3. Roles and standards for information exchange should be drawn up.

It can be concluded that the alliance of Philips and P&Y is successful since both entities are satisfied with the achievement of objectives and goals.

The virtual cooperation between the two parties is also regarded as successful since all measurements are above level 3. Philips sees ICT strategy as strategically important, and together with the highly matched operational fits and the macro-ICT infrastructure, all aspects relating to electronic communication are at high level. This leads to the ICT systems being useful and highly satisfactory regarding both the ICT systems and the partner's conduct with the ICT systems.

CHAPTER 7 CROSS-CASE ANALYSIS

7.1 Introduction

To identify the factors that influence the success of virtual cooperation within Dutch-Chinese strategic alliances, a cross-case analysis of data collected from the case studies needs to be carried out. The analysis needs to track the relationships between the research model's main components (see Figure 5.2), address the four main propositions defined, and present an overview of the cross-case comparisons including similarities and differences.

7.2 Findings from the case studies

The findings of the case studies have been given in Chapter 6. A summary of the overall findings from the case studies is given in Table 7.1 (Case 1 to Case 10 are ordered based on Table 5.11 in Section 5.5).

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Strategic fit	1	4	5	5	4	3	5	4	4	5
Operational fits										
Cultural fit	1	3	4	5	4	3	4	4	4	5
Organizational fit	1	3	5	5	4	3	4	4	4	5
Resource fit	2	3	4	5	4	3	4	4	3	4
Technological fit	4	3	5	5	5	2.5	3	2	2	4
Macro-ICT factors	3	3	4	4	4	4	3	3	3	4
ICT System Factors										
System importance to the alliance	4	3	5	5	4	2.5	4	3	2.5	4
Degree of virtuality	4	3	4	5	4	3	4	3	2.5	4
ICT System quality	3	3	5	5	4	3	3	3	3	4
Information quality	1	3	4	5	4	3	4	3.5	3	4
Success Factors										
Satisfaction with the alliance	1	4	5	5	4	3	5	4	4	4.5
Usefulness of ICT system	4	3	5	5	4	3	4	3	2.5	4
Satisfaction with the ICT system	3	3	5	5	4	3	3	3	3	4
Satisfaction with partner's conduct with ICT system	1	3	4	5	4	3	3.5	3	3	4
Status of Virtual Cooperation[1]	2.7	3	4.7	5	4	3	3.5	3	2.8	4

Table 7.1: Findings from the case studies

[1)] average of 2nd, 3rd and 4th scores of success factors

In order to summarize the success two indicators are taken:

- Satisfaction with the alliance, as it includes the cooperating partners' views towards the alliance such as achievement of goals and financial results;
- Status of Virtual Cooperation: this indicator summarizes the success indicators that relate to virtual cooperation, which is the average of the other three success

indicators (Usefulness of ICT system, Satisfaction with ICT system, and Satisfaction with regard to partner's conduct with the ICT system).

Table 7.1 contains the average scores for the relevant factors in the ten studied cases. In most cases, both partners have similar views regarding these factors. However, different opinions or levels of system importance to the alliance, degree of virtuality, and usefulness of the system were found in three cases, which are given in Table 7.2. It is decided to use the average scores from the two partners for the analysis and without weighing.

Factors	Case 2		Case 8		Case 9	
	Dutch	Chinese	Dutch	Chinese	Dutch	Chinese
System importance to the alliance	4	2	4	2	2	3
Degree of virtuality	4	2	4	2	2	3
Usefulness of ICT system	4	2	4	2	2	3

Table 7.2: Different opinions/levels from three cases

The findings in Table 7.1 show that, regarding the satisfaction with the alliance, Case 1 is a clear failure and Case 6 cannot be regarded as successful (score of satisfaction with the alliance is equal or below 3); the other eight cases are considered as successful (score of satisfaction with the alliance above 3). As for the status of the virtual cooperation, Cases 3, 4, 5, 7, and 10 are successful (score of status of virtual cooperation above 3), and the other five cases are not (score of status of virtual cooperation is equal or below 3). The detailed analyses of the relationships between the different factors will be given in the following sections.

7.3 The relationship between strategic factors and virtual cooperation

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Strategic fit	1	4	5	5	4	3	5	4	4	5
Success Factors										
Satisfaction with the alliance	1	4	5	5	4	3	5	4	4	4.5
Status of Virtual Cooperation	2.7	3	4.7	5	4	3	3.5	3	2.8	4

Table 7.3: Findings of strategic fit and virtual cooperation factors from the cases

From Table 7.3, it can be concluded that there is a very good match between strategic fit and satisfaction with the alliance: the higher the degree of strategic fit, the higher the satisfaction with the alliance. Of the ten cases, eight cases show high satisfaction

regarding the alliance, that is the achievement of objectives and goals of those alliances are relatively high. As a result, these alliances are stable and long-term orientated. One case (Case 6) is regarded as of neutral status because the partner acceptance is not very high in the Dutch entity, and the achievement of the Chinese side is below expectation. For Case 1, the total lack of strategic fit at the beginning can be seen as the cause of a high degree of dissatisfaction on both sides, and led to halting this alliance. To summarize, we can conclude that where partners have a strategic fit, both parties will have the same direction (objectives) in operating the alliance, and thus they will be mutually dependent with respect to the realization of the direction (objectives), it is in line with the proposition 1 addressed in Section 5.4: a good strategic fit has a positive impact on the satisfaction with the alliance.

7.4 The relationship between operational factors and ICT system factors

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Operational fits										
Cultural fit	1	3	4	5	4	3	4	4	4	5
Organizational fit	1	3	5	5	4	3	4	4	4	5
Resource fit	2	3	4	5	4	3	4	4	3	4
Technological fit	4	3	5	5	5	2.5	3	2	2	4
ICT System Factors										
ICT system importance	4	3	5	5	4	2.5	4	3	2.5	4
Degree of virtuality	4	3	4	5	4	3	4	3	2.5	4
ICT system quality	3	3	5	5	4	3	3	3	3	4
Information quality	1	3	4	5	4	3	4	3.5	3	4

Table 7.4: Findings of operational and ICT system factors from the cases

From Table 7.4, some direct relationships between operational factors and ICT factors can be identified, and these are discussed below:

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Technological fit	4	3	5	5	5	2.5	3	2	2	4
ICT system importance	4	3	5	5	4	2.5	4	3	2.5	4

Table 7.4.1: Relationship between technological fit and ICT system importance

In Table 7.4.1, the linkage between technological factor and ICT system importance to the alliances can be identified because the scores of six cases out of ten are matching. In this sense, a higher degree of technological fit could increase the ability of an ICT system in replacing the traditional ways of executing business functions, and thus increase the degree of interdependency between cooperating partners through the ICT system. However, the evidence is not hard enough to make this a firm

conclusion. From the cases studied, one fact also needs to be taken into account: the strategic visions of the cooperating entities towards the use of ICT system do influence the system importance heavily. These visions are based, on the one hand, on the nature (business sector) of the companies/alliances and, on the other hand, on the management's views toward the use of ICT systems.

Regarding the nature of the companies/alliances, ICT-related enterprises and software vendors clearly consider the use of ICT central to their businesses and alliances, for instance in Cases 1, 3, 4, and 5. In Case 2, even though the system importance is only neutral, one partner (the software company ANT) considers the system should be important based on its own perceptions and experiences with its other European partners (see Table 7.2). However, its Chinese partner (a distributor) regards the system as not important. For manufacturing enterprises, for instance Cases 6 and 9, the system importance is relatively low because the organizational variables such as staff and machines are tied together by something quite physical in traditional manufacturing firms, and so the need to replace with ICT is much lower.

Because people are the designers and/or members of organizations and alliances, the virtual cooperation form demands more business and technical expertise in carrying out business activities and, thus, the management's mindset regarding the use of an ICT system is a key point in forming a virtual cooperation. Cases 7 and 10 are two examples in which the involved companies are manufacturers but, as management teams have realized the benefits of using ICT systems, related policies and actions have been defined and implemented. As a result, the system importance is rated as high in these two alliances. In Cases 2 and 8, the Chinese partners do not regard the ICT system as important, which differs from their Dutch counterparts' views (see Table 7.2).

The findings show that technological fit has a direct impact on ICT system importance to the cooperation. However, the strategic factor and the nature of the involved companies play a more important role in influencing the system's importance.

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Technological fit	4	3	5	5	5	2.5	3	2	2	4
Degree of virtuality	4	3	4	5	4	3	4	3	2.5	4

Table 7.4.2: Relationship between technological fit and the degree of virtuality

From Table 7.4.2, a relationship between technological fit and degree of virtuality can be identified, with most cases showing that when the degree of technological fit is equal or higher than 3, the degree of virtuality will be also equal or higher than 3. In this sense, it means that information technology is the dominant part of the virtualization process of organizations/alliances. The virtualization process is about ease and degree of being connected or getting connected with internal and external parties by electronic communication channels. Without the ability to master

the technology, such a process would not be possible. The exception is Case 8, in which the degree of virtuality is neutral even though there is a misfit of technologies. The reason for this exception is that the ICT infrastructure in the Dutch entity is much better than on the Chinese side, which leads to a higher average degree of virtuality in the cooperation (see Table 7.2).

Within ICT system factors (see table 7.4.3), an interesting finding is the relationship between ICT system importance and the degree of virtuality, which shows that the higher the degree of ICT system importance, the higher the degree of virtuality. In this sense, ICT system importance, on the one hand, depends on the nature of the companies/alliances, and their strategic vision while, on the other hand, it also acts as the starting point or a conditional factor for influencing the virtualization process.

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
System importance	4	3	5	5	4	2.5	4	3	2.5	4
Degree of virtuality	4	3	4	5	4	3	4	3	2.5	4

Table 7.4.3: Relationship between ICT system importance and the degree of virtuality

A relationship between resource fit and degree of virtuality can also be seen, most cases show that the higher the resource fit, the higher the degree of virtuality (see Table 7.4.4). Virtualization requires the implementation of a number of ICT systems, and this requires substantial resource inputs. One exception is Case 1, in which the degree of virtuality of this alliance is high even though the resource fit is very low. The reason is that even though both partners have hesitated to invest substantial resources in the alliance, their inputs for ICT systems can still be considered to fit as both parties are ICT-related enterprises.

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Resource fit	2	3	4	5	4	3	4	4	3	4
Degree of virtuality	4	3	4	5	4	3	4	3	2.5	4

Table 7.4.4: Relationship between resource fit and degree of virtuality

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Technological fit	4	3	5	5	5	2.5	3	2	2	4
ICT system quality	3	3	5	5	4	3	3	3	3	4

Table 7.4.5: Relationship between technological fit and ICT system quality

ICT system quality concerns the ability of the information system to fulfill users' quantitative and qualitative needs and expectations, which is related to the quantity of system failures. From Table 7.4.5, a relationship between technological fit

and system quality can be identified: most cases show that the higher degree of technological fit, the higher the quality of the system. From this finding, it is clear that without correct implementation and use of the system (the soft part), the system itself cannot function well. Therefore, professional personnel and competence in ICT use is very important to ensure the quality of electronic communications.

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Resource fit	2	3	4	5	4	3	4	4	3	4
ICT system quality	3	3	5	5	4	3	3	3	3	4

Table 7.4.6: Relationship between resource fit and ICT system quality

From Table 7.4.6, a relationship between resource fit and ICT system quality can also be observed: most cases show that the higher the resource fit, the higher the ICT system quality. The exception is Case 1, and the reason for this was given earlier. Also, this finding explains the two exceptional Cases, 8 and 9: due to certain resource inputs, the degree of ICT system quality is higher than the degree of technological fit (see Table 7.4.5). To summarize, substantial resource inputs are the basis for adapting ICT systems (hard part).

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Cultural fit	1	3	4	5	4	3	4	4	4	5
Information quality	1	3	4	5	4	3	4	3.5	3	4

Table 7.4.7: Relationship between cultural fit and information quality

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Organizational fit	1	3	5	5	4	3	4	4	4	5
Information quality	1	3	4	5	4	3	4	3.5	3	4

Table 7.4.8: Relationship between organizational fit and information quality

From Table 7.4.7 and Table 7.4.8, it is clear that there are strong links between cultural fit and information quality and between organizational fit and information quality as most cases show the higher the degrees of cultural and organizational fit, the higher the degree of information quality.

Cultural fit involves the national or ethnic culture, industry culture, and individual corporate culture. At the national/ethnic level, almost all cases show that language and personal relationships with the Chinese are the two main cultural issues. English was the communication language in all the studied alliances. For most Chinese people, their level of English is not sufficient for international

communication; while, for the Dutch, English is also not their native language. To overcome this problem, most Dutch enterprises hired Chinese speakers, and the Chinese companies employed some staff with good abilities in English; however, misunderstandings between the two sides still occurred. The difficulty of building personal relationships 'guanxi' with Chinese people was pointed out in many of the cases in which this issue had a direct impact on trust between partners. In most cases, the Chinese prefer to build up a personal relationship first and then start cooperation. Also, having the same foreign contact(s) is regarded as very important for sustaining trust by many Chinese people; they will feel displeasure if the usual contact person's colleagues respond or take part in the communication process. Trust can be regarded as the heart of cooperation. Case 1 shows that when there is a lack of trust, both partners can regard the information provided by their partner as untruthful.

Individual corporate culture also plays a very important role regarding information quality. In successful virtual cooperation, for instance Case 3, 4, 5, 7, and 10 all regard information sharing as the core aspect of their corporate culture, all involved employees/parties must provide relevant and up-to-date information, and no withholding of information is allowed.

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Organizational fit	1	3	5	5	4	3	4	4	4	5
Status of Virtual cooperation[1]	2.7	3	4.7	5	4	3	3.5	3	2.8	4

Table 7.4.9: Relationship between organizational fit and status of virtual cooperation

Organizational fit concerns the organizational arrangements for the cooperation. In order to realize the objectives of alliances, some rules or policies need to be created and observed. The successful cases, for instance Cases 3, 4, 5, and 10, show that the following arrangements need to be made in order to suit the requirements of electronic communication and to overcome cultural barriers:

- creation of an ICT department or ICT expert team,
- clear policies and roles regarding the provision of information, and
- special and fixed structure design, with clear responsibilities and tasks regarding electronic communication.

The successful cases show that by using standard and structured formats enforced by rules and policies, information quality could be increased.

From the analysis, we can conclude that the linkages between operational fits and ICT system factors had been identified. This conclusion is in line with the proposition 2 addressed in Section 5.4: good operational fits have a positive impact on ICT system factors.

7.5 The relationship between macro-ICT and ICT system factors

Factors	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10
Macro ICT	3	3	4	4	4	4	3	3	3	4
ICT System Factors										
ICT System importance	4	3	5	5	4	2.5	4	3	2.5	4
Degree of virtuality	4	3	4	5	4	3	4	3	2.5	4
ICT System quality	3	3	5	5	4	3	3	3	3	4
Information quality	1	3	4	5	4	3	4	3.5	3	4

Table 7.5: Findings on Macro-ICT and ICT system factors from case studies

Factors	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10
Macro ICT	3	3	4	4	4	4	3	3	3	4
ICT System quality	3	3	5	5	4	3	3	3	3	4

Table 7.5.1: relationship between Macro-ICT and ICT system quality

From Table 7.5.1, the link between the macro-ICT infrastructure factors and ICT system quality can be identified (scores of seven cases out of ten are matching). It appears that the macro-ICT infrastructure mainly influences the ICT system quality, i.e. the 'hard part' of the use of ICT systems.

All the case study companies agree that the macro-ICT infrastructure in China and in the Netherlands could satisfy the requirements for using basic ICT systems such as email, EDI, ERP, and E-commerce applications. However, the transfer speed of data or images in China is much lower than in the Netherlands, and the Chinese parties in two alliances (Cases 7 and 8) have indicated their disappointment regarding the low quality of emotions expressed using videoconferencing systems. Even though they see the system quality as the main cause, the macro-ICT infrastructure has some responsibilities for this issue. Also, in Cases 2 and 9, the high costs of videoconferencing systems limited the choice. The partners were willing to upgrade the degree of virtuality in their cooperation; however, the availability and reliability of such systems in China resulted in a delay in implementing advanced ICT systems.

From the analysis, we can conclude that a well-developed macro-ICT infrastructure has a positive impact on ICT system factors, which it is in line with the proposition 3 addressed in Section 5.4.

7.6 The relationship between ICT system factors and virtual cooperation

Factors	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10
ICT System Factors										
ICT system importance	4	3	5	5	4	2.5	4	3	2.5	4
Degree of virtuality	4	3	4	5	4	3	4	3	2.5	4
ICT system quality	3	3	5	5	4	3	3	3	3	4
Information quality	1	3	4	5	4	3	4	3.5	3	4
Success Factors										
Satisfaction with the alliance	1	4	5	5	4	3	5	4	4	4.5
Usefulness of ICT system	4	3	5	5	4	3	4	3	2.5	4
Satisfaction with system	3	3	5	5	4	3	3	3	3	4
Satisfaction to partner's conduct of ICT system	1	3	4	5	4	3	3.5	3	3	4
Status of Virtual Cooperation	2.7	3	4.7	5	4	3	3.5	3	2.8	4

Table 7.6: Findings on ICT system factors and the success of virtual cooperation

From Table 7.6, some relationships between ICT system factors and success measurements of virtual cooperation within Dutch-Chinese strategic alliances can be identified.

As discussed earlier, satisfaction with the alliance can be regarded as the starting point for a virtual cooperation, in that it mainly concerns strategic issues. From the case studies, no strong evidence of a direct relationship between ICT system factors and satisfaction with the alliance has been found (from Table 7.6, based on the scores of each of the relevant variables, no more than four cases out of ten are matching).

Factors	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10
ICT system importance	4	3	5	5	4	2.5	4	3	2.5	4
Usefulness of ICT system	4	3	5	5	4	3	4	3	2.5	4

Table 7.6.1: Relationship between ICT system importance and usefulness of the ICT system

Factors	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10
Degree of virtuality	4	3	4	5	4	3	4	3	2.5	4
Usefulness of ICT system	4	3	5	5	4	3	4	3	2.5	4

Table 7.6.2: Relationship between degree of virtuality and usefulness of the ICT system

Table 7.6.1 and 7.6.2 show that there are strong links between ICT system importance and usefulness of the ICT system, and between degree of virtuality and usefulness of the ICT system (the scores of nine cases out of ten are matching). In

Cases 1, 3, 4, 5, 7, and 10, the companies all regarded the ICT system as very important, especially the business competitors in Cases 3 and 4 consider the system to be at the centre of their businesses, and they also have high degrees of virtuality. The advantages of using such systems have been recognized, for instance for efficient and effective data storage and transfer, real time monitoring, control, and services despite physical location differences, cost saving especially the travel and communication expenses, and to sustain relationships with employees, partners, and customers. As a result, the degree to which the companies believe that using the systems enhances their businesses or cooperation performances is high. In Case 9, the Dutch partner doubted whether using ICT system would improve its performance significantly, resulting in a low system importance and degree of virtuality in this cooperation. However, one fact that this company has to face is its huge inventory, and it might need to rethink its strategy concerning its stocks. As a small trading company, Dutchi keeps more than 6 million Euro worth of products in its warehouse in the Netherlands in order to respond to customers quickly. During the interviews, the CEO of Dutchi agreed that by implementing some ICT applications such as EDI, ERP, and CRM, to link its supplier and customers together, the company could lower its stock levels substantially and could improve the performance of the company.

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
ICT system quality	3	3	5	5	4	3	3	3	3	4
Satisfaction with the ICT system	3	3	5	5	4	3	3	3	3	4

Table 7.6.3: Relationship between ICT system quality and Satisfaction with the ICT system

From Table 7.6.3, a perfect match (all scores are the same) between ICT system quality and satisfaction with the ICT system can be seen. Each user has a set of expected benefits or aspirations for the information system. When the system meets or fails to meet each of these aspirations, the user is more or less satisfied.

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Information quality	1	3	4	5	4	3	4	3.5	3	4
Satisfaction with partner's conduct of ICT system	1	3	4	5	4	3	3.5	3	3	4

Table 7.6.4: Relationship between information quality and satisfaction regarding a partner's conduct with the ICT system

In Table 7.6.4, a strong link between information quality and satisfaction regarding a partner's conduct with the ICT system can be identified (scores of eight cases out of ten are matching, and the difference of the other two cases is just 0.5). In Cases 3, 4, 5, and 10, the companies regard their partners' behavior in using the ICT

systems to be good, in that mostly the information provided through the systems is relevant, trustful, up-to-date, standard, and useful. In this way, trust between them and their partners can be sustained. In Cases 2, 6, 7, 8, and 9, the degree of information standardization is low, and so additional work and tasks are needed to process the information provided by way of the ICT system. Also, several of the interviewed companies complained that their partners sometimes withheld certain information, which hurt the trust between the cooperating entities. In Case 1, the information quality is very low since partners frequently withheld information or failed to respond to requests. As a result, trust between the two parties was lost completely. Conflicts between the two regarding behavior in operating the systems became frequent.

From the analysis, we can conclude that the linkages between ICT system factors and the success factors of virtual cooperation within Dutch-Chinese strategic alliances had been identified. This conclusion is in line with the proposition 4 addressed in Section 5.4: positive ICT system factors have a positive impact on the success of virtual cooperation within Dutch-Chinese strategic alliances.

7.7 Factors influencing the success of virtual cooperation

The relationships between independent variables and intermediary variables and between intermediary variables and dependent variables have been discussed in previous sections. This section will analyze what factors are influencing the success of actual virtual cooperation within Dutch-Chinese strategic alliances.

Factors	**Case 1**	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**	**Case 7**	**Case 8**	**Case 9**	**Case 10**
Strategic fit	1	4	5	5	4	3	5	4	4	5
Satisfaction with the Alliance	1	4	5	5	4	3	5	4	4	4.5
Status of Virtual Cooperation	2.7	3	4.7	5	4	3	3.5	3	2.8	4

Table 7.7: Satisfaction of Dutch-Chinese strategic alliances and status of virtual cooperation within these alliances

Regarding the satisfaction with the alliance, Table 7.7 shows the cases can be grouped into four categories (unsuccessful, $2 \leq$ score < 3: no case): very unsuccessful (score = 1: Case 1), neutral (score = 3: Case 6), successful ($3 <$ score ≤ 4: Cases 2, 5, 8, 9), and very successful (score > 4: Cases 3, 4, 7, 10). As discussed in Section 7.3, there is a direct relationship between the strategic fit and satisfaction with the alliance. Moreover, Table 7.7 shows that in a successful virtual cooperation (score of status of virtual cooperation > 3), their strategic fits are high (≥ 4). Therefore, it can be concluded that, as in traditional alliances, the strategic fit plays a key role in the alliance itself, also in a virtual cooperation form. However, it also can be noted that

strategic fit is a necessary but not sufficient condition for a success virtual cooperation (e.g. Cases 8 and 9).

Regarding the status of virtual cooperation, the cases can be grouped into four categories: unsuccessful ($2 \leq$ score < 3: Cases 1, 9), neutral (score = 3: Cases 2, 6, 8), successful (score: $3 <$ score ≤ 4: Cases 5, 7, 10), and very successful (score > 4: Cases 3, 4). To identify the influencing factors in a virtual cooperation, only the unsuccessful and successful cases will be kept for the analysis (neutral cases are not significant in generating conclusions). Table 7.8 provides an overview of the successful and unsuccessful cases. The relevant factors of these cases that are lower or higher than 3 are shown in 'bold' in order to specify the influential factors.

Factors	**Case 1**	**Case 3**	**Case 4**	**Case 5**	**Case 7**	**Case 9**	**Case 10**
Operational							
Cultural fit	**1**	**4**	**5**	**4**	**4**	**4**	**5**
Organizational fit	**1**	**5**	**5**	**4**	**4**	**4**	**4**
Resource fit	**2**	**4**	**5**	**4**	**4**	3	**5**
Technological fit	**4**	**5**	**5**	**5**	3	**2**	**4**
Macro-ICT	3	**4**	**4**	**4**	3	3	**4**
ICT System Factors							
System importance to the alliances	**4**	**5**	**5**	**4**	**4**	**2.5**	**4**
Degree of virtuality	**4**	**4**	**5**	**4**	**4**	**2.5**	**4**
ICT system quality	3	**5**	**5**	**4**	3	3	**4**
Information quality	**1**	**4**	**5**	**4**	**4**	3	**4**
Successful Factors							
Satisfaction with the alliance	**1**	**5**	**5**	**4**	**5**	**4**	**4.5**
Usefulness of ICT system	**4**	**5**	**5**	**4**	**4**	**2.5**	**4**
Satisfaction with the ICT system	3	**5**	**5**	**4**	3	3	**4**
Satisfaction with partner's conduct with the ICT system	**1**	**4**	**5**	**4**	**3.5**	3	**4**

Table 7.8: Findings on seven successful or unsuccessful cases of virtual cooperation

From Table 7.8, of the intermediate ICT system factors, both system importance and degree of virtuality have seven 'bold' scores, indicating the two are essential factors that influence the success of a virtual cooperation. Information quality also has six 'bold' scores out of seven; this is closely related to the trust, confidence, and communication process between partners. In other words, it is the 'heart' of electronic communication. The ICT system quality has four 'bold' scores out of seven, which means this 'hard' factor plays a less important role in comparison with other factors.

The macro-ICT infrastructure has four 'bold' scores out of seven, indicating that the macro-ICT factor is influential. However, it is expected the macro-ICT infrastructure in China will continue to improve; when the development reaches a certain level, it will no longer be a major influential factor for Dutch-Chinese virtual cooperation.

With respect to the operational fits, both cultural and organizational factors have 'bold' scores in all seven cases. It indicates that, as in traditional international strategic alliances, cultural issues are still a key for success. Also, organizational arrangements for electronic communication must be appropriate in order to fulfill the requirements. Both resource and technological fits have six 'bold' scores. Without technology, virtual cooperation would not be possible. Compared with traditional alliances, the technological factor does have a greater impact on the success of a virtual cooperation, in so far as it influences the degree of virtuality and ICT system quality, and therefore affects the usefulness of the ICT system and satisfaction with the ICT system. An ICT infrastructure requires substantial resource inputs. Without sufficient resources, the degree of virtuality cannot be upgraded and the ICT system quality will not be high, thus influencing the usefulness of the ICT system, and the satisfaction with the ICT system.

Comparing Table 7.7 and 7.8, we can see that in Cases 2, 6, 9, the alliances can be regarded as successful (Cases 2 and 9) or neutral (Case 6). However, the degree of virtuality is low because of the low technological fit and the low ICT system importance to the alliances. Therefore, the virtual cooperation cannot be considered to be successful. This result provides further evidence regarding the importance of the technological factor as discussed above.

7.8 Differences between the cases focusing on the similarities and common characteristics

7.8.1 Overview

The previous sections have analyzed the findings from the case studies focusing on the similarities and common characteristics. This section aims to analyze the differences between the cases. There are various differences or other factors that might influence the success of virtual cooperation; two major aspects will be discussed in this section. The reasons of such a selection are as follows: as discussed in Section 5.5.2, the cooperation between independent companies, between parents and joint ventures, and between parents and fully-owned subsidiaries might result in differences in virtual cooperation, thus the differences need to be discussed further. Also, during the case studies, the nature of the companies that may have a direct influence on ICT system importance to the alliances and to the degree of virtuality, and the role of electronic communication for virtual cooperation have been pointed out; as the result, the two aspects need to be analyzed. Table 7.9 presents the differences regarding the types of alliances, nature of the companies, system importance and degree of virtuality, and in status of virtual cooperation. The following sub-sections address the differences in three main areas: differences in cooperation/alliance, different nature of cooperating companies, and the roles in electronic communications.

Case	Type of cooperation*	Nature of companies (NL-CN)	System importance/degree of virtuality (NL-CN)	Status of virtual cooperation
1	a	ICT/ICT	High/high	Low
2	a	ICT/Trading	Neutral/neutral	Neutral
9	a	Manufacturer/manufacturer	Low/low	Low
6	b	Manufacturer/manufacturer	Low/neutral	Neutral
8	b	Services/services	Neutral/neutral	Neutral
10	b	Manufacturer/manufacturer	High/high	High
3	c	ICT/ICT	Very high/high	Very high
4	c	ICT/ICT	Very high/very high	Very high
5	c	ICT/ICT	High/high	High
7	c	Trading/manufacturer (trading)	High/high	High

* Type of cooperation: (a) both are independent companies, (b) parent and joint venture, and (c) parent and fully owned subsidiary

Table 7.9: Overview of the cases concerning type of cooperation and nature of companies

7.8.2 Different types of cooperation/alliance

Table 7.9 shows that among the ten cases, the cooperating partners in Cases 1, 2 and 9 are independent companies, while the rest are either parent-joint ventures (Cases 6, 8, 10) or parent-daughter (Cases 3, 4, 5 & 7). A finding is that in the parent-daughter relationships all four cases show a higher ICT system importance and a higher degree of virtuality. In this sense it can be concluded that, in a network where all members belong to the same family, it is easier to form a shared ICT strategy. While in the parent-joint venture relationships, only Case 10 shows a high degree of ICT system importance and virtuality, in the other two cases they had a neutral status. Regarding this point, it is clear that when both parents play an important role in the joint venture, to achieve an agreed and shared ICT strategy, each must take the other parent into account. Case 10 is an exception mainly due to the Dutch partner being much stronger and taking the lead in the joint venture; as a result the strategies (including ICT) in the joint venture are designed to suit the Dutch parent's overall strategies. In the relationships between independent companies, both Case 2 and Case 9 show that it is difficult to get an agreed ICT strategy because both parents need to pay more attention to business and trust building issues rather than ICT. Case 1 is an exception here because the two partners are ICT/Internet enterprises, and the use of ICT is the core of their businesses.

The culture-related issues have been mentioned frequently in considering the cooperation between independent companies. In Case 1, the strong misfit in culture resulted in a lack of basic understanding and trust between the partners which, in turn, caused many unexpected actions to occur. In Cases 2 and 9, the Chinese partners from the two alliances were surprised by the fact that there were always different people from their Dutch partners to react to or communicate with, this they believe hurts the Chinese need for personal contact or communication, in turn damaging the trust.

These three cases (Case 1, 2, and 9) all show there are instances of unacceptable behavior such as withholding information, and sometimes avoiding to answer instead of saying 'no' also hurts trust. With the other types of cooperation, this kind of complaints occurred less. Cases 3, 4, 6, 7, 8, and 10 (Case 5 is different and will be discussed later) are Dutch parent plus joint venture or Dutch parent plus fully-owned subsidiary relationships. Among these six cases, only Case 6 showed the strategic and cultural conflicts between the cooperating entities. The reason was that the Chinese parent played a very important role in the joint venture, and the joint venture was only a part of its overall operations. To protect its own interests and core competences, the Dutch parent refused to transfer certain technologies to the joint venture, even though additional advantages would have been created if it decided to do so. The other five cases do show that the strategies as well as the culture of the Dutch parents were well copied to the subsidiaries in China. In Case 5, even though the subsidiary of the Chinese company was registered and operated in the Netherlands, it should be considered more like a Chinese company than a Dutch enterprise because the key managers were transferred from China and most employees are of Chinese origin. In either a Dutch company or a Chinese enterprise, when the cooperating entities are in the same family, strategic or operational factors can be agreed more easily. Thus, it can be concluded that in international cooperation, cultural barriers are still a dominant factor in influencing trust, and this in turn influences the alliance's success. According to the type of cooperation, the degree of such cultural barriers can be ranked as follows: between independent companies (high); between parent and joint ventures (low); and between parent and fully-owned subsidiary (very low).

7.8.3 Different nature of cooperating companies

Almost all the companies interviewed have expressed that certain advantages of using ICT systems (such as cost saving in communication and travel expenses, overcoming time zone differences, and transferring large-volume information) had been achieved despite some cooperation having very little virtuality.

The nature of the companies can lead to different views towards the use of ICT systems. In Cases 1, 3, 4 and 5, the cooperating partners are ICT enterprises, and thus all of them regard the use of ICT as central to their businesses. For other types of companies, the situation appears to be different. In Case 2, the Dutch partner is an ICT company and its nature and successful experience in Europe have resulted in the use of ICT being central to its strategy. However, its Chinese counterpart is a traditional enterprise, with a different view regarding the ICT system, and this has led to a lower level of ICT use in their cooperation. In Case 8, the nature (testing house/services) of Kema and its network requires advanced ICT systems, which means that many business functions can be replaced by electronic versions. Also, a large part of its information exchange such as drawings, testing results, and certificates can be structured and standardized. Using integrated ICT systems such as a centralized database, EDI, and integrated ERP could increase its operational

efficiency, as has been recognized by Kema's own experiences in Europe and North America. However, the Chinese partner still regards an ICT system as a cost factor and hesitates to implement higher advanced ICT systems. This alliance, to move one step further towards virtual cooperation, requires an agreement between the involved parties. Since Kema China is not fully-owned by Kema, the Chinese parent plays an important role in the joint venture. How to remove the resistance from the Chinese side is the main task for this alliance if it wants to achieve a higher-level of virtual cooperation. In Cases 6 and 9, the cooperating partners are manufacturers, and either do not regard ICT as strategically important or do not have a shared ICT strategy, and simply plan and implement such systems on their own; this has led to a low degree of ICT system importance and virtuality. In Cases 7 and 10, even though the cooperating partners are manufacturers, the top management has put the use of ICT on the strategic level, and role and resource allocation for such systems have taken place. Given the situation, the cooperation could enjoy a higher level of ICT system importance and a higher degree of virtuality, leading to a higher level of virtual cooperation, and some of the advantages of using such systems being achieved.

The nature of companies can lead to different views regarding ICT strategies. IT-related enterprises are more willing to apply ICT systems in their businesses than are manufacturers. However, manufacturers may also become more virtual if the top management realizes the importance of ICT systems in their overall strategies and certain arrangements and roles are implemented.

7.8.4 The role of electronic communication

Several cases indicate that certain disadvantages concerning ICT use occur in Dutch-Chinese business cooperation, such as misunderstandings, lowered information quality, and lack of physical contact. However, such issues most frequently occurred in those cases with the lower levels of ICT system importance and lower degrees of virtuality (except Case 1). This raises the question what could be the result if the unsuccessful virtual alliances are at the higher level of system importance and virtuality? It has been concluded that such issues are mostly related to culture/trust, which leads to the question: whether advanced ICT systems can overcome cultural barriers.

From the successful instances of virtual cooperation (Cases 3, 4, 5, 7 and 10), the answer would appear to be yes if there is mature trust between the partners, a set of roles (e.g. sharing information as center of the network), standard formats and structures for information exchange, strong ICT teams or departments, and strict enforcement regarding electronic information exchange. However, one important fact is that the cooperating entities in each of these five cases are in the same family or, if not, the parent takes the lead in the joint venture (Case 10). In this sense, corporate culture plays a significant role in the network compared to trust and national or individual cultures. In line with Chesbrough & Teece (1996), who found that those successful virtual companies who have demonstrated staying power are all at the

centre of a network, these five cases show that there needs to be one entity, at the centre of the network, to lay down all the necessary requirements regarding the electronic information exchange, and the other members are forced to follow suit.

When applying the findings above in the other cases, no matter what the type of international alliance is, if one party takes the lead to draw up and play the necessary roles, standards and enforcements regarding ICT system usage, the above-mentioned cultural issues could be solved to a large extent. Fully sharing information and implementing the enforcement guidelines requires full and mature trust between the partners, requires the leader of the cooperating partners to have more bargaining power, and/or requires the interdependence between the partners to be high. Thus, building and sustaining mature trust is the basis for successful electronic information communication which, in turn, leads to successful virtual cooperation.

7.8.5 Summary

The analysis of the differences between the cases leads to the conclusion that in international cooperation, cultural barriers are still a dominant factor in influencing the alliance's success. With regard to the different types of cooperation, the degree of such cultural barriers can be ranked as following: between independent companies (high); between parent and joint ventures (low); and between parent and fully-owned subsidiary (very low). Moreover, the nature of companies has significant impact and can lead to different views regarding ICT strategies. In general, ICT-related enterprises are more willing to apply ICT systems in their businesses than are manufacturers. However, manufacturers may also become more virtual if the top management realizes the importance of ICT systems in their overall strategies and certain arrangements and roles are implemented. Another important conclusion is that trust is a key element (part of cultural factors) that influences the quality of electronic communication which, in turn, influences the success of a virtual cooperation. The core of successful virtual cooperation is information openness and sharing based on standardized roles, structures, and formats. However, trust alone cannot lead to a successful virtual cooperation. In some of the cases studied, mature trust does exist, but as the management of the cooperating partners does not regard ICT systems as strategically important, the use of ICT system stays at a lower level and leads to an unsuccessful virtual cooperation. It can be concluded that even though trust is the key for a successful virtual cooperation, the appropriate management support and related strategies are required, especially when non-ICT enterprises are involved. Without meeting these requirements, Dutch-Chinese virtual cooperation was judged not successful.

7.9 Conclusion

Section 7.3, 7.4, 7.5 and 7.6 presented the findings regarding four propositions provided in Chapter 5. Based on the analyses, the four main propositions of this research have all been examined, and supporting evidence has been found for all.

In traditional alliances, strategic fit is the most important fit. In the virtual cooperation form, where partners have a strategic fit, both parties will have the same direction (objectives) in operating the alliance, and thus they will be mutually dependent with respect to the realization of the direction (objectives) of the alliance.

The data show that operational factors all influence ICT system factors. The most important factors are the cultural and organizational fits, followed by technological and resource fits. As in a traditional international strategic alliance, the cultural factor is still the key to success. Organizational arrangements for electronic communications must also be made in order to fulfill requirements. The technological factor does have a great impact on the degree of virtuality and ICT system quality: without technology, a virtual cooperation is impossible. An ICT infrastructure requires substantial resource inputs since without sufficient resources, the degree of virtuality cannot be upgraded and the ICT system quality will not be high.

There are links between the macro-ICT infrastructure and the degree of virtuality and ICT system quality, indicating that the macro-ICT factor mainly influences the 'hard part' of electronic communications quality. However, when the macro-ICT infrastructures in the Netherlands and China reach an adequate level for the current ICT applications, it will no longer be a major influential factor.

The individual intermediate ICT system factors all influence certain aspects of virtual cooperation, of which ICT system importance to the alliance and the degree of virtuality are the two most fundamental factors. These are followed by the 'heart' of electronic communication information quality, which is closely related to trust, confidence, and the communication process between partners. An interesting finding is, unlike the other factors, the 'hard' factor ICT system quality plays only a minor role in influencing the success of a virtual cooperation. From the discussion earlier, on the one hand, a perfect match (all scores are the same) between ICT system quality and satisfaction with the ICT system can be seen. On the other hand, all scores for ICT system quality and satisfaction with the ICT system were 3 (neutral) or higher, so that no negative (lower than score 3) matches are available (see Table 7.6 for more details). Therefore, the relationship between these two variables (ICT system quality and satisfaction with the ICT system) cannot be considered significant as the evidence is not as strong as other relationships identified in this research.

From the analysis of the differences among the cases, it can be concluded that trust is a key element (part of cultural factors) that influences the quality of electronic communication which, in turn, influences the success of a virtual cooperation. Moreover, the appropriate management support and related strategies are required, especially when non-IT enterprises are involved. The core of successful virtual cooperation is information openness and sharing based on standardized roles, structures, and formats. If these requirements were not met, Dutch-Chinese virtual cooperation was considered not successful.

Chapter 8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Introduction

With the globalization wave taking place, companies are increasingly seeking partnerships to gain and sustain competitive advantages. The rapid development of the Internet has speeded up such processes and Information and Communication Technology (ICT) is enabling organizations to be flatter, networked, and more flexible on a global level. Distance and place are no longer barriers for companies to expand business globally. Over the past few years, China has made great progress in Internet development, which provides a new way and channel for organizations, especially SMEs both in China and Europe, to gain advantages from cooperation and to create added value. In line with these developments, research has been executed on how traditional international cooperation sustains and expands business relationships in the age of 'going virtual'. In order to investigate this phenomenon, the new concept of the International Virtual Alliance is defined as: an electronically-networked cooperation involving companies, from different countries, that envisage mutual benefits by delivering products or services on the basis of common business understandings and a set of agreed goals and standards. The cooperating units provide their respective complementary assets and core competencies. The key concept is the construction and operation of electronic communication systems.

Regarding this new concept, most of the literature focuses on the technical issues, different forms, and trust building. The main objective of this research has been to investigate the success of international virtual alliances. However, as pure virtual alliances appeared to be rare, it was decided to study virtual cooperation within international strategic alliances rather than international virtual alliances.

In the current chapter, the conclusions of this research are presented. A discussion regarding issues such as Dutch-Chinese virtual cooperation context, Dutch-Chinese business cooperation, the validity of this research and the research model will be given, and recommendations based on the research findings are presented.

8.2 Conclusions

Research question 1 aims to identify the characteristics of virtual cooperation within international strategic alliances. When discussing virtual cooperation within international strategic alliances it is necessary to study relevant aspects such as the degree of virtuality and the general ICT applications. The higher the degree of virtuality, the more virtual an alliance becomes. The highest level of virtual cooperation is regarded as a virtual alliance. Virtual cooperation within an international strategic alliance is defined as: cooperating companies or business units from different countries in an alliance that are linked by an ICT system in order to

achieve mutual benefits by delivering products or services on the basis of common business understandings and a set of agreed goals and standards. The ICT applications may vary from basic supporting communication to fully integrated collaborative systems. By extending Arnold's (1995) and Skyrme's (1998) findings, in this research we have summarized the degree of virtuality using five levels (very low, low, neutral, high, and very high) and also discussed example applications based on this. Alliances between Dutch and Chinese businesses that have implemented ICT applications beyond level one (see Table 2.4) are considered as virtual cooperation to a certain extent.

Research question 2 concerns how the macro-ICT infrastructure influences virtual cooperation within international strategic alliances. The framework for characterizing the state of the Internet in a country is used to compare Internet development in China and the Netherlands. From the comparison, it is clear that the Netherlands is ahead of China in almost every dimension except one: organizational infrastructure; in this regard the situation in both countries is comparable. However, as rapid improvement in China is made, the gap between China and the Netherlands in macro-ICT infrastructure is expected to narrow. Also, there is one thing that needs to be kept in mind: the imbalance of ICT diffusion in different regions in China. In some well-developed regions, the ICT infrastructure could well support virtual cooperation, while in other parts, the weak ICT infrastructure could have negative impacts on virtual cooperation within international strategic alliances.

Research question 3 aims to define the factors that affect the success of virtual cooperation within international strategic alliances based on a literature review. From the literature study, several factors have been selected, namely: strategic, operational (resource, cultural, organizational, and technological), and related ICT factors (ICT system importance to the alliance, degree of virtuality, ICT system quality, and information quality) that influence the success of virtual cooperation within international strategic alliances. As this research aims to investigate virtual cooperation within international strategic alliances, strategic and operational factors together with macro-ICT infrastructure act as independent variables, and ICT factors act as intermediate variables that influence the virtual cooperation (see conceptual research model in Figure 5.2).

Research question 4 discusses how the success of virtual cooperation within international strategic alliances can be measured. From the literature on success in strategic alliances and the success of information systems, four measurements emerge: satisfaction with the alliance, satisfaction with the partner, usefulness, and user satisfaction. As this research aims to investigate virtual cooperation within international strategic alliances, the four measurements are elaborated to: satisfaction with the alliance, usefulness of the ICT system in the virtual cooperation, satisfaction with the ICT system in the virtual cooperation, and satisfaction with partner's conduct with ICT system in the virtual cooperation.

Research question 5 aims to identify the factors that influence the success of virtual cooperation within Dutch-Chinese strategic alliances from case studies. From the findings of the case studies, four main propositions formed in Chapter 6 of this thesis have all been examined, and supporting evidence has been found for all.

The main problem of this research was: what insights can be obtained regarding the factors that influence the success of virtual cooperation within Dutch-Chinese strategic alliances?

Literature suggests that the strategic fit is the starting point, and that the operational factors are 'equally' important in influencing the success of international alliances. Regarding virtual cooperation forms, some researchers argue that cultural factors might not be as important as before once a high degree of standardized electronic information exchange takes place. Moreover, the macro-ICT infrastructure plays a key role in forming and operating virtual cooperation successfully. For the intermediate variables, previous research mostly focused on ICT use in a single organization, with ICT system importance to the alliance, ICT system quality, and information quality being centrally important for the success of ICT system use. From the case studies, several similarities and also differences have been found compared with the earlier reported studies. The results are discussed in the following paragraphs.

The results of the case studies show that strategic factors strongly influence the success of an alliance. From this, it can be concluded that, as with traditional international alliances, strategic factors play the key role in the international virtual cooperation form.

In terms of operational factors, the most important ones are the cultural and organizational factors, followed by technological and resources factors. In terms of cultural factors, and disagreeing with what some researchers have argued, this research shows that the cultural issue still plays an important role in international virtual cooperation by influencing the information quality, which in turn has an impact on satisfaction with regard to the partner's conduct with the ICT system in the virtual cooperation. This finding is in line with the quote 'trust is the heart of a virtual organization'. Thus, it can be concluded that in order to build and sustain trust in a virtual cooperation, cultural factors have a central role in international business cooperation. Regarding organizational factors, the organizational arrangements not only need to focus on the alliance itself, as in a traditional alliance design, but also carefully consider the requirements of electronic communications within an alliance. Traditionally, companies have mainly focused on the technologies relating to products and production, whereas in the virtual cooperation form, as a heavy user of ICT, the ability and competence in implementing and operating advanced ICT technology is a key factor. Compared with traditional alliances, the technological fit does have a great impact on the success of virtual cooperation which influences the degree of virtuality and ICT system quality which, in turn, affect the usefulness of the ICT system, and satisfaction with the ICT system. In traditional alliances, resource inputs heavily influence the alliances. This is even more important in a virtual cooperation since the

ICT infrastructure requires substantial resource inputs. Without this, the degree of virtuality cannot be upgraded and the ICT system quality cannot be high, which influences the usefulness of the ICT system, and satisfaction with the ICT system.

From the case studies, links were confirmed between the macro-ICT infrastructure and the degree of virtuality, and ICT system quality, indicating that the macro-ICT factor mainly influences the 'hard part' of the ICT system. Previous researches suggest the macro-ICT infrastructure in China is far behind that in the Western world, inhibiting the use of ICT systems. However, with the rapid developments in China, the macro-ICT infrastructure in both areas has reached a sufficient level, and for the ICT applications currently used it is no longer a major influential factor.

Based on the case studies, the various intermediate ICT factors all influence certain measures of virtual cooperation within Dutch-Chinese strategic alliances, of which ICT system importance to the alliance and the degree of virtuality are the two dominant factors. ICT system importance to the alliance is mainly dependent on the nature of the companies and the alliance; it also depends on the management mindset. Within the intermediate variables, ICT system importance to the alliance also acts as a starting point and influences other factors. The degree of virtuality is an important measure for a virtual cooperation. Without a certain degree of virtuality, the usefulness of the ICT system will be limited. The next important factor is the core of electronic communication, information quality, which is closely related to the trust, confidence, and communication processes between partners. However, unlike other factors, the 'hard' factor of ICT system quality only plays a limited role in influencing the success of virtual cooperation. As discussed earlier, on the one hand, a perfect match (all scores are the same) between ICT system quality and satisfaction with the ICT system can be seen. On the other hand, all scores for ICT system quality and satisfaction with the ICT system were at least 3 (neutral) (see Table 7.6 for more details). This means, unlike other causal relationships identified in this research, the conclusion on the relationship between ICT system quality and the success of a virtual cooperation lacks the significant comparison and, as a result, the evidence is not as strong as for the other relationships identified. This means that while, within their own organizations, companies are more focused on 'hard' infrastructure and development, in cross-cultural cooperation, the 'soft' part is more important and, as such, a more difficult barrier to overcome than the 'hard' part.

Overall, the strategic fit is the most important in terms of influencing the success of an international alliance. The cultural and organizational fits influence the ICT system, in turn influencing the success of a virtual cooperation. Technological and resource fits also cannot be avoided as, without them, virtual cooperation cannot be implemented and operated well.

From the analysis of the differences among the cases, further findings were identified: it is clear that trust is a key element (part of cultural factors) that influences the quality of electronic communication which, in turn, influences the success of a

virtual cooperation. The core of successful virtual cooperation is information openness and sharing based on standardized roles, structures, and formats. However, trust alone cannot lead to a successful virtual cooperation. In some of the cases studied, mature trust did exist; however, as the management of the cooperating partners did not regard ICT systems as strategically important, the use of ICT system stays at a lower level and leads to an unsuccessful virtual cooperation. It can be concluded that even though trust is the key for a successful virtual cooperation, the appropriate management support and related strategies are required, especially when non-IT enterprises are involved. Without meeting these requirements, Dutch-Chinese virtual cooperation was judged unsuccessful.

8.3 Discussion

8.3.1 Quality of this research

The findings in this research are based on case studies undertaken. As discussed in section 5.5, the quality of case study research can be judged by the criteria of construct validity, internal validity, external validity, and reliability (Yin, 1994).

Construct validity concerns choosing the right operational measures for the concepts being studied. In this research, documentation and interviews are the two main sources. According to Yin (1994), the two sources have some weaknesses such as incompleteness of collection, response bias, and inaccuracies due to poor recall. However, the advantages are also significant as: documents provide stable, unobtrusive, exact, and a broad coverage of information, while the interviews were focused directly on the case study topic and gained insightful data. From the beginning of the case studies, a database was created in order to establish a chain of evidence. As the case studies were mainly based on interviews, the case study reports have been sent to the interviewees for reviewing, and their feedback was included in this thesis in order to increase construct validity.

Internal validity is concerned with the way that causal relationships are established. In this research, pattern matching has been applied, and the patterns are related to the independent, intermediate, and dependent variables. The results of the case studies generally match the predicted ones, which strengthens the internal validity. According to Yin (1994), in a multiple case study, one goal is to build a general explanation that fits each of the individual cases, even though the cases will vary in their details. In this research, this goal also has been achieved since general explanations regarding propositions and a set of causal links have been established and used for each individual case.

External validity is concerned with the problem of knowing whether the findings from the case studies are generalisable. Unlike surveys, case studies rely on analytical generalization rather than statistical generalization (Yin, 1994). In this research, ten cases (Yin suggests 6 to 10 cases is a good range for a multiple case study) were conducted in which most cases turned out as predicted, which provides

compelling support for the initial set of propositions (theoretical replication). This research aimed to investigate virtual cooperation within international strategic alliances, which means a combined case study plus survey approach could be more suitable and valuable in improving confidence in the results. Initially, such a combined approach was intended. However, due to the difficulty in finding a sufficient number of companies for a survey, this approach had to be changed. As a result, a total of ten case studies have been conducted, partly together with two teams of Dutch graduate students (see De Kool & Stijlen, 2001; Breet, 2004; Buchinhoren, 2004).

A study is considered reliable when it can be shown that the operations in a study could be repeated with the same results. In order to increase the reliability of this research, a case study protocol was developed and applied in every individual case in this research including the student research. Besides case study reports, a database was also created in which the case study questionnaires have been documented in appendices. Other researchers could follow exactly the same case study procedures and produce similar conclusions. Thus, this study matches the required base for reliability. However, it should be noted that when repeating such a study, the time element must not be ignored as the circumstances could have changed, or will change, especially in view of the rapidly developing macro-ICT infrastructure in China, and in the virtual cooperation used in Dutch-Chinese business relationships.

As discussed in Section 5.5.2, one of the problems with case study research is the limited ability to generalize the results. In this research, the study of multiple cases is the main strategy that had been chosen to increase generalizability. Ideally, for this research, each case should be a pure virtual alliance. However, few purely virtual forms exist. Therefore, cooperation with the degree of virtuality equal or above level 1 were considered as potential case companies, meaning that not every alliance is suitable for a case study. The objective of the selection criteria is to arrive at a number of Dutch-Chinese alliances that are relevant to this research, out of the large number of alliances formed in recent years. It should be noted that given the limited number of case studies undertaken, these can not be considered to be fully representative for all Dutch-Chinese companies and all types of alliance.

8.3.2 Reflections on the research model

The research model developed in this research has adopted a factor approach. However, ICT system use within business cooperation can also be seen as a process, for which a stage model could be applied. Even though a combination of the process approach and the factor approach might gain more insights, this research aimed to focus on the highest level of international virtual cooperation the virtual alliance, and thus the factor approach was judged a suitable method. Also, ICT, especially in the Chinese context has experienced rapid development, and so some stages of ICT development in some alliances are very short, which adds difficulties in applying a stage model.

In the developed research model, relationships between strategic fit and the success of virtual cooperation within Dutch-Chinese strategic alliances, operational fits and ICT system factors, macro-ICT infrastructure and ICT system factors, and ICT system factors and the success of virtual cooperation within Dutch-Chinese strategic alliances, have been investigated. However, the relationship between strategic fit and operational fits has not been discussed. The reason is that there is already much literature regarding the concept of strategic alliances, most of which agrees that the strategic factor has a direct impact on operational factors, which then influence the success of an alliance. Also, the relationships between the dependent variables (success measurements) themselves have not been discussed even though there are indications of mutual linkages. The reasons for not investigating these linkages are: a) based on literature there are interactions between these measurements, but the extent of the impacts is hard to measure; b) this research was primary aimed to identify the determining factors and how these factors influence the dependent variables. In short, the developed research model is judged as a suitable, useful and valuable one based on the experiences gained in conducting the research project.

8.3.3 The Dutch-Chinese business cooperation

This research focused on Dutch-Chinese business cooperation, and all the cases studied were Dutch-Chinese alliances, in which the similarities and differences relating to Dutch and Chinese cultures were studied. The results generated from this research can also be applied to all Dutch-Chinese business cooperation. In order to make a cooperation successful, cooperating companies from the Netherlands and China need to examine and review the degree of the fits of strategic (objective and goal) and operational (resource, cultural, organizational, and technological) factors with their partners, and if necessary, make adjustment or take action. Moreover, the results generated from this research can be extended to a wider Western-Chinese business cooperation context, for instance, how to cope with Chinese culture, and how to build trust and sustain business cooperation with Chinese enterprises.

8.3.4 The Dutch-Chinese virtual cooperation context

This research initially aimed to investigate virtual alliances between Dutch and Chinese businesses since it was believed that this new cooperating form could bring advantages to companies in overcoming barriers such as distance and space, and strengthen competitive positions or the efficacy and effectiveness of cooperation. Success stories in the Western world and the rapid ICT development in China gave further support to this assumption. However, after two rounds of selections, few pure Dutch-Chinese virtual alliances could be identified, and this led to difficulties in testing the developed research framework at the virtual alliance level. The reasons why so few Dutch-Chinese virtual alliances existed include:

1) Many companies, especially Chinese enterprises, still regarded ICT as a cost factor, and the advantages of ICT were not recognized. This can be seen from the

studied cases of which six companies from the Chinese side were ones with foreign investment; while for the remaining four enterprises, only two ICT enterprises had a high degree of virtuality.

2) Chinese culture still believes physical, face-to-face, contact is very important in doing business and ICT is only regarded as an additional tool. Also, the personal relationship or 'guanxi' is still a key point in building contacts or relationship with the Chinese. This is also supported by the researcher's own experiences, when trying to contact the selected Dutch and Chinese companies for interviews or sending questionnaires the 'virtual' way: by email and telephone, the Dutch people responded positively and very cooperatively, while the Chinese always ignored such requests. Only when the requests were forwarded and the appointments were made by their Dutch partners, face-to-face interviews could take place (virtual ways were not attractive).

This required adaptation of the research plan, resulting in the core of this research being to investigate international virtual cooperation in Dutch-Chinese business contexts. Despite the changes, the output of this study can be considered relevant for virtual alliances as their fundamental component, i.e. electronic communication, is at the core of this research. Moreover, the developed research model can be regarded as a framework for Dutch and Chinese enterprises, which indicates that companies must not only analyze the strategic, operational, and macro ICT-infrastructure factors, but also need to take the ICT system factors into account in order to enhance and sustain their international virtual cooperation. Since the development of macro ICT-infrastructure in the Netherlands and in China has reached a certain stage, which can sufficiently support the use of ICT systems in cooperation, more attention needs to be paid to the other influential factors.

8.4 Research contribution

The research model developed in this research can be regarded as suitable, useful and valuable from a scientific point of view. It combines the relevant factors from different existing theories such as international strategic alliances, virtual organization, and information systems.

In the past, research in international cooperation mainly focused on traditional cooperating ways such as alliances, joint ventures, and coalitions and so on. This study extended the international business cooperation from traditional ways to a 'virtual' extent. Literature on international strategic alliances states that strategic and operational factors (resource, cultural, and organizational) are independent variables that influence the success of international business cooperation. This study has extended this aspect to one step beyond, which added one variable i.e. the technological factor to the operational factors. Technology in traditional organizations tends to focus on production capabilities. However, in this research, it tends to

embrace the "informate" and "transformate" parts of the technology factor, in which the ability of the cooperating partners to implement and operate the ICT system has been the core issue. This is also in line with the most recent findings: management in business networks generally faces a multiple of complexities such as coordinating different actors with different knowledge and backgrounds, creating an environment where collaborative action can evolve and take place, and dynamically aligning diverse strategic, organizational, and technological perspectives (Akkirman & Harris, 2005; Bardley et al., 2006; Riemer & Klein, 2006; Haas et al., 2007).

In terms of cultural factors, some researchers have argued that compared with traditional international strategic alliances, cultural factors might play a less important role in the virtual context, since parties involved should communicate according to the agreed standards and roles. In disagreeing with them, the contribution of this research is that the results show that the cultural issue still plays an important role in international virtual cooperation by influencing the information quality, which in turn has an impact on satisfaction with regard to the partner's conduct with the ICT system in the virtual cooperation. Especially trust (one of the cultural factors) is still essential in international virtual cooperation. This is in line with Wehmeyer & Riemer's study entitled Trust-building potential of coordination roles in virtual organizations. Wehmeyer & Riemer state that successful partner relationships involve the existence of several characteristic traits and it is widely acknowledged that trust is one of them. And trust is seen as a main characteristic of the virtual cooperation. The usage of ICT to bridge spatial gaps can further impede the creation of trust and social relationships in which lasting trust can emerge (Henttonen & Blomqvist, 2005; Wehmeyer & Riemer, 2007; Schumacher, 2006; Heide & Wathne, 2006).

In addition, Macro-ICT infrastructure factors have also been considered to be independent variables since they have direct influence on ICT use in international business cooperation. It is in line with the recent finding, which clearly identified that the low cost of broadband connections is a key factor for virtual cooperation (Sakellarides et al., 2006). However, this research indicates that the macro-ICT factor mainly influences the 'hard part' of the ICT system instead of the whole part or the use of ICT system, and this finding was not expected at the beginning of this research.

Another contribution of this research is the ICT system factors are regarded as intermediary variables thereby linking the concept of international strategic alliances with virtual organizations. Previous research on information systems was focused on the systems themselves, and the construction, implementation, and operation of the related systems. Knowledge on international business cooperation using ICT systems to sustain the cooperation and gain competitive advantages is lacking. This study has extended the concepts of international strategic alliances and virtual organizations to a new concept: international virtual alliance.

This research also extended the information system success within an organization to inter-organization level, together with international alliance success, the success of international virtual alliances and virtual cooperation within

international strategic alliances can be operationally measured. In turn, the identified independent, intermediary, and dependent factors and their relationships have been identified and examined during ten case studies in actual Dutch-Chinese business cooperation. This is also in line with the current research in which researchers have focused on aspects of managing virtual organizations instead of focused on projects within a single organization (Cameron, 2007).

The results support existing theory that strategic factors are still the starting point for success of international business cooperation, followed by operational factors. The findings from the case studies confirmed and reflected the findings from literature. Moreover, this research suggests that success of virtual cooperation within an international strategic alliance could improve the chance of the success of this alliance.

Besides the similarities from the case studies, the differences and the specific factors/requirements from the studied cases have also been analyzed, which provides additional evidence i.e. the management roles, the procedures and policies regarding ICT use in cooperation, and the nature of the cooperating companies and contribution to existing theory (e.g. Bardley et al., 2006; Cameron, 2007).

To summarize, the results of this research have all confirmed the existing theory. The main contribution of this study is that the results have extended and combined some aspects to one step beyond. For instance: added technological factors into operational factors, which extend the research from traditional strategic alliances to virtual alliances; the ICT system factors are regarded as intermediary variables thereby linking the concept of international strategic alliances with virtual organizations; extend the information system success within an organization to international inter-organization setting, which makes international virtual cooperation measurable and controllable.

8.5 Recommendations

Recommendations to European (Western) Companies

Even though the open door policy in China has been implemented for more than twenty years, many Chinese companies still lack experience in international business, and the Chinese way, for instance ‘guanxi’, is still very important in China. Building mutual trust with a Chinese partner is a key to success. Paying attention to the Chinese partner in trust building at the beginning could save much effort later. Even though ICT can bring advantages, maintaining physical contacts with a Chinese counterpart is still essential.

Recommendations to Chinese Companies

Chinese companies are increasingly participating in the global market place and forming international business cooperation. Such companies should not only focus on acquiring advanced technologies, but also on the know-how and international

standards in doing business and other aspects. The 'soft part' is much more difficult to learn, however, it can help much in the longer term. Moreover, all Chinese companies need to pay attention to their foreign partners' culture. In order to build and sustain mature trust and long-term business relationships with their foreign partners, they should study the foreign culture and should not expect everything to be the same in a foreign country as it is in China.

Recommendations regarding virtual cooperation/ alliance building

Based on this research, some general rules for virtual cooperation/alliance building can be identified:

- In some cases, the cooperating parties still regard implementing ICT systems as a cost factor, and hesitate to invest in such systems. Such views are short-term orientated. To think and act long term, companies need to realize the importance of the use of ICT systems, and the advantages that could be realized eventually. Also, the ICT systems chosen need to meet the requirements of the companies and the cooperation. For instance, for ICT and non-ICT companies, the demands of ICT systems are different. As a result, the ICT systems need to be carefully investigated and planned.
- Investing and upgrading ICT systems is not only the necessary financial resource input for the 'hard' part, but also ICT competence such as personnel for the 'soft' part. Many cases studied show that the 'hard' part is easy to be built and upgraded, however, the 'soft' part is more difficult to strengthen. Thus, building a reliable and professional ICT team or department to develop and implement the hard and soft parts of the virtual infrastructure is needed.
- Many cases studied show building trust is more difficult in virtual cooperation compared to traditional ways since lacking physical contacts with partners. Thus, companies need to take cultural factors more seriously than before in order to increase trust and information quality for an effective and efficient virtual cooperation.
- The successful cases show that within virtual cooperation, a clear and strict organizational arrangement such as information sharing and exchange policies, standard and structured formats, and enforcement rules is highly needed. This could help in overcoming cultural differences, and result in building and sustaining trust. The training of stakeholders is also needed. Such training should not only focus on technical issues, but also on the policies and roles so that every stakeholder involved could understand and follow these roles and procedures.

Recommendations for further research

This research has defined relevant operating processes and aspects of international virtual alliances/cooperation by enhancing and extending the insights and theoretical foundations. Furthermore, the factors that influence the success of virtual cooperation

within Dutch-Chinese strategic alliances have been defined. However, there are also limitations, leading to the recommendations for further research given below.

In this research, most interviewees were ICT managers or general managers of cooperating companies. Even though their insights are considered very valuable, the large number of end-users of inter-organizational information systems also can be taken into consideration in order to increase the construct validity.

ICT development is an ongoing process. Once the status of ICT development reaches a certain level, a combination of the process approach and the factor approach might be more useful in gaining further insights, which would increase the internal validity.

A case study approach plus an empirical survey method is suitable for more-focused proposition testing involving a larger number of companies in order to improve the quality of this research in terms of its external validity. This research mainly focuses on virtual cooperation even though initially the target was virtual alliances. As further developments in the virtuality of Dutch-Chinese business cooperation can be expected, a larger number of virtual alliances will be realized. Thus, a survey specialized in virtual alliances will become a feasible option. This will lead to extended insight in the challenging operations of international business cooperation.

In the past, research on 'doing business with Chinese' mainly focused on how foreign companies took the lead to form business cooperation with Chinese enterprises, in which how other cultures could cope with Chinese culture was the main concern. It is the same also in this research, with the Dutch entities taking the lead in most of the cases studied. However, the trend is changing. More and more Chinese companies (e.g. Huawei, ZTC, Haier, Hisense, and Lenovo in the Netherlands) are going abroad and taking the lead but the research on how Chinese culture could cope with other cultures is still lacking, and Chinese companies are experiencing the difficulty. Further research in this field is expected to provide extended insight.

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Appendix: Questionnaire (English)

Strategic Factor

What were your motives for forming the alliance (more answers are possible) How would you rank the motives you chose? Could you point out the motives why your partner entering the alliance?	a) Cost reduction b) Access to the new market network of the partner c) Strengthen competitive position d) Access to the competences or knowledge of the partner e) Access to the resources of the partner f) Internationalisation strategy g) Local legislation Other: 1. 2. 3. 4.
How important is the alliance for your overall organization?	(a). Very important (b). Important (c). Neutral (d). Relevant (e). Not important
Do you and your partner share the same mission in the alliance? If yes, how? If No, why?	Yes No

Operational Factors

What resources were/are committed to be invested in this alliance and this ICT system? Have those resources committed been invested in this alliance and this ICT system? If no, please specify	Yes No
Is there a balance in the contribution of resources from both sides? Please specify	Yes No
Is there any cultural gap? e.g. language, miss-understanding Are there frequent misunderstanding between you and your partner? If yes, in which areas?	Yes No …… …… …… ……..

Is it easy to come to agreements with your partner?	Yes No
How do you rate mutual trust as important factor for a successful alliance?	a) Very important b) Important c) Neutral d) Relevant e) Not important
Do you think mutual trust exists between you and your partner? If no, why?	Yes No ……
Is cultural difference a reason for you to use more traditional communication devices instead of ICT systems?	Yes No
Do you have quicker and/or better results if you use traditional communication methods?	Yes No
Can ICT overcome cultural barriers? If No, why not? How do you expect it in the future? If Yes, to what extend?	Yes No
Do you and your partner have a similar vision on the alliance design? If no, why not? How are the tasks divided between the partners? Is the alliance in some areas conflicting with your own strategic objectives? If yes, how did you take this into account in the alliance design?	Yes No ……
Are there differences in governance between your and your partner's organization? Please specify	Yes No
What changes have been made for instance organizational structure in your and in your partner's companies to suit the requirement of the alliance and the use of ICT system?	
Is there a specific manager/department responsible for the alliance? If yes, which manager/department? How did the selection of people responsible for the alliance take place?	Yes No

Is there a difference in bargain power between you and your partner?	a) Yes b) No c) Not obvious
Is the alliance monitored at regular intervals? If yes, at which intervals?	Yes No
How the profits of the alliance are divided among the partners?	a) Equal b) Based on relative input of the partners c) This can not be disclosed Other:
Do you and your partner cooperate only in the areas initially agreed upon during the alliance agreement? If no, which areas have been added over time?	Yes No
Do you expect to extend the activities with your partner in the future? If yes, which areas will be added?	Yes No
What improvement in (a) your own organization structure and (b) in your partner can be made to make the alliance more successful?	
Do you think the *availability, reliability,* and *quality* of macro IT infrastructure in China and Europe (the Netherlands) could support electronic information exchange between you and your partner? *Please specify*	Yes No
What macro-ICT factors have limited the use of electronic information exchange between you and your partner? If current situation is not satisfied, what improvement you think should be made in the future?	

ICT system factors

Is the system central to the alliance? If yes, to what extend?	Yes No
What business functions have been replaced by ICT system? What do you expect can be added in the future?	
Do you and your partner have different expectations regarding the ability of ICT to replace business processes?	
What benefits have been gained by using ICT for the	(a) Reduce costs, e.g. business travel,

alliance: Is the use of ICT strategic importance to a successful alliance? Is your company strongly depended on the your partner's contribution to the ICT system? Is your partner strongly depended on your contribution to the ICT system? The system is very important for your company The system is very important for your partner	communication (b) Operation more efficiency (c) Increasing customer satisfaction (d) Advantages against competitors (e) Change the balance of bargain power in business relationships (f) Generate innovation (g) Others (please specify) Very low Neutral Very High 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5
What kind of ICT system you are using? History of the development of the ICT use Is the system developed in house or outsourced?	➔ Category 1: telephone, fax & computer ➔ Category 2: email, internet ➔ Category 3: Intranet, EDI ➔ Category 4: ERP systems, groupware systems and other advance technologies Other:
How do you rate the quality of the system?	Very Low ----------➔ Very High 1 2 3 4 5
How important is the system quality for you and your partner?	1 2 3 4 5
Is the system stable? Is the system easy to use and maintain? Does the system have less error?	1 2 3 4 5 1 2 3 4 5 1 2 3 4 5
Will you upgrade the system? Or what can be improved for the current system?	
How would you personally describe a high qualitative system?	
The system is flexible and easy to extent in applications/ functionalities?	1 2 3 4 5
What kind of information is exchanged between you and your partner? Is the information structured or unstructured? In which format and language?	
Do you (always) trust the information your partner provided via the system? Compare with the traditional way for instance face to face	1 2 3 4 5
The information provided by your partner via the ICT system is always relevant and secured	1 2 3 4 5

Successful virtual cooperation

What are your and your partner's expected objectives/goals of the alliance? Are the objectives/goals achieved? *Please specify* Have/are you considered(ing) other partners? If yes, why? (more answers are possible)	Yes No Yes No Compare with current partner, that company a) has better access to the market b) has more and better resources c) has better quality d) the ability in learning is higher e) could lead lower costs f) mutual understanding will be higher *Others:*
Is it easy to withdraw from the current alliance? *If no, why?*	Yes No
What changes or improvements from your partner need to be made so that could make you more satisfied with regard to the alliance?	
What are your and your partner's expected objectives/goals of the use of ICT system? Are those objectives/goals achieved? *Please specify*	Yes No
The gained advantage is remarkable for using ICT. If yes, to what extend?	Yes No
How do you think about your partner?	Very unsatisfied -------→ Very Satisfied 1 2 3 4 5
How do you rate the your partner's ability in operating ICT system?	1 2 3 4 5
How do you think about your partner's behaviour when using ICT? What changes or improvements should be made from your partner in conducting ICT system?	1 2 3 4 5
Trust can be sustained and strengthened when face-to-face contact is replaced by ICT? Compare with the traditional way?	Yes No
Are you satisfied with current ICT system? *Please specify*	Yes No
What improvement of the ICT system needs to be made in the future?	