

HELSINKI SCHOOL OF ECONOMICS  
Faculty of International Business



**The Flow of Innovation and the Transfer of Technology within a  
Global Firm in the IT-Service Industry  
Case Study: Fujitsu Services**

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# TIIVISTELMÄ

## Pro-Gradu -tutkielma

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Innovaatioiden leviäminen ja teknologiansiirto globaalin IT-palveluyrityksessä – tapaustutkimus Fujitsu Services

### Tutkimusongelma ja tutkimuksen tavoitteet

Tehokkaan sisäisen yritysviestinnän hyödyt ovat nykyään laajalti tiedossa. Silti kansainvälisillä yrityksillä on vaikeuksia sisäisen innovaatioiden levittämisen ja teknologian siirtämisen kanssa. Tämän tutkimuksen tutkimusongelma on: kuinka globaali IT-palveluyritys voi parantaa innovaatioiden leviämistä ja teknologian siirtämistä sisäisesti siten, että päällekkäisten T&K-projektien määrä pienenee ja resurssien jakaminen paranee.

Tutkimuksen tavoitteet on tunnistaa suurimmat haasteet, jotka yritysten on ratkaistava parantaakseen innovaatioiden leviämistä ja teknologian siirtämistä. Lisäksi ratkaisuehdotuksia kyseisten ongelmien ratkaisemiseksi on esitetty tutkimuksessa kerätyn aineiston perusteella.

### Tutkimusmenetelmä ja -aineisto

Tutkimusmenetelmänä käytetään Yinin (2003) yhden tapauksen tapaustutkimusmenetelmää. Kerätty aineisto edustaa sekä kvantitatiivista, että kvalitatiivista aineistoa. Tutkimusmenetelmää testataan kirjallisuuskatsauksen pohjalta kehitettyä teoreettista raamia käyttäen Fujitsu Services:iä tapaustutkimuksen kohteena.

Tehdyt haastattelut ja kysely on suunniteltu noudattaen useita kyseisen alan teoksia<sup>1</sup>. Kvantitatiivinen aineisto analysoitiin käyttäen Likert-asteikkoon perustuvia menetelmiä<sup>2</sup>.

### Tapaustutkimusyritys

Valittu yritys on Fujitsu, maailman kolmanneksi suurin globaali IT-palveluntarjoaja. Fujitsu tarjoaa asiakkailleen asiakaskohtaisia informaatioteknologia-, tietotekniikka- ja tietoliikennetarkoituksia maailmanlaajuisesti.

### Tutkimustulokset

Tutkimuksen tulokset osoittavat, että pääasialliset innovaatioiden leviämistä ja teknologian siirtoa haittaavat haasteet ovat: vähäinen tietoa muiden yksiköiden resursseista, kustannusten jakaminen ja kommunikointiongelmat, kuten kieli ja kanavat.

Tutkimuksesta käy myös ilmi, että työntekijöiden mielestä tehokkaimmat parannukset saavutettaisiin tarjoamalla parempia kansainvälisiä uramahdollisuuksia ja etenemismahdollisuuksia uralla.

### Avainsanat

Innovaatio, teknologian siirtäminen, viestintä, monikansallinen yritys

<sup>1</sup> Kts. Payne, 1951; Converse & Presser, 1986; Hakim, 1987; Prasad, 2005; Kelle, 1995; Malhotra & Birks, 2000

<sup>2</sup> Kts. Likert, 1932; Malhotra & Birks, 2000; Stevens 1946, 1951



# ABSTRACT

**Master's Thesis**

March 2007

The Flow of Innovation and the Transfer of Technology within a Global Firm in the IT-Service Industry – Case Study: Fujitsu Services

## **Research Problem and Objectives**

Even though the benefits of efficient communication within a multinational company are evident, companies today still struggle with internal transfer of technology and flow of innovation. The research problem of this study is how a global IT-service company can improve the flow of innovation and transfer of technology, in order to minimize overlapping or duplicate R&D-projects and to improve sharing technology and innovations.

The research objectives are to identify the main challenges that such a firm faces when improving the flow of innovation and technology transfer between subsidiaries and headquarters. In addition, suggestions for overcoming these challenges are evaluated and discussed using the data gathered in the research.

## **Methodology**

The methodological approach of this research is both qualitative and quantitative. The research is of exploratory nature; hence a combination of research techniques is used. The theoretical framework is constructed against the findings from the literature review and the methodology and validity testing is built upon a single case study design proposed by Yin (2003).

The interviews and questionnaire were conducted according to propositions by a number of works<sup>3</sup>. The quantitative results were rated and analyzed using Likert scales and constructed according to guides in research for social studies<sup>4</sup>.

## **Choice of Case Study Company**

The chosen company to be researched, Fujitsu, is the world's third largest IT-service company. Fujitsu provides customers with customer-specific information technology and communications services globally.

## **Results of the study**

The results show that the major issues inhibiting the flow of innovation and technology transfer between subsidiaries is seen by the employees to be: Firstly, lack of knowledge of what resources other units have to offer. Secondly, problems with sharing development or administration costs were identified. Thirdly, communication issues, language and channels.

One of the research results was also that the workforce is willing to improve the cross-border co-operation of the company and according to the employees the most effective incentives to improve this are career advances and international work opportunities.

## **Key Words**

Technology transfer, innovation, communication, multinational corporation

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<sup>3</sup> Please see Payne, 1951; Converse & Presser, 1986; Hakim, 1987; Prasad, 2005; Kelle, 1995; Malhotra & Birks, 2000

<sup>4</sup> Please see Likert, 1932; Malhotra & Birks, 2000; Stevens 1946, 1951

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Helsinki, 15<sup>th</sup> of March 2007

**Mikko Laaksonen**

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## 1 Introduction

Until now, surviving in the global competition as a multinational has meant sustaining a competitive advantage largely based on economies of scale, standardisation and some local adaptation. When that becomes the norm for the majority of firms in the global corporate landscape, new ways of differentiation are needed. According to the literature on the metanational corporation, connecting globally dispersed knowledge is an opportunity to develop a foundation for a new type of dynamic competitive advantage. Hence, the manageability of communication channels and processes, personal relationships and networks as well as the ability to manage and control them is an increasingly relevant concern for managers and corporate strategists. Efficient flow of innovation and technology transfer across borders is the prerequisite for the move towards the metanational firm. The metanational organization is able to facilitate innovation and to allocate know-how more efficiently on a global scale than its competitors by tapping into globally dispersed ‘pockets of knowledge’ (Doz et al., 2001). Therefore it is extremely important for firms operating in innovation intensive industries to facilitate development in the global transfer of applied knowledge, technology.

This research concentrates on identifying the main obstacles to the transfer of applied knowledge (technology) and innovation within the multinational company (MNC). The analysis is based on data obtained by interviewing management and other senior staff, as well as data gathered by a questionnaire. The main focus is on practical dimensions of the obstacles of and solutions for improving the allocation of knowledge within the firm.

The study also analyzes the extent of the use of existing channels of communication within Fujitsu and the selected subsidiaries. Also the role of social networks, interpersonal and inter-organizational contacts is taken into account, as well as the resources and opportunities to re-enforce these in the organization. Personal relationships and the promotion of networks can lead to increasingly successful corporate dynamics.

The research data is founded on the views of the employees of Fujitsu on innovation, R&D and technology transfer, and obstacles thereof. The focus is on views about facilitating innovation and transferring applied knowledge on an international scale within Fujitsu.



The two quotations below sum up how knowledge allocation within a company can translate into competitive advantage.

*“The competitive advantage will go to those who can make best use of the information they have or can find, those who can distribute information and knowledge most freely throughout the executive, managerial, technical and product/service-making workforce, and those who deliver the fruits of this knowledge to customers throughout the world.”*

*(Daniels & Daniels, 1993, xxii)*

*“To date, however, innovation based on accessing, mobilizing and leveraging pockets of knowledge drawn from around the world has been the exception. In the global knowledge economy, it will be critical to success.”*

*(Doz et al., 2001)*

In the latter quotation, an argument is made that this opportunity has not been seized by organizations. This research undertakes the challenge of mapping out obstacles to cross-border sharing of knowledge and innovation, on a practical micro-level.

In this chapter, the background to this research is explained, followed by the research gap, research problem and objectives. From these, the research questions are derived. In the last two sections, the relevant terminology is defined and the structure of the study set out.

After this introductory section, a literature review of relevant literature is set out, upon which a theoretical framework is built. In the third chapter, the methodology of the research is described and also the quality of the research is assessed. In the fourth chapter, findings and analysis of the data are presented. Fifthly, discussion and recommendations according to the findings is done.

## **1.1 Background**

The inevitability of globalization must be evident to all by now, maybe even to the point where the concept has become somewhat clichéd. Business literature and media have trumpeted the global integration of almost every aspect of business activities. But are companies actually being proactive enough to harness the benefits of the technological advances that make the transfer of knowledge so much more efficient than how it has been done a decade or two ago? It is only through the evolution of the mindset and vision of companies that can facilitate the development of communication channels and processes so that the individual employee would become a pro-active individual in the global network of knowledge resources within the company.

At present, companies' competitive edges very much rely on the scale benefits of global effectiveness, yet on local level, responsiveness to local needs is crucial. Surely, it is evident that in the context of knowledge management, global effectiveness is epitomized by efficient allocation of knowledge globally, whereas local responsiveness is dictated by the ability to have access to a vast array of knowledge, the ability to apply (or re-apply) this knowledge according to the requirements and preferences of the local business environment.

The importance of being able to identify, codify and transfer relevant technology and innovations within a company, i.e. develop towards a metanational company, is self-explanatory. A company that has dispersed pockets of knowledge should be able to, when necessary, locate that knowledge and apply it efficiently elsewhere. Porter (1980) argues that a company can develop competitive advantage based on three things: leadership, differentiation or focus. According to the theory of the metanational (Doz et al., 2001), this can be achieved through innovation stemming from efficient allocation of knowledge within the MNC.

Technology transfer and the management of innovation is not a new area of research with some of the earliest works published in the late 1960s (K. Arrow, 1969). Since then, research on international technology transfer has mounted up to a considerable pool of studies. In addition to the biography of the current study, please see: Baranson, 1970, 1977, 1978, 1981; Ghayut et al., 1981.

The identification of obstacles to technology transfer and the flow of innovation is done using the International Technology Transfer (ITT) Process (Al-Obaidi, 1999) combined with intra-corporate knowledge flow model (Gupta & Govindarajan, 2000). In addition, the findings are further analyzed and compared against the metanational framework (Doz et al., 2001). The metanational framework is a fairly new concept, as it combines established theoretical components but at the same time introduces a new logic for the multinational corporation in making use of its communication channels.

The purpose of this research is to translate the vague concept of global knowledge management<sup>5</sup> into a focused crystallization of strategies<sup>6</sup> and their implementation that could help companies develop their ability to manage their pool of know-how and the flow and sharing of innovation between subsidiaries and between a subsidiary and the headquarters.

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<sup>5</sup> Please refer to Section 2.7.1.4 for definition

<sup>6</sup> It should be noted that the strategic consideration is to commit on management level to the development towards the metanational. The current study is concerned with the obstacles in the implementation stage.



The results are aimed at helping to resolve practical obstacles and challenges that companies face while advancing towards the metanational state, having first identified them using the chosen theoretical frameworks.

### **1.1.1 Choice of Case Study Company**

The scope of this research is to research the flow of innovation and technology transfer within a multinational company, operating in the IT-service industry. For this purpose, Fujitsu Services was chosen as the company to be researched. For more detailed account on the access to the case company, please see Section 3.1.2. In this section, the choice of Fujitsu Services as the case company is justified.

Fujitsu Services is the third largest company offering IT-outsourcing services in the world. It acts in the customer-focused information technology and communication service industry and is headquartered in Tokyo, Japan. The headquarters for the European operations are located in London, UK. Globally Fujitsu employs 158 000 employees and is listed on the Tokyo Stock Exchange.

The service offering of Fujitsu includes consulting, systems integration, IT infrastructure management, software, telecommunications and hardware. Hence it can be considered a fully fledged IT-house and is suited for the scope of this research. It should be noted that the research focuses on researching the IT-services side of the business, rather than hardware or telecommunications.

The following section defines the gap that exists in present literature concerning the topic of the study.

## **1.2 Research Gap**

Having studied the past literature in the field of technology transfer and innovation, areas of research were identified that have not been addressed before.

There are two interesting scenarios to examine. Firstly, the on-going process of technology transfer and flow of innovations across borders within a multinational company, or the lack of it. Second being the transfer of technology during the internationalization process within the MNC.

It should be noted that the scope of this study does not include the actual internationalization or globalization process. The topic is more on the efforts of a global company striving to improve its transfer of knowledge and the flow of innovation between subsidiaries and headquarters, on a global scale and on a day-to-day basis.



### **1.3 Research Problem**

The managerial problem is: How can a multinational company improve the flow of innovations and the transfer of technology between subsidiaries and headquarters, in order to minimize overlapping or duplicate R&D-projects and to improve sharing resources, products and/or services.

The central focus is to identify obstacles and problems that should be overcome to enhance the effectiveness and efficiency in the flow of *applied knowledge*, technology, ideas and innovations.

### **1.4 Research Objectives**

Research objectives are to identify and analyze the problems that a global IT-service company faces in the international flow of innovations and transfer of technology between its subsidiaries and the headquarters, as well as between subsidiaries.

The above objective will be achieved through creating a comprehensive theoretical framework from existing models and theorems to suit this particular study. Second objective is to empirically test the applicability of the hypotheses drawn from the framework. Thirdly, a set of recommendations are suggested to resolve the identified main problems. Resolving the identified obstacles would benefit Fujitsu by sharpening its competitive edges through more efficient allocation of know-how, technology and other knowledge-based capabilities.

### **1.5 Research Questions**

- What are the issues of concern seen by the personnel of Fujitsu in inter-unit communications, interaction and technology transfer process, when examined in the context of Al-Obaidi's (1999) International Technology Transfer (ITT) Process model and Gupta & Govindarajan's (2000) determinants of intra-corporate knowledge transfer model as the framework?
- What are the main challenges that arose from the issues?
- How could these challenges be overcome, when examined in the light of Fujitsu's personnel's views?

### **1.6 Definitions**

In this part, the main terminology of this study is defined. Because of the fragmented and incoherent nature of definitions of terminology in this field of study, certain assumptions and generalizations

had to be made. These limiting factors that had to be made in order for the scope and focus to remain solid are explained in this section.

### 1.6.1 Knowledge

It is of crucial importance to clearly and unambiguously define knowledge and its different forms and components. Another important thing is the link between knowledge and innovation: the former being the foundation for the latter (Botkin, 1983). It has also been suggested that tacit knowledge can be difficult to articulate (Polanyi, 1966). Hence it is important to note that in order to have a more in-depth framework to examine knowledge, the model below (Figure 1) also adds the dimension of implicit knowledge into the framework.

Knowledge itself is defined according to Hornby (1995, 656):

*“1(a) Using the facts, information, understanding and skills that a person has acquired through experience or education*

*1(b) An organized body of information shared by people in a particular field: specialist/scientific knowledge”*

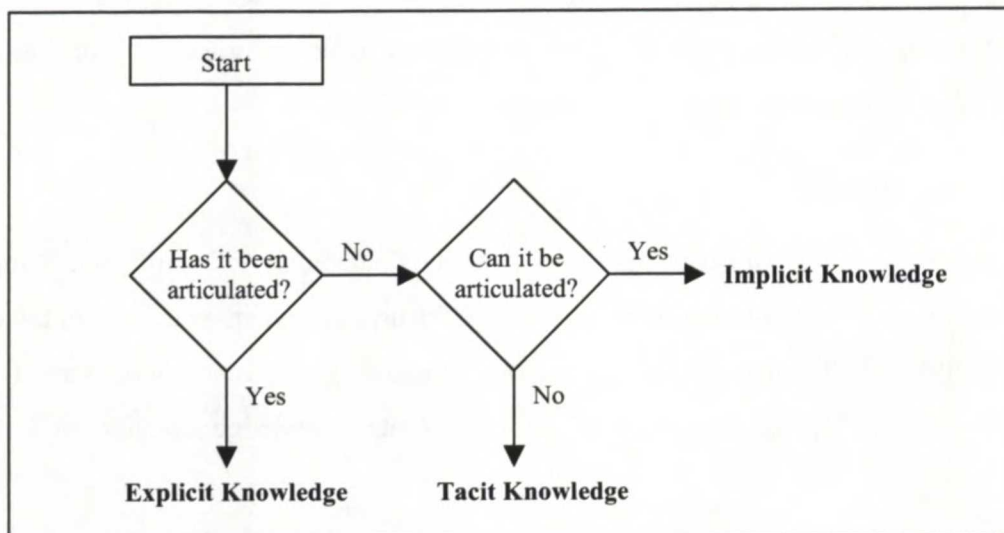


Figure 1: Explicit, Implicit and Tacit Knowledge (Nickols, 2000)

#### 1.6.1.1 Tacit Knowledge

The distinction between tacit and explicit knowledge can be expressed in terms of knowing-how and knowing-that, respectively (Ryle 1984, pp. 25-61). Therefore, for the purpose of this study, tacit knowledge could be defined as the know-how that an expert applies without explicitly following certain documented (explicit) rules or principles.

The distinction between tacit and implicit knowledge is that tacit knowledge cannot be documented or articulated. In other words, tacit knowledge cannot be turned into explicit knowledge. As Polanyi

(1997) put it: “We know more than we can tell”. He gave an example of one being able to recognise a person’s face but being unable to describe how this process goes.

### **1.6.1.2 Explicit Knowledge**

Explicit knowledge involves consciously accessing knowledge that is documented or articulated and therefore a skill can be learned through explicit instruction (of knowledge). Nonaka (1991) defines explicit knowledge as “formal and systematic”, giving product specifications, scientific formulas and computer programs as examples.

It should be noted that as Polanyi (1958, 1974) argued, after acquiring a skill through learning explicit knowledge, a person acquires understanding that defies articulation. Hence explicit knowledge can become tacit knowledge for that person.

### **1.6.1.3 Implicit Knowledge**

According to Nickols (2000), implicit knowledge differs from tacit knowledge in that it can be articulated or documented, but it has not been. For example during commercialization of an invention, certain specifications and marketing materials are being produced. Hence in that phase of the innovation process, implicit knowledge is turned into documented explicit knowledge.

### **1.6.1.4 Knowledge Management**

*“Knowledge management is a process that helps organizations identify, select, organize, disseminate, and transfer important information and expertise that are part of the organization’s memory and that typically reside within the organization in an unstructured manner.”*

*(Turban, McLean & Wetherbe, 2002, 388-389)*

Defining knowledge management process is argued to enable the organization to effective and efficient problem solving, dynamic learning, strategic planning and decision making. Knowledge management focuses on identifying knowledge, explicating it in such a way that it can be shared in a formal manner, and thus leveraging its value through re-use.

## **1.6.2 Technology**

*“Systematic knowledge for the manufacture of a product, for the application of a process or for the rendering of a service”*

*(UNCTAD, 1985)*



A knowledge-based view on technology is chosen for this study as for this context it seems the most appropriate. This is due to the fact that the main emphasis is on technology transfer rather than diffusion of knowledge (see Section 3.2 of literature review for distinction and further discussion).

As Al-Obaidi (1999, 53) points out, a physical object on its own is not a technology. It is further argued, that technology is systematically applied knowledge, embodied in the minds of people, the procedures they follow, the methods of organisation they adopt as well as in the physical objects or services they design and the processes they use to produce them. Hence, technology also includes skills, know-how and knowledge relevant to producing a products, process or service.

Al-Obaidi (1999, 71) distinguishes “four generic components of technology” in the following manner:

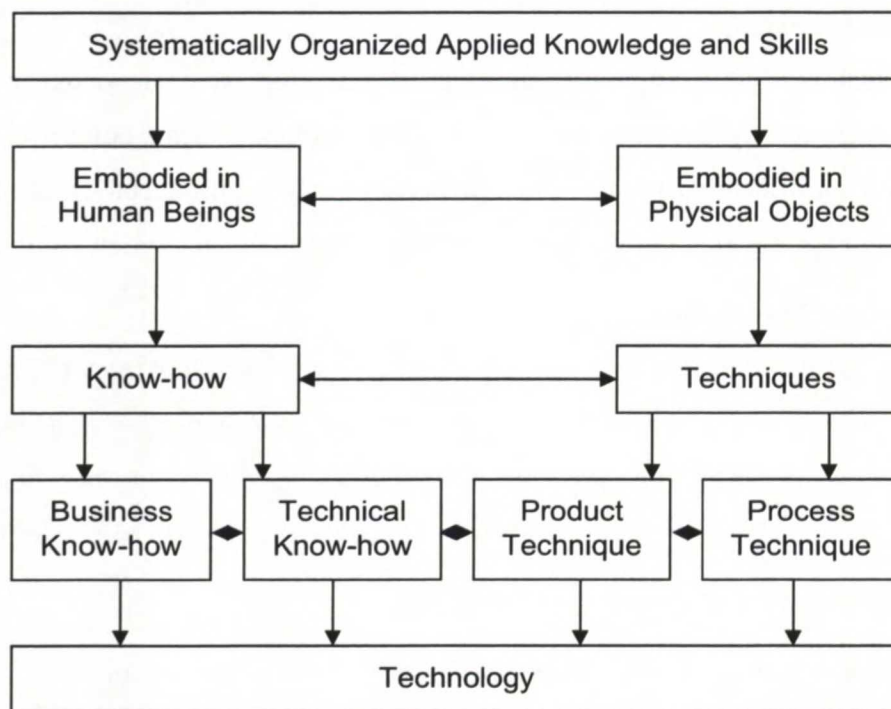


Figure 2: Four Generic Components of Technology (Source: Al-Obaidi 1993)

The purpose of Figure 2 is to enforce the importance of other aspects of technology that have to be taken in account in addition of patents, design or process. In other words, there are other more general aspects of performing the efforts of transforming various inputs into viable and marketable products (Al-Obaidi, 1999, 70).

### 1.6.2.1 Technology Transfer

*“Technology transfer is defined as the process of purposefully communicating and transmitting technology to enhance the capability of the receiver through interaction and*

*active learning in order to achieve certain anticipated and agreed upon outcomes by the parties involved.”*

*(Al-Obaidi 1999a, 62)*

In the context of the current study, technology transfer refers to the conscious and intentional transfer of technology within the company. This transfer can take place between the headquarters and subsidiaries or between subsidiaries.

### **1.6.3 Metanational**

According to Doz et al. (2001), the concept of metanational is a company that:

*“builds a new kind of competitive advantage by discovering, accessing, mobilizing, and leveraging knowledge from many locations around the world.”*

In other words, a metanational company does not rely on headquarter or “centre of excellence” based R&D activity, but rather relies on gathering knowledge from a global pool and then applying this knowledge for innovation. Hence the competitive advantage over its competitors, as a greater variety of worldwide stock of knowledge can be accessed more efficiently through connecting globally dispersed “pockets of knowledge”.

A crucial difference compared with a traditional multinational company is that the metanational does not prosper on homogeneity of products or markets, but rather by appreciating and leveraging the knowledge that stems from global geographic and cultural diversity.

### **1.6.4 Innovation**

Like knowledge, innovation as a term has been defined in a number of ways. However, for the purpose of this study, a view that innovation is the process that transforms ideas into commercial value is used. This view is explained by the following definition:

*“Knowledge Innovation is the creation, exchange, evolution and application of new ideas into marketable goods and services for the success of an organization, the vitality of a nation's economy, and the advancement of society as a whole”*

*(Amidon, 1993)*

Amidon (2003) researched over forty definitions of innovation and was able to simplify the innovation process into the 3Cs: knowledge creation, knowledge conversion and knowledge commercialization (ibid, 29-30). Merrifield has a supporting view of innovation, as he defines the three stages of innovation as invention, translation and commercialization (Merrifield, 1986). In other words, when considered with Merrifield’s (1986) definition, they are parallel in the view that

innovation, as a complete process, should include the actual idea, its codification as well as realization of the commercial value.

### **1.6.5 Fujitsu**

In this section, the different parts of the Fujitsu Group are defined. Many of these are units within the organization, but must be distinguished for the purposes of the research and understanding in what context technology transfer and the flow of innovation is dealt in.

The chosen company to be researched, Fujitsu, is the world's third largest IT-service company. Fujitsu provides customers with customer-specific information technology and communications services globally. The country-units researched in this study were Finland, Spain, Netherlands, United Kingdom, South Africa, Estonia, Sweden, Belgium and Denmark.

#### **1.6.5.1 Fujitsu Group**

Fujitsu Group (or Fujitsu) refers to the global Fujitsu Corporation.

#### **1.6.5.2 Fujitsu Services Oy**

Fujitsu Services Oy (or Fujitsu Finland) refers to the Finnish subsidiary of Fujitsu Group.

#### **1.6.5.3 Fujitsu Nordic**

Fujitsu Nordic includes all of the Fujitsu Group's Nordic subsidiaries: Fujitsu Finland, Fujitsu Sweden and Fujitsu Denmark.

#### **1.6.5.4 Fujitsu UK**

Fujitsu UK is the European headquarters of the global Fujitsu Group.

### **1.6.6 Task Force / Hit Team**

The terms 'task force' and 'hit team' are used as synonyms in this study. Having an internal 'task force' is a way of transferring technology between country units. A task force consists of experts of a certain solution or service that can efficiently transfer different technologies or innovations to other units. Task forces introduce, train, consult and internally market solutions within a company. In the current study, task forces are expected to have their own targets and budget constraints.



## 1.7 Limitations

Due to the broad scope of the research area of this study, certain generalisations and assumptions have had to be made about the definitions of the terminology associated with the topic of this thesis. The relevant literature on the subject is not completely coherent in its terminology, especially in the field of knowledge, technology and innovation, hence forcing certain modification on the definitions of terms in order to focus the scope to relevant considerations of this particular study. Due to the necessity of this focus, certain limitations hold true and therefore the conclusion of this study does not apply to all multinational companies. These assumptions of terms are detailed in the definitions sections of the work.

Former research has concentrated much on the abstract theoretical side, general limitations and the importance of effective transfer of technology and flow of innovation. Though these are extremely important foundations for any field of study in any discipline, this study at hand concentrates more on the concrete practical challenges and possible solutions in order to improve the flow of innovation and transfer of technology within a company operating in a technology and innovation intensive industry and environment.

This research is a single case research, because of two reasons. Firstly, the nature of this research is exploratory (revelatory) and hence single case design is relevant (Yin, 2003, 45). Secondly, the access to the case company was such that similar access to another relevant case company would be extremely difficult to gain or manage. The fact that the research is based on a single case, naturally limits the generalization of the results. Also the industry represents IT-service industry, hence limiting the applicability of the findings to other industries.

Underlying each issue that acts as a hindrance to the flow of innovation and technology transfer, a scientific theory and field of research exists. However, due to the scope of this work being a Master's Thesis, each of these areas cannot be addressed at great depth. Therefore it is left to the reader to acquaint himself/herself with the literature associated with, for example cultural distance, language diversity, employee empowerment or social capital.

Finally, this study restricts to general analysis of the gathered data. No extensive segmentation or cross-referencing is done between the various groups of data. This is again due to the nature and the scope of the research. It should be noted though, that the option for further analysis of the data is reserved for further research.

## **2 Literature Review**

The main objective of the literature review is to provide the reader with an understanding of the context of the current study and to develop grounding for the theoretical framework, against which the empirical findings of the research are evaluated upon.

This review comprises of three main elements: flow of innovation, technology transfer and the concept of the metanational. Even though the problems associated with being innovative are out of the scope of this research, the importance of innovation for companies is analysed. Technology transfer is a field in which a substantial amount of research and literature exists. Hence it should be noted that the main emphasis was to choose the most relevant sources in light of the scope of this study. Metanational is a fairly new concept, so the material existing is fairly limited. However, as the model plays a central part for the analysis of the empirical findings, the model is gone through in depth.

The structure of the literature review section advances in the following manner. Firstly, the significance of flow of innovation and technology transfer for the multinational corporation is discussed in a broader strategic sense. After this, literature on innovation is discussed, followed by a review into technology transfer literature. Thirdly, the metanational concept is described and discussed in the last section. Finally, a framework is developed in the last section.

### **2.1 The Management of the Flow of Innovation and Technology Transfer as a Part of Corporate Strategy**

In knowledge and innovation intensive industries the issue of competitiveness is shifting away from the *control* aspect with the importance focusing more on the ability to make resources available wherever they are needed to support the company's global operations and the company's business processes (Daniels & Daniels, 1993, 77). In other words, it is more important to facilitate the flow of innovation and technology transfer between the international units of the company, than exerting control over them.

The flexible and efficient flow of resources is seen to be more important and could be interpreted in such way that subsidiaries have more control not only over their own resources, but also the inter-unitary exchange of resources and technology as well. The main contributors to innovation must of course be viewed as resources, just like raw materials or finance. Inter-unitary knowledge transfer is seen as improving knowledge creation, learning and the ability to innovate (Kogut & Zander, 1992; Tsai & Ghoshal, 1998), which can also be argued to be one of the strengths of a multinational company.



Therefore, the contribution of innovation, technology and knowledge transfer to competitive advantage has become an integral part of corporate strategy. Already in 1986, a report based on the expertise of practising managers in large European companies, states that innovation strategy based on technological research and development is becoming an increasingly important part of the corporate strategy:

*“It is essential that the R&D function is totally integrated with the company’s activities and strategic thinking. This is the most effective way of judging the relevance of technology past, present and future, to the company’s fortunes – its strengths, weaknesses, opportunities and threats. R&D management needs to take the initiative in playing a proactive part in strategy formulation and in executing the plan.*

*For R&D to participate fully, a person with an overall technical awareness of the company’s activities, such as the Technical Director, at senior management level is essential. His/her primary functions are:*

- *to provide a technical awareness within the company and a ‘window’ on the external world of technology;*
- *to ensure the appropriate level of technology for maintaining or regenerating the company’s existing business;*
- *to provide a technical input into reviews of new business opportunities;*
- *to determine the overall technical strategy consistent with corporate requirements”<sup>7</sup>*

What is important in the successful innovative companies is that individuals within them can put their ideas forward without leaving the company, which also can be called ‘intrapreneurship’ (Tidd, Bessant & Pavitt, 2001). It is also stated that the emergence of powerful information and communications technologies have further facilitated networking and ‘virtual organizations’, hence making it possible to allocate innovation and technology in new ways (Dell, 1999). According to a number of studies, the ability to create and transfer knowledge is the main source of differentiation, hence improving the competitive advantage of a multinational company (MNC) (Minbaeva et al., 2003; Tsai, 2001; Reddy & Zhao, 1989; Dierickx and Cool, 1989). However this is not without hindrance, as it is also pointed out by Tsai (2001, pp. 464-476) that organizational units differ in their ability to leverage and benefit from knowledge existing in other units due to a number of

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<sup>7</sup> EIRMA (European Industrial Research Management Association): *Developing R&D Strategies*, 1986, Paris.



reasons not all generic, but rather company-specific depending on the firm's capabilities, technology, corporate culture, cultural differences, language and so on.

A study by Robert Lester made as early as 1989 identified seven best practices in order for a company to become more responsive. It suggests that firms have to accelerate the shift away from mass production of low cost and standardized products and concentrate on the responsiveness of their businesses and global scope (Lester, 1989). The seven recommendations were:

1. Simultaneous continuous improvement in cost, quality, service, and product innovation
2. Breaking down organizational barriers between departments
3. Eliminating layers of management creating flatter organizational hierarchies.
4. Closer relationships with customers and suppliers
5. Intelligent use of new technology
6. Global focus
7. Improving human resource skills

The relevance of this study is clear when compared to the theory of the metanational. On this basis it could be argued, that the concept of the metanational corporation may not be all new, but rather is a collection of old ideas, packaged together in a new way to approach the managerial problem from a new perspective.

## **2.2 Innovation**

It should be pointed out right at the beginning of this section that the scope of this study is strictly on the *flow* of innovation, not on the management or valuation of innovations in the commercial sense. In other words, this research does not take any position as to what is a good or profitable innovation and what is not. The focus is on the actual transfer and flow of innovations and technology. Having made this point, we can commence laying out the grounding for the importance of innovation to an organization.

Innovation is argued to be one of the three main fundamentals of strategic management (Turban, McLean & Wetherbe, 2002). It is seen as one of the crucial factors for companies to maintain their competitive advantage, stay in business, attract the best people and be more productive (Schumann et al., 1994). However, the scope of this research is not concerned with the innovativeness of the firm, but rather on the actual flow of innovation (and technology transfer) within a global IT-service company.

According to Wheatley (1992):

*“Innovation is fostered by information gathered from new connections; from insights gained by journeys into other disciplines or places; from active, collegial networks and fluid, open boundaries. Innovation arises from ongoing circles of exchange, where information is not just accumulated or stored, but created. Knowledge is generated anew from connections that weren't there before.”*

*(Wheatley, 1992, 113)*

Wheatley's view above connects the discussion on innovation to the framework of the metanational. What stems from the view is the importance of the communication channels, or “connections” that foster innovation, knowledge and technology transfer. This is an essential part of the scope of this study: Harnessing the innovations and technologies created in the various subsidiaries of the MNC.

### **2.2.1 Determinants of Innovation and Knowledge Transfer**

Among literature in the field of determinants of innovation, there is both inconsistent evidence, as well as clear-patterned findings. Rather surprisingly, the subsidization of a firm's R&D activity does not always correlate with the amount of innovation (Favre, et.al; See Kleinknecht & Mohnen, 2002). Having R&D capability leads to successful innovations in approximately 25% of product innovators and 18% of process innovators (Baldwin et al., 2000). More closely tied to the topic of this research (ibid) is the finding that foreign control does not play a significant role in the level of innovativeness, once consideration is given to company size and R&D. This finding combined with Katz & Allen's (1992) “Not Invented Here”-theorem very much exemplifies the purpose of this study: Having successfully operating R&D capacity dispersed in subsidiaries in a multinational firm does not automatically mean global innovativeness.

The “NIH”-syndrome describes a persistent corporate culture where individual units or teams, intentionally or not, steer clear of using previously performed research or knowledge, because the work was not conducted locally or ‘in-house’. Katz & Allen (1992) investigated the effect of project team tenure on the overall technical performance of the team and the level of communication outside the team. It was found out that performance and level of communication increased until 1.5 years of team tenure. After that, both started to decline, most notably after 4-5 years. Even though the decline in performance is not all due to “NIH”-syndrome, the results of the research (ibid) clearly identify it as an element of technology transfer rigidities. Findings of the current study will hopefully shed light on remedies that could be used to overcome this absurdity.



Size as a determinant is seen to be a clear indication of the ability to innovate successfully. The largest firms are found to innovate successfully three times more than smaller firms (Baldwin et al., 2000; Kleinknecht & Mohnen, 2002). Size also is an important matter, as the innovations become more complex, combine products and processes or are groundbreaking in their field (ibid).

Foreign ownership has not been found to affect the rate of successful innovations. Therefore it can be concluded that size and the existence of facilities for R&D activities are the main determinants for the conditions for innovations (ibid)<sup>8</sup>. For more about determinants of innovation and performance, please see Kleinknecht & Mohnen (2002).

Absorptive capacity of the receiving unit has been found to be a significant factor of innovativeness and knowledge transfer in MNCs (Tsai, 2001; Gupta & Govindarajan, 2000; Minbaeva et al., 2003). Organizations in the same environment can differ greatly in their absorptive capacities mainly due to two reasons: Firstly, the extent of prior related knowledge and secondly the extent of similarity between the sending and receiving units (Gupta & Govindarajan, 2000, 476). Minbaeva et al. (2003) add such things as employees' ability, motivation and HRM practices that may have an impact on the two formerly mentioned. Firstly, they found that HR practices such as training has a significant effect on employee ability, which hardly comes as a surprise. A more interesting finding though is that performance-based appraisal does not have a significant effect on employee ability. Secondly, employee motivation was most influenced by performance-based compensation and the level of internal communication. Merit-based promotions were not found to significantly improve employee motivation. Thirdly, it was found that it is the employees' ability and motivation *combined* that improves knowledge transfer, either one individually does not have a positive impact. These findings are valuable in the latter analysis of findings of the current study, as it would explain some of the aspects related to the problem of knowledge being "sticky" and could ground some suggestions that could help resolving the issues which are identified when conducting the research project.

Network position is also found to play a central role in the level of knowledge transfer and innovativeness of an organization. The more central the unit's position in the knowledge transfer network, the more innovative the unit (Tsai, 2001). Again, implications for the recommendations may arise from this finding.

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<sup>8</sup> However, it should be noted that this research is based on Canadian manufacturing firms, hence not necessarily fully applicable to IT-service industry.



There is also a substantial amount of literature on the effect of personal contacts and informal networks on knowledge transfer and flow of innovation. This perspective of the current topic is suggested to be taken in account in the recommendation for further research.

Less attention has been given to these aspects of knowledge transfer and innovation: delegation of authority and decisive rights, the provision of incentives and the monitoring of managers and employees (Foss & Pedersen 2004). Also, on managerial level there is a lack of theory-based guidance about organizational design in knowledge-intensive multinationals (ibid).

Another concept that is often confused with technology transfer and the flow of innovation is diffusion. This concept is reviewed next.

### **2.2.2 Diffusion**

Diffusion is seen as the self-perpetuating<sup>9</sup> (Stoneman, 2000; 31) spread of knowledge of a multinational to, for example, its employees in a foreign subsidiary and therefore to other individuals and firms (Burda & Wyplosz, 2001). However, it is also worth noting that increasing competition increases the rate of diffusion more than actual innovation (Baldwin et al., 2000).

Diffusion has also been defined as:

*“The process whereby innovations are accepted and used by firms and consumers through imitation, licensing agreements, or sale of products and patents”*

*(Pass, Lowes & Davies, 2000, 125)*

In other words, diffusion of technology refers to the inevitable spread of technology that eventually leads to homogeneity of markets and the diminishing competitive advantage (Johansson, 2000, 14, 340). It can be partly seen as involuntary, from the perspective of the source firm, as there might not be control over the employees moving to another company or certain knowledge leaking out through imitation or industrial espionage. As a result of this definition of diffusion, it is not the focus of this study to examine diffusion, but rather the transfer of technology.

### **2.2.3 Rationale for Being Innovative**

In this section, the underlying principles of the benefits of being innovative are defined. In the earlier sections of this study, innovativeness has been assumed to be an asset for a company. Below, the reasons for it are explored. Botkin (1983) states, that the benefits of innovativeness reflect in productivity:

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<sup>9</sup> It should be noted, that Stoneman refers to the most commonly used “epidemic” view of diffusion in this instance. Nevertheless, it is the relevant model to be used in the context of the current study.

*"Innovation cuts across a broad range of activities, institutions and time spans. If any part of the pipeline is broken or constricted, the flow of benefits is slowed. This is felt ultimately in lower productivity and lowered standards of living. In this sense, the cost of capital is crucial not only at the early stages of research and product development but also at the later stages when high-technology products are installed in production processes, in both manufacturing and service industries, as new tools to improve worker effectiveness."*  
(Botkin, 1983)

As defined earlier, technology stems from the process of innovation. As pointed in the quote above, technology benefits organizations in greater productivity. Even though the benefits of innovativeness may seem self-evident, the fundamental rationale is good to have been stated.

*"To explain innovation, we need a new theory of organizational knowledge creation...The cornerstone of our epistemology is the distinction between tacit and explicit knowledge...the key to knowledge creation lies in the mobilization and conversion of tacit knowledge."*  
(Nonaka & Takeuchi, 1995, 56)

The quote above very much epitomizes the focus of this study: the importance of the knowledge creation and exchange process, which facilitates the flow of innovation and technology transfer.

#### **2.2.4 A Note on Technology and Innovation**

As defined in Section 1.6.4, innovation is examined as a process. Technology is the result of the innovation process. Technology is something that has been invented, translated or documented and commercialized; hence it is in production and can be offered as a product or a service to customers.

On the other hand, technology transfer is also a process. Technology transfer is something that happens intentionally and it is planned. The process of innovation 'spreads' (diffusion) can and usually is not planned, it happens in spontaneously and unconsciously.

### **2.3 Technology Transfer**

Early technology (craft skill) arguably was seen as progressing ahead of science, as it was based very much on trial-and-error development. Modern technology is more and more science-based and communicated mainly on demonstration and documented information, absorbed by those qualified enough to receive it (Bannock et al., 1998). As technological innovation has developed more into a scientific process, the knowledge involved can be assumed to have progressed more into explicit forms from tacit and implicit knowledge. This development has relevance to this study, as the focus is on transferring knowledge and for that purpose it is useful to understand that even though the



topic is on innovation, the ability to articulate and document the knowledge involved is essential for it to be transferred using the existing communicated channels.

It is seen that in addition to selling its products or services abroad, transferring technology is seen as one of the fundamental activities that multinational companies must do in order to expand globally (Johansson, 2000). This view of the multinational acting as an efficient knowledge transfer system is shared by a number of academics.

There is also another, more general view of technology, which states that technology can be defined as the goods and services produced and the means by which they are produced in a firm, industry or an economy (Stoneman, 2002). However, even though this view can be appreciated as appropriate in another context, for this study it is too broad in the way that it deals with a more macro-level perspective. Therefore, a more knowledge-based definition of technology and technology transfer is used in the current study.

Based on the results of his fairly recent research, Al-Obaidi (1999) argues that technology transfer is a continuous activity and as a process, international technology transfer should be seen as multifaceted and diversified. Also, from a managerial point of view, technology transfer process is argued to be seen more as learning and developmental practice rather than simply moving physical things<sup>10</sup>. An extremely important point that is also made is about the technological development since the research was completed. Information technology tools such as web-based groupware and video conferencing<sup>11</sup> are mentioned to have the potential of drastically changing or improving the technology transfer process. The importance of IT-systems has not gone unnoticed by others (see Morgan, 2002; Nairn, 1997; Turk, 1997; Ward, 1995) and many companies have been unsuccessful in their efforts ending up with numerous channels of communication that have been too difficult or impractical to use or that just do not integrate. The importance of integration is highlighted by Dixon (2000), where it is stressed that each element of a knowledge transfer system must work to reinforce and support the others. Dixon also argues against the dichotomization of knowledge transfer into technological and cultural components. Al-Obaidi (1999) contends that that from a technology transfer perspective, technology needs to be de-composed into its four essential components: Product technology, process technology, technological know-how and business know-how (See also Figure 2 in Section 1.6.2).

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<sup>10</sup> This view supports the current study fully, as technology that is relevant to IT-services is usually not physical, but rather knowledge.

<sup>11</sup> Groupware also referred to as online collaboration, virtual workspaces and team sites. Video conferencing has been supplemented with something known as instant messaging, about which in latter parts of the study.



Technology transfer is an important factor in a multitude of contexts. It is a term used in microeconomics, international or macroeconomics and international business. In terms of macroeconomics, a clear distinction should be made between technology transfer and *diffusion of technology*. Diffusion of technology is something involuntary or unplanned. Technology transfer is a conscious process, which is clearly purposeful and in which two parties must participate: suppliers and recipients.

### **2.3.1 Headquarter Control Mechanisms and Knowledge Transfer**

Björkman et al. (2004) researched the impact of organisational mechanisms on inter-unit knowledge flows in multinational corporations. In the study, mechanisms that increase knowledge flows between subsidiaries and between subsidiaries and headquarters are researched.

Obstacles to efficient knowledge flows identified are motivational factors (Szulanski, 1996; Forsgren et al., 2000), because of the risk of the subsidiary losing its superior position and high costs of the transfer process. Björkman et al. (2004) state that socialisation and close relationships have been found to lessen opportunist behaviour of subsidiaries and self-serving activities of managers. Their study of 134 Western-owned subsidiaries located in Finland and China found that:

- There is strong correlation between knowledge transfer and the perceived importance that headquarters attach to knowledge transfer when evaluating subsidiary performance.
- There is significant correlation between knowledge transfer and lateral socialisation practices (managers interacting through visits, joint training programmes, cross-unit committees and task forces).
- There is relatively small correlation between knowledge transfer and top management being compensated on the basis of regional and global performance of the MNC.
- There is relatively small correlation between knowledge transfer and the number of expatriates in management.

It seems that informal networks that are created through various socialisation occasions are effective in improving knowledge flows between subsidiaries. Also the scanning and evaluation of subsidiaries on the basis of knowledge transfer seems to have a significant effect. Potential career advances acting as an incentive to managers could explain the latter. Monetary compensation however did not seem to play a crucial role in the levels of knowledge transfer.

These findings may prove to be very useful when trying to come up with solutions to the obstacles to technology transfer and flow of innovation examined in the current study. The findings also have

an impact on the questionnaire formulation and hence Björkman et al. (2000) is a very important piece of research in the context of the current research.

### **2.3.2 The Search-Transfer Problem**

It is argued that in a multiunit company, intraorganizational search process for relevant knowledge for a certain purpose is very time-consuming and possibly impossible (Hansen, 1999). Hansen also argues that in large organizations, the relations between the subsidiaries involved in the Search-Transfer Process become more important, as these relations largely determine the way that the inter-unit exchange of knowledge is conducted.

Rather surprisingly, it is found (ibid) that subsidiaries with weak ties conduct the search process more efficiently when compared to subsidiaries sharing stronger ties. This is due to the relevance and preciseness of the information provided. With subsidiaries with stronger ties, more irrelevant information and tasks are conducted. In addition, units with stronger ties tend to stick to those channels and contacts that are established, hence not exploring new sources of knowledge that could speed up and make the search process more varied.

The knowledge transfer project, especially when involving innovation, can be hugely problematic too. According to Hansen (1999), this is due to two things: Willingness and ability<sup>12</sup>. Willingness shared by both the transferee and recipient is a prerequisite, but without the ability (absorptive capacity), problems will arise. Hence both are needed in order to complete the knowledge transfer process successfully.

The interesting finding of Hansen's study is that having weak or strong ties does not effect the overall time of the completion of the search-transfer process. However, these two variables do have an effect on various parts of the process. Weak inter-unit ties are beneficial in the search-part of the process, but have a negative effect on the transfer-part, when the knowledge transferred is complex. Weak ties have a positive effect on the transfer when the knowledge is simple. Therefore, strong inter-unit ties are only beneficial when complex information is being transferred. These aspects are encompassed in Al-Obaidi's (1999) work as the 4 C's: Content, Context, Communication and Consequences. Please see Section 3.6.1 for a more detailed discussion.

### **2.3.3 A Note on Knowledge Transfer in Relation to Technology Transfer**

For the purposes of the current study, transfer of applied knowledge is embedded within the definition of technology transfer. However, as there is an interesting dimension to knowledge transfer that is in the interests of the analysis part of this study, two of subsets of knowledge transfer

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<sup>12</sup> Note that these correspond well with Gupta & Govindarajan's (2000) motivational disposition and absorptive capacity



are defined as subsets of technology transfer process. These two are “complementary knowledge transfer” and “substitutive knowledge transfer” (Gupta & Govindarajan, 2000, pp. 491-492). These two are described and defined next.

### **2.3.3.1 Complementary Technology Transfer**

Technology transfer that takes place when two units in a different stage of the company’s value chain engage in the exchange of technology. An example could be technical know-how transferred from production facilities to a sales unit.

### **2.3.3.2 Substitutive Technology Transfer**

A substitutive technology transfer context would be when two units are in the same stage of the value chain and have identical or similar activities. An example could be two sales units exchanging technological know-how.

## **2.4 Metanational Advantage**

*“The metanationals’ key advantage won’t come from crossing the borders between nation-states; it will come from transcending them. Their vision of economic paradise is not one of global homogeneity, in which it would be easy to deploy homegrown products, technologies, and systems to customers around the world. Quite the opposite is true. The metanationals will thrive on seeking out and exploiting uniqueness. They value geographic and cultural differences. And because they fish for knowledge in a global pond, they can potentially create new and better competencies than any multinational player’s headquarters, national subsidiary, or center of excellence.”*

*(Doz et al., 2001)*

Since the importance of the contribution of innovation to sustaining competitive advantage is grounded above, it is logical to think of new ways to improve an organization’s ability to innovate. The Metanational thinking tries to do this by promoting efficient inter-unitary communications as well as “scanning” of the local environments that the subsidiaries of an organization operate in. According to Doz et al. (2001), a fully-fledged metanational corporation does not yet exist.

Foss and Pedersen (2004) have raised questions about the scope of recent research in the knowledge transfer within an MNC. They argue that the most recent research focuses too much on “understanding knowledge *flows* between MNC subsidiaries than understanding the stratification of knowledge *stocks* across the MNC”. The focus of the current research is on the flow of knowledge,

innovations and technology within an MNC, therefore also covering this aspect. The theory of metanational also concentrates on this aspect.

The challenges for the traditional multinational “projection” model according to Doz et al. (2001) are as follows:

- Global spread is no longer a distinctive competitive advantage
- A single national market no longer leads in most industries
- Valuable knowledge is increasingly scattered
- Valuable knowledge is sophisticated and sticky<sup>13</sup>

As the companies operating under the multinational model face pressures to develop their global operations to protect or create new competitive advantages, new possibilities arise (ibid):

- New sources of differentiation
- New opportunities to unlock global consumers’ latent needs
  - [ed.] The most innovative and leading markets may not be the largest. The mobile phone revolution in Finland very much epitomizes this.
- New ways to create unique advantage
- Instant global reach and scale
  - Fast, effective entry into new international business
  - Global scale R&D

Because of these reasons, the beliefs, performance measures, incentive systems, decision-making processes, organization structures, information systems and financial controls should come under scrutiny to better support the metanational ideology and functionality of the firm. However, there are certain risks associated, especially if the metanational thinking was to be applied on a multinational organization<sup>14</sup>:

- The organization becomes a “global debating society”, where no application for the innovations are reached
- Increased stress due to ambiguous and unclear work descriptions, responsibilities and routines

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<sup>13</sup> “Sticky” refers here to tacit and implicit knowledge, as it has not been documented, it spreads straight from people to people and experience-wise.

<sup>14</sup> However, solution covering all of these possible risks is presented in the recommendations section



- Increased complexity and increased overhead
- Investing only in the communications technology, hardware and software

In the light of Lester's (1989) study, it could be argued, that the concept of the metanational corporation may not be all new, but rather is a collection of old ideas, packaged together in a new way. This allows an approach to resolving the identified issues from a new perspective with a more focused approach to the practical challenges identified by the research.

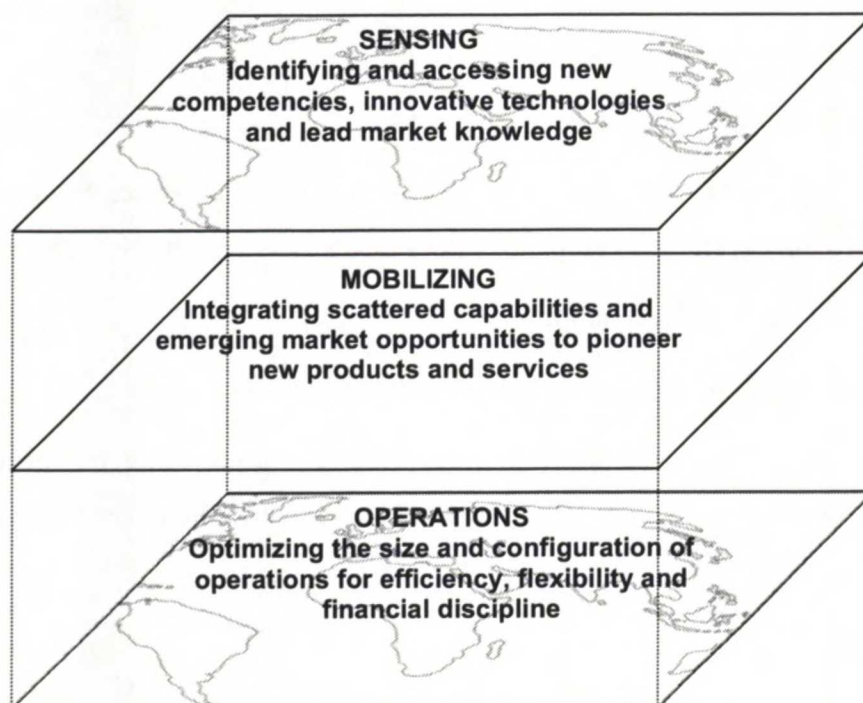


Figure 3: The three levels of competition in the global knowledge economy (Adapted from Doz et al., 2003, p. 163)

#### 2.4.1.1 Sensing

The essential capability that facilitates efficient sensing is the ability to identify relevant technologies and competencies, as well as to understand leading-edge customers. The next step is to be able to codify this knowledge into a transmittable format, into explicit knowledge. This, however, is something that companies are already doing. It is the ability to do this efficiently on a local level through a *sensing network* that will build a new source of competitive advantage for the firm. The main objective is to identify technologies and customer needs that the competition has not yet discovered. Sensing is prospecting and accessing technologies and market knowledge with potential business value globally.

#### 2.4.1.2 Mobilizing

As a result of sensing, the company then has accumulated globally dispersed “pockets of knowledge”, which need a set of structures (“magnets”, see Figure 4) to facilitate the use of this

knowledge. Such magnets can be a global product or service architecture, process or business model (Doz et al., 2001, 175). Mobilizing the knowledge will result in translation of new knowledge into innovative products or new market opportunities. It should be noted that the mobilizing magnets should encourage and promote entrepreneurship within the organization.

### 2.4.1.3 Operationalizing

As a result of the first two phases, a new product, service or business model has been created. Realizing its profit potential is the next step. Most multinationals already have successfully developed this capability, as they already have a global offering. It is the responsibility of the units that decide to operationalize the innovation, that it is done efficiently, flexibly and according to enough financial discipline to suit their local environment.

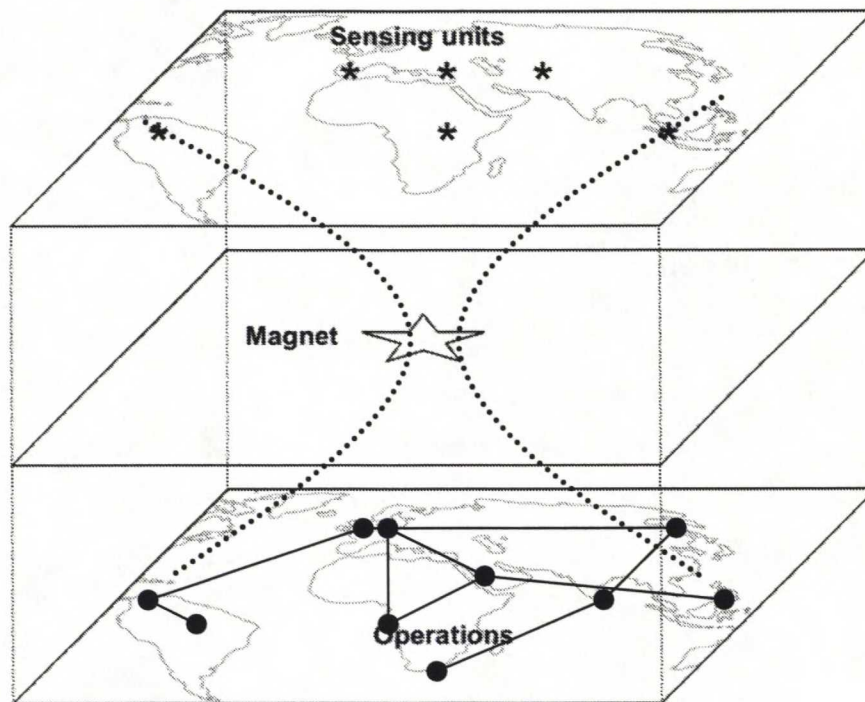


Figure 4: The Metanational Innovation Process (Doz et al., 2001; 81)

In Figure 4, each of these levels has its own essential role in creating the metanational advantage through sensing, mobilizing and Operationalizing innovation. However, it can be argued that the sensing units and the operations already exist in most multinational companies. The magnet, which facilitates the mobilizing of the dispersed knowledge, needs to be implemented.

Doz et al. (2001, 175) argue that the magnet can be a global product or service platform. Platform encompasses such things as architecture of a product or a service, of a process or a business model. In the context of the current research, the magnet is considered both a business model and service architecture.



### **2.4.2 Summary**

Based on the above review of the literature, there are two main considerations for organizations acting in highly innovative and knowledge-intensive industries, such as IT-outsourcing. Firstly, the importance of innovation as part of the corporate strategy should be highlighted. It is not only about *inventing*, but rather being able to come up with new commercial potential, new solutions and new architectures that may serve the local markets better. The mobilization and leveraging of this local knowledge being created is the second consideration. Technologically, organizations have incredibly efficient communication systems at their fingertips. Now, organisational structures and processes should be developed in such way that the globally created local innovation can be shared and harnessed throughout the organisation.

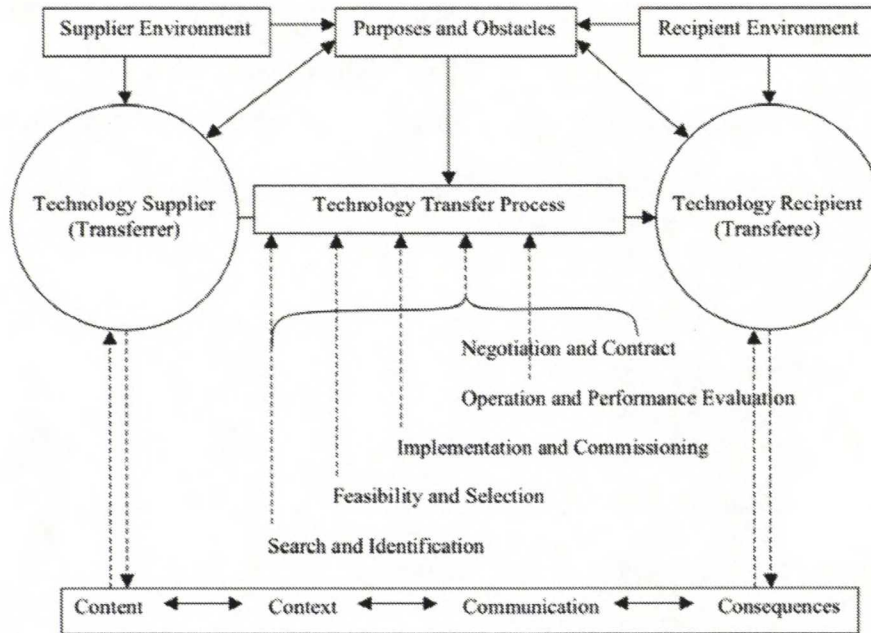
The key literature for this study and for constructing the theoretical framework are the works by Al-Obaidi (1999), Gupta and Govindarajan (2000) and Doz et al (2001). It should be noted that other works also contributed to the research, but the above mentioned acted as core theories upon which the research was built.

### **2.5 Theoretical Framework**

When selecting appropriate theoretical framework for the analysis, the functional purpose of the theories was clear. On a broader scale, the *process* of technology transfer was to be examined; hence a holistic process-view theory was selected. Also the *motivational* aspects of flow of innovation were needed. And finally, a structured approach to analysing and solving the challenges arising from the analysis of the empirical findings was founded. These three frameworks are described next.

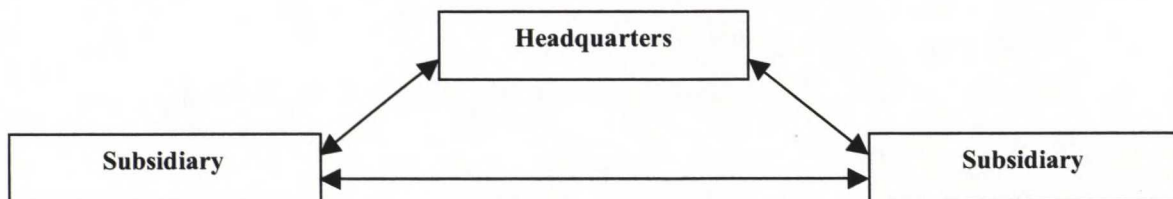
### 2.5.1 Technology Transfer

This framework is used to model the process of transferring technology



**Figure 5: Building Blocks of International Technology Transfer (ITT) Process (Al-Obaidi, 1999, Lehtinen & Seristö, ed. p. 121)**

According to Al-Obaidi (1999), international technology transfer “includes the transmission, adaptation and absorption (assimilation) of accumulated applied knowledge and skills”, which can



**Figure 6: The Context of ITT Examined**

then be put to productive use by the receiving organization. In this study, technology transfer process is examined in the context illustrated by Figure 6, but the process of transferring technology itself is examined along the modified phases suggested by Al-Obaidi’s (1999) model. Al-Obaidi’s model specifies in detail various steps and procedures that ensures effective and efficient means of implementation. The following section specifies the adopted steps and procedures relevant to this study.

Referring to Figure 6, having technology transferred from one subsidiary to another via the headquarters includes first transferring the technology from the source of the innovation firstly to headquarters, from which it is then distributed to other subsidiaries. That includes already three



nodes of transfer. But also a more horizontal mode of transfer is explored, which is directly from subsidiary to another.

Two main inadequacies are distinguished in the article (Gupta & Govindarajan, 2000, 112): undeveloped production technologies and shortcomings in production management and organization of the recipient subsidiary or country. In the context of the current study, as in-house transfer of IT-service related technologies is examined, these problem areas would translate into:

- Technological development gaps of the receiving end, whether headquarters or another subsidiary
  - Is the desired recipient able to technologically produce the innovation or technology in question
- The ability of the management and organization to absorb (assimilate) the technology or knowledge being transferred
  - Is the management of the receiving end able to understand the innovation or technology and its benefits

An additional note has been made on the level of adaptation needed for the product to better suit the changing need and conditions of the local and international market. This is also one of the researched issues of the current study, i.e. how flexible should the technology that is transferred be (for example architecture and documentation) in order for it to best suit the receiving market.

#### **2.5.1.1 Dimensions of Technology Transfer Process**

In this section, the dimensions of Al-Obaidi's (1999) ITT process (see Figure 5) are explained.

These are also referred to as the 4 C's:

1. **Content aspects:** From the supplier's perspective, the supply and permission to transfer the technology. From the recipient's perspective, the readiness and capability to acquire and implement the technology.
2. **Communication aspects:** The linkages and channels needed to transmit the needed knowledge in order for the recipient to be able to learn, master and benefit from the technology.
3. **Context aspects:** The organizational aspects of the business operation. Contractual considerations, time framework and management processes.

4. **Consequence aspects:** Managing the results of the technology transfer process. Managing the impact of the implementation of the new technology to the recipient and the environment.

#### 2.5.1.2 Phases of Technology Transfer Process

1. **Search and Identification Phase:** This phase consists of three stages
  - a. **Research and Auditing:** Where the technology exists within the company, who has developed it and has it been used or commercialized
  - b. **Transferability:** Is the technology ready and transferable
  - c. **Consequences:** Potential consequences of the commercial transaction
2. **Feasibility and Selection Phase:** The managerial decision about the technology transfer process is made and level of adaptation need is assessed.
3. **Negotiation and Contract Phase:** Terms and conditions are negotiated according to:
  - a. **Content, Context, Communication and Consequences**
  - b. **Adaptations**
  - c. **Contributions and Responsibilities** of each party
  - d. **Time Frame** for the practical aspects of the transfer process
4. **Implementation and Commissioning Phase:** The actual technology transfer phase consists of five stages, which can be considered as a project:
  - a. **Developing a Management Structure**
    - i. Goals and objectives for implementation of the project
    - ii. Structure of management authority
    - iii. Communications between people and organizations involved
    - iv. Resource allocations and authorization
    - v. Adequate control mechanisms over relevant issues
  - b. **Specifying and Conducting Project Activities:** Some of the following activities are carried out, depending on the technology being transferred and the nature of the project
    - i. Design equipment and tools



- ii. Documentation / Specifications / Blueprints (Explicit knowledge)
- iii. Personnel selection and recruitment for implementation, training, supervision
- iv. Know-how transmission and training, tacit elements
- v. Contracting, subcontracting and supervision
- vi. Construction of the infrastructure, plant or facility
- vii. Installation / Implementation

c. **Planning the Project:** A project plan is drafted according to the company best practices.

d. **Project Finance and Costing:** Project financing and costing is drafted according to the company best practices

e. **Commissioning and Testing**

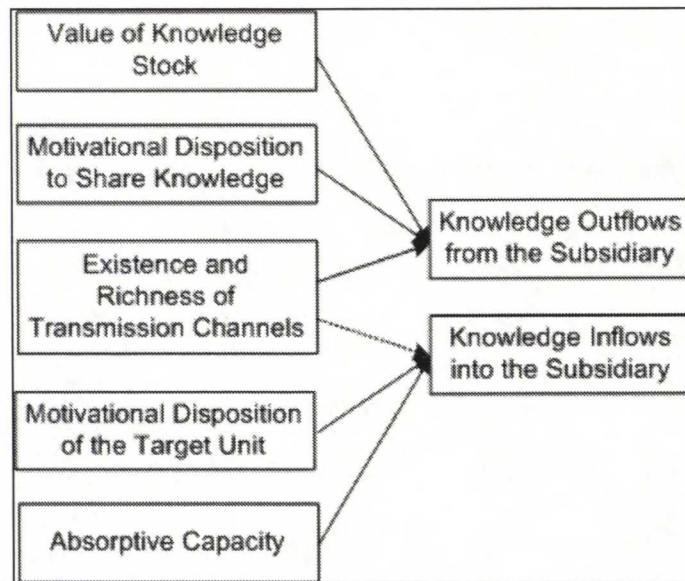
5. **Operation and Performance Evaluation Phase:** Monitoring the outcome and consequences of the technology transfer project.

**2.5.2 Hypothesis #1**

- **Hypothesis 1a:** No clear process for inter-unitary technology transfer exists in the company researched.

**2.5.3 The Flow of Innovation**

The level of efficiency of the flow of innovation (knowledge) is examined using a model developed by Gupta and Govindarajan (2000). The emphasis here is to examine the knowledge flows between the subsidiary and the headquarters in order to find weaknesses in the facilitating systems (transmission channels) and motivating factors that affect these flows.



**Figure 7: Determinants of intra-corporate knowledge outflows from and inflows to foreign subsidiaries (Gupta & Govindarajan 2000, p. 477)**

Gupta & Govindarajan (2000) focused primarily on the transfer of knowledge that is referred to as “know-how” rather than a more limited definition of “operational information”. This supports also the examination of the flow of innovation, which very much relies on this kind of knowledge being communicated effectively within the organisation.

- a) **Value of Knowledge Stock:** The more valuable the stock of knowledge of a subsidiary is compared to the rest of the MNC, knowledge transfer becomes more attractive between that subsidiary and other units. The knowledge stock should comprise of non-duplicative knowledge, as otherwise the value of the knowledge stock would diminish over time.
- b) **Motivational Disposition to Share Knowledge:** An idea of “information monopoly” (Cyert, 1995) within an organisation has been introduced to explain problems with the motivation to share knowledge. This is interlinked with power struggles within the organisation as well as the lack of incentives that employees may face when expected to share knowledge.
- c) **Existence and Richness of Transmission Channels:** The technology and systems must be in place for a flexible and efficient way of exchanging knowledge. Recent technological advances have improved the channels greatly, and a more detailed description of possible solutions is presented within the recommendations section of the study.
- d) **Motivational Disposition of the Target Unit:** “Not Invented Here” (NIH) syndrome (Katz and Allen, 1982) can explain some rigidities that can cause managers to block or devalue the value of knowledge stock of peer subsidiaries due to two proposed driving forces:



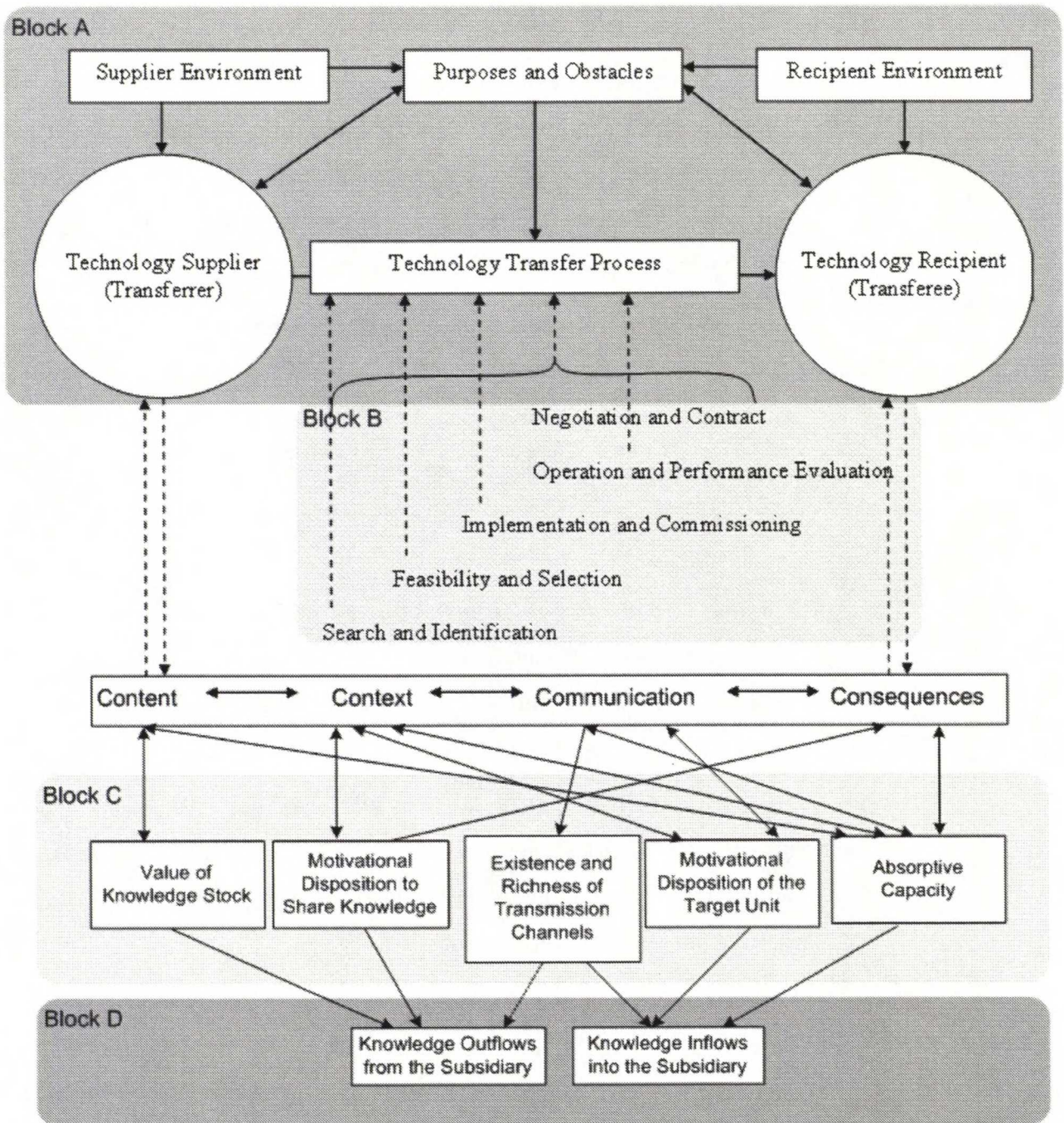
- a. Ego-defense mechanisms
  - b. Power struggles within organizations
- e) **Absorptive Capacity of the Target Unit:** Absorptive capacity is defined as “ability to recognize the value of new information, assimilate it, and apply it to commercial ends” (Cohen & Levinthal, 1990, 128). Two explanations are introduced to explain the differing abilities to intake information:
- a. The extent of prior related knowledge
  - b. The extent of inter-unit homophily of the receiving unit versus the sending unit

In their study, four flows of knowledge were examined:

- i) Knowledge outflows to peer subsidiaries
- ii) Knowledge outflows to the parent corporation
- iii) Knowledge inflows from peer subsidiaries
- iv) Knowledge inflows from the parent corporation

The scope of this study is the same, however with greater emphasis on the knowledge flows between the subsidiary and the headquarters.

### 2.5.4 The Revised Theoretical Framework for This Study



**Figure 8: Connections between the ITT Process Model and Determinants of intra-corporate knowledge outflows from and inflows to foreign subsidiaries**

In order to understand the connections between the two theoretical models, relevant components of each model are connected in order to create a suitable model for this study. The scope of the current study is only concerned with intra-organizational technology transfer. The international technology transfer model was originally designed to cover technology transfer in a much broader sense. In order to serve the scope of this research, the connections between the aspects of Al-Obaidi's (1999)



ITT model and determinants of intra-corporate knowledge outflows from and inflows to foreign subsidiaries –models (Gupta & Govindarajan, 2000, 127) are explained:

- a) **Content – Value of Knowledge Stock:** The supplier of technology must have something worth transferring from the recipient's perspective. Hence the value of the knowledge stock, at least in some part, must be greater than the recipient's. Hence the recipient is motivated to prepare their capability to ensure readiness to receive new technology.
- b) **Content – Motivational Disposition to Share Knowledge:** If the supplier of technology has superior technology, a motivation for sharing it must be existent. Especially in cost sense this is important, as sharing technology will cost the supplier in the form of time of the employees, documentation and so on. Internal cost sharing, licensing or royalties may prove solutions for this problem.
- c) **Context – Motivational Disposition to Share Knowledge:** This is linked with the former. If the organizational technology sharing and managerial processes are bureaucratic or unclear, motivation to share knowledge will suffer.
- d) **Context – Motivational Disposition of the Target Unit:** Former applies also to the motivational disposition of the target unit. Organizational processes, contracts, time frameworks and management processes must support the technology transfer process.
- e) **Context – Absorptive Capacity:** Management must pay attention to receiving units' ability to absorb and 'import' new technology. This must be a company-wide practise to enforce implementation of new technologies locally.
- f) **Communication – Motivational Disposition to Share Knowledge:** The existence of well functioning and efficient communication channels will have an effect on the motivation to share knowledge. If the information worker's tools are not efficient, technology transfer process will not either.
- g) **Communication – Existence and Richness of Transmission Channels:** The linkage here is obvious, communication channels are needed to exist and be rich enough to facilitate the technology transfer.

- h) **Communication – Absorptive Capacity:** The existence and efficiency of linkages and communication channels can have an effect on the absorptive capacity of the recipient. The absorptive capacity of the target unit will improve through improvement of open transmissions channels, as the ‘matching’ transmitters and receivers are more likely to interact directly<sup>15</sup>.
- i) **Consequence – Motivational Disposition to Share Knowledge:** For the supplier of technology, the implementation in the recipient’s end is relevant. Especially if contractual agreements have royalties or other performance-based incentives attached.
- j) **Consequence – Motivational Disposition of the Target Unit:** Managing the results of the technology transfer process and the impact of implementation on the target unit is important in reference to future technology transfer. Especially the successfulness of past technology transfer projects have potential of great impact on the motivation of the target unit to embark on further technology transfer.
- k) **Consequence – Absorptive Capacity:** The effect of managing the results and implementation is also connected with the absorptive capacities of the target unit. The whole life cycle of the product or service being transferred must be managed when transferring technology. This has an impact on the absorptive capacity of the technology at hand as well as future technologies.

### 2.5.5 Hypotheses #2

- **Hypothesis 2a:** A clear strategic vision encouraging the flow of innovation and technology transfer is a prerequisite for efficient knowledge sharing management processes.
- **Hypothesis 2b:** There is a need for better and more open communication channels between international units.
- **Hypothesis 2c:** The corporate stock of knowledge is fragmented into “Pockets of Knowledge” across subsidiaries
- **Hypothesis 2d:** The existing communication channels are not widely used.

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<sup>15</sup> See Gupta & Govindarajan (2000), page 476.



### 3 Methodology

In this chapter, the research methodology is introduced and the suitability and limitations of this approach are justified according to the adaptability to the topic of the research. Also, the choice of and the access to the case company, Fujitsu, is grounded. Thereafter, the three faces of data collection methods are presented, with a description of both the qualitative and quantitative collection methods and the justification for these phases of data collection. After introducing the data collection methods, the context of data collection is defined, presenting the critical groundings for the data collection process and the results that stem from the analysis. Next, the data analysis methods and process are described. Finally, the quality of research is assessed.

#### 3.1 Research Method

The chosen research strategy for the current research is case study, as the purpose is to describe a phenomenon within the context of a particular, single global firm. More precisely, the 'survey within a case study' strategy is used, as the current study is concerned with exploratory research (Yin, 2003; 9). Yin (ibid; 13) defines case study as:

*"1. A case study is an empirical inquiry that*

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

*2. The case study inquiry*

- copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result*
- relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result*
- benefits from the prior development of theoretical propositions to guide data collection and analysis."*

This case study combines both qualitative and quantitative research. Qualitative research is not the primary mode of research, as it is merely used in the preliminary interview phase and observations, which are used in helping design the final questionnaire. The final questionnaire is designed according to the theoretical framework and the insights of the findings from the preliminary interviews and observations. In addition to these research methods, vigorous observations were

made during research in the organization. Observations were made and accounted for by the researcher and represent perspectives of both researcher and employee.

A more detailed account of the design and execution of the research for each of these is presented in Section 3.2 Data Collection.

### **3.1.1 Components of Research Design**

Yin (2003; 21) states that for case studies, there are five components of research design to consider:

1. A study's questions
2. Its propositions, if any
3. Its units of analysis
4. The logic linking the data to the propositions
5. The criteria for interpreting the findings

Each of these has been considered when crafting the structure for this research. The questions of the current research originate from a managerial problem, which was also found to be a research gap in current material on the topic. This was translated into a research problem and research questions. A relevant theoretical framework was developed, upon which the hypotheses (propositions) were based. From these hypotheses, empirical tests were developed, resulting in interview and questionnaire questions.

The research analysis is based on the empirical findings of the questionnaire, hence the unit of analysis is the company (or more precisely the subsidiaries) being researched and the data consisting of responses of individual employees.

The logic by which the gathered data is linked to the propositions is actually defined by the way that the questionnaire was designed. Please see Section 3.3.2.1 for a table, in which the individual questionnaire questions are categorized according to the theoretical framework and hypotheses. Hence, the criteria for interpreting the findings is linked directly to the propositions of the study, which in turn are developed from the theoretical framework.

### **3.1.2 Access to the Case Company**

The first main reason for choosing Fujitsu as the case company was the access to in-depth knowledge due to being an employee of the company. The second reason is the fact that Fujitsu is an ideal company to represent IT-service industry. Working in the service development department of the Finnish subsidiary provided a unique perspective not only to the innovative processes,



commercialization and marketing of the IT-services, but also to the interaction with headquarters and other subsidiaries. This gave an opportunity to conduct the preliminary interviews that provided valuable information and grounding for the questionnaire.

The initial contact was made through a summer internship within the company and a prospect of research opened up naturally through discussions with the director of service development. Global integration of operations and innovative processes is a hot topic in the field of IT-service outsourcing, so that matched well with my personal interest in corporate strategy and the theoretical field thereof.

The main concern of the research is the flow of innovation and transfer of technology across borders. Of course, establishing channels to the headquarters and other foreign subsidiaries provided not only a challenge to the research, but also a significant opportunity to observe the very obstacles that managers face when involved in inter-unitary exchange of knowledge and technology.

The main data collection method, questionnaire conducted via a web-form on the internet, was designed so that the threshold for answering would be as low as possible. The fact that it was accessible through public internet meant, that it could be answered by anyone working for Fujitsu Services.

## **3.2 Data Collection**

Three methods were used in order to collect a comprehensive and many-sided set of data. The methods include observations, interviewing and questionnaires. These were done both using traditional methods of face to face and telephone interviewing, but computer-aided collection was central to the current research. The data collection methods are now described in detail.

### **3.2.1 Direct Observations**

Direct observations were an important part of the data collection process. Even though these observations were made in a less formal way (Yin, 2003; 92), it should also be noted that the observations made during the execution of the data collection are in close relation to the topic of the current research. The observations were not made on occasional visits to the site, but rather on a day-to-day basis. Yin (ibid; 93) states that:

*“Observational evidence is often useful in providing additional information about the topic being studied. If a case study is about a new technology, for instance, observations of the*

*technology at work are invaluable aids for understanding the actual uses of the technology or potential problems being encountered.”*

Working within the company made it possible to observe on a daily basis and also being present in meetings and projects that involved international exchange of information and technology provided valuable insight into the real life working of the flow of innovation and technology transfer within the company.

Direct observation was hence possible, but it should be noted that it was limited to the perspective of a subsidiary. No time was spent within the headquarters of the company, which would have probably given a more balanced grounding for the data collected through observation.

The types of observations relevant to the study were:

1. The attitudes of people present in cross-border interaction
2. The use of language
  - a. Formal communication
  - b. Informal communication
  - c. Spoken language
  - d. Written language (mainly e-mail)
  - e. The effect of language skills
3. The utilisation of communication channels when used for cross-border communications
  - a. Exchange of documents
  - b. Carrying out the preliminary work for the thesis research
    - i. Finding and contacting the contact people in each country unit
    - ii. Communicating and carrying out the questionnaire

Yin (2003; 86) lists certain weaknesses of direct observation as a data collection method: Time consuming, selectivity, reflexivity and cost. The only one that applies to the current research is selectivity. Time was not an issue, as the researcher was an employee of the company. Reflexivity was not an issue, as most of the events observed were actual happenings, so no alteration to the event was made due to it being observed. Cost was not an issue, as the observations were work and research related to start off with. Selectivity might have been an issue, however a minor one due to the research being a long-term process.



### **3.2.2 Preliminary Interviews**

The function of the preliminary interview stage was to act as exploratory research to provide insights and understanding of the nature of the problem (Malhotra & Birks, 2000, 77). The aim of this part of the research is to identify and describe the relevant issues for further examination. In other words, no statistical generalizations are to be made based on data gathered, hence justifying the use of qualitative research (Eskola & Suoranta, 1998, 61). A select group of managers within the service development, marketing and sales departments were interviewed using a questionnaire that evolved (Malhotra & Birks, 2000, 76) according to development of the interview discussion. Exploratory methods were used in this stage due to their flexibility and versatility compared to more formal research methods, as main objectives were:

1. To obtain background information where nothing is known of the problem area
2. To define problem areas fully and to formulate hypotheses for further investigation and/or quantification
3. To identify relevant or salient behaviour patterns, beliefs, opinions, attitudes, motivations, etc. and to develop structures of these components.

The interviews within the Finnish subsidiary were conducted both face to face and also through e-mail exchange of questions and answers. The main challenge was allocating the time for the interviews due to the busy schedules of managers. This is the reason why e-mail was used in some of the cases. However, this proved to be an excellent way of conducting, as the manager could find the suitable time for answering the questions and further questions for elaboration could be conducted via the same method.

#### **3.2.2.1 Choice of Interviewees**

The choice of interviewees was done according to their experience in the field of research and their position within the company. According to Sulkunen (1990, 272-273; see Eskola & Suoranta, 1998, 66), it is recommended that in order to be able to form generalizations, the respondents would have:

1. a relatively similar, at least current, experience world
2. knowledge of the research problem
3. an interest in the research

These three recommendations were all addressed, as the interviewees shared a common job description within the same unit (although a varied education or past career), were informed in depth about the purpose and scope of the study (see Appendix 1) and all voluntarily took part in the

interviews. The outcome of the study also had close ties to their positions, which further motivated the respondents to participate. All of the information and interviews were conducted directly with the respondents using e-mail, face to face and telephone.

<b>Interviewee</b>	<b>Title</b>	<b>Unit</b>
<b>#1</b>	<b>Development Manager</b>	<b>Service Development</b>
<b>#2</b>	<b>Development Manager</b>	<b>Service Development</b>
<b>#3</b>	<b>Director of R&amp;D</b>	<b>R&amp;D</b>
<b>#4</b>	<b>Commercialization Director</b>	<b>Service Development</b>
<b>#5</b>	<b>Management Consultant</b>	<b>Sales Support</b>
<b>#6</b>	<b>Director of Nordic Solutions</b>	<b>Service Development</b>

**Table 1: Preliminary Interview Roles**

The interviews were conducted between October and December of 2005. Please see Table 1 above for description of the interviewee roles within the company.

### **3.2.2.2 Topics Discussed in the Preliminary Interviews**

6. Why is the transfer or flow of new products and production models from a country unit to the headquarter an important thing? Benefits?
7. What do you see as the main challenges to this?
8. Does the headquarter see the country units more like as R&D-centers or sales units? The Finnish case?
9. How important is innovation and innovating to the Finnish country unit?
10. Would a 'horizontal connection' between the country units be beneficial? (i.e. the units would have efficient communication channels, as well as the permission to bypass the headquarters even concerning important decisions)
11. Should the headquarters be more active in scanning the country units' R&D activities?
12. Who should pay for the R&D-activities of country units?
13. Who should pay for the R&D-activities of country units, if the local innovations can be used commercially in other units?



### 3.2.3 Questionnaire

*“Because questionnaires are usually written by educated persons who have a special interest in and understanding of the topic of their inquiry, and because these people usually consult with other educated and concerned persons, it is much more common for questionnaires to be overwritten, overcomplicated, and too demanding of the respondent than they are to be simpleminded, superficial, and not demanding enough.”*

*(Sheatsley, 1983, 200)*

In order to avoid the most common pitfalls of questionnaire-based research, the fundamentals of the questionnaire design were founded on a number of works on the subject (Payne, 1951; Converse & Presser, 1986; Hakim, 1987; Prasad, 2005). As the questionnaire was conducted as an online web-form, the use of information technology also was taken into account (Kelle, 1995; Malhotra & Birks, 2000).

As the topic of the current research can be considered quite abstract in the sense that much of the analysis is on strategic level, the importance of practicality and the simplicity of language used in the questionnaire becomes an important aspect. Such things as “simplicity, intelligibility and clarity” (Converse & Presser, 1986: 10) must be accomplished in the questionnaire design. This objective is to be reached by applying the following four concepts to the wording of each question on the questionnaire (ibid):

1. Simple language
2. Common concepts
3. Manageable tasks<sup>16</sup>
4. Widespread information

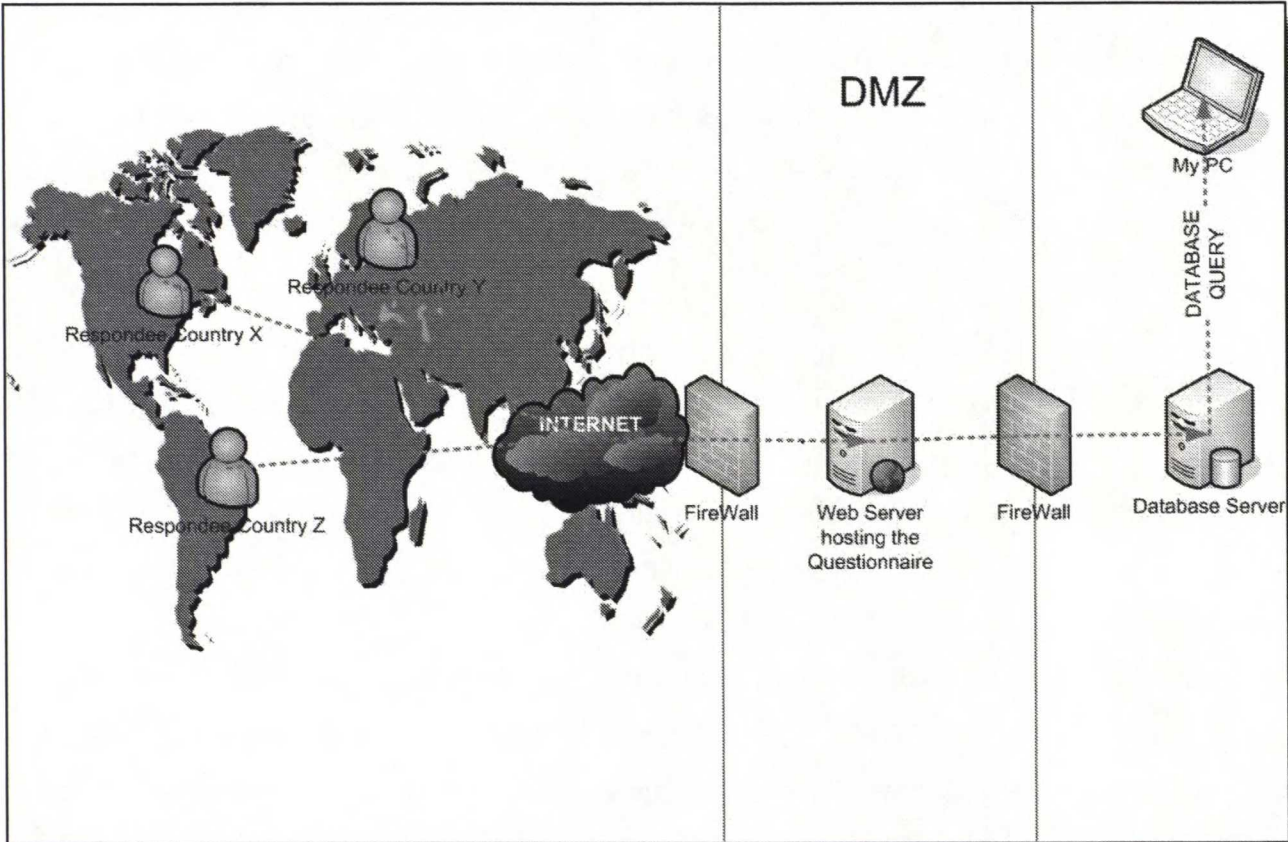
However, it should be noted, that certain assumptions about IT industry-specific terminology and basic knowledge on them on the behalf of the respondents must be made. Definitions and clarifications are made when considered necessary.

Also, as some hypothetical questions are imposed, special attention has been paid to also have questions on actual experiences on the same topic. This gives valuable reference data and also ties the answers to the hypothetical questions more tightly into reality. Also, a “no opinion option” is offered whenever possible to minimize uneducated answers and therefore errors in the analysis. Wording is done in such fashion to minimize ‘leading’ the respondents towards a certain choice.

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<sup>16</sup> I.e. are the respondents able to understand and answer the question in hand?

Motivating the respondents was considered a challenge from the outset. This was due to the complexity of the questions, data protection and the fact that most respondents are busy with their jobs. The solution for this was to write a strict disclaimer of the confidentiality issues, a description of the ease and quickness of replying and having a chance to win an mp3 player as an incentive for answering the questionnaire.



**Figure 9: Questionnaire - Technical Achitecture**

In Figure 9, the questionnaire technical architecture is described. The idea is simple, yet flexible. The questionnaire is located on a server accessible from the public internet. The web-form is filled out by the responder and then sent to the web-server. Therefore, anyone that gets the link can answer the questionnaire. For this reason, a password was assigned in order to minimize the risk of unauthorized access to the questionnaire. The link and login information for the questionnaire was distributed via e-mail and intranets; hence it should not leak to outside sources. After answering the questionnaire in the browser, the user clicks on “submit”-button and the information is uploaded onto a server. From that database, the data can be accessed and different kinds of reports can be drawn out. The data analysis is then done using Excel-features. Please see the questionnaire reproduced in the Appendix.



### **3.2.3.1 Sample Population**

Qualitative research has traditionally been criticized due to its methodological tendency of small samples. This research practice caused criticism due to the view that the findings of such research were based on anecdotal accounts from individuals that do not represent the population under study correctly (Lundberg, 1942, 169). However, managing the research using computers offers the potential to increase sample sizes drastically (Kelle, 1995, 22). However, this also means more planning and precautionary work in order to for the sample to truly represent the target population under scrutiny. As the current research is combining qualitative research in the form of the preliminary and final interviews with quantitative research in the form of the questionnaire, the larger sample size in conducting the latter is justified with rule of generalizability of findings based on larger samples (ibid, 23).

The sample selection was done by randomly choosing responders by their e-mails, as well as directly contacting top management and senior staff, as they are a minority and hence in danger of not being selected in the random sample. The population can then be segmented after the data has been collected. This is made possible by having demographic questions that define the respondent's country and job description in such way that all respondents can be normalized and therefore the results are comparable. It must be noted, that the job description may differ, even though the official title may be the same. This is especially relevant in international contexts. In this case, the questionnaire is to be answered by all employees of Fujitsu Services, within the selected countries. The questionnaire in itself is designed so that the grouping of respondents can be done efficiently and accurately.

### **3.2.4 Challenges when conducting the questionnaire**

There were some challenges when executing the final questionnaire. Since the current research represents a kind of knowledge transfer in an international context, it can be assumed that same kinds of challenges would have to be faced by anyone conducting technology transfer in the same context. Below, an account of the problems faced when conducting the questionnaire is presented.

#### **3.2.4.1 Finding the Correct Person in a Foreign Unit**

Employees have their own responsibilities that are dictated by their work description and title. Often it seems, that roles are not completely clear-cut when it comes to 'unexpected' transactions, especially in an international context. Therefore sometimes it seemed that getting in touch with the right person was not only difficult, but very time consuming. Even though everything that can be done is done, the whole project can be delayed due to trying to find persons – or waiting for their reply. This has obvious implications on:

- Roles, work descriptions, guides and instructions
- Communication channels, structure of the corporate intranet and internal phonebooks
- Lists of contact people

#### **3.2.4.2 Timeliness of Cross-Border and Multi-Unit Research**

Partly intertwined with the latter, it should be noted that even the smallest of setbacks can cause a delay that is multiplied due to the international nature of the project. A slight change of plan in one country or unit can cause the whole project to be delayed.

The solution to these kinds of problems lies not only in clear roles and corporate vision of being innovative across borders. Experience and process implementation play a crucial role as well.

#### **3.2.4.3 Technical Constraints and Limitations**

There are also technical considerations to be made when executing international projects. In this instance, the sheer number of potential respondents to the questionnaire posed certain constraints in relation to the network and server capacity.

The corporate network and tools should be designed in such a way that a global information network is technologically viable and the tools are intuitive and easy to use.

#### **3.2.4.4 Motivating the Respondents and Avoiding “Questionnaire Fatigue”**

Generally, there is a lot of research done in these days. Not only in everyday life generally, but also within the workplace. The employer is interested in how to improve things and in learning about the employees. Therefore the message needed to be clear: What this research is and how can it benefit the respondent. This message was consciously made very clear as the point of this research is basically to improve the sharing of resources across borders. Also a material incentive was given in the form of a mp3-player.

In addition of the above mentioned ways to tackle questionnaire fatigue and motivation, a ‘progress meter’ was added to the questionnaire. From this, the respondent could see how much is left of the questionnaire, in percentage. Also the time spent responding to the questionnaire was indicated.



### **3.3 Data Analysis**

In this section, the methods for data analysis for each of the research stages are presented. The research process is divided into two stages: Preliminary stage, which is qualitative research in the form of interviews and Final stage, which is quantitative research based on the findings of the qualitative stage. Hence the data analysis techniques differ drastically and are presented in their own sections, respectively.

#### **3.3.1 The Preliminary Interviews – Qualitative Research**

The main objective of the qualitative data analysis in this study was to provide a concise approach to the design of the final questionnaire. A practical approach was needed to be able to put the components of the theoretical framework into context and in order of importance in managerially practical sense. It has been stated that data analysis of qualitative data, which the preliminary interviews represent, is the most difficult part of such research and that there are no formal directions for doing it (Eskola & Suoranta, 1998). Therefore the data gathered in the preliminary interview stage were used merely for guidance of what are the problem areas that would need extra consideration and attention.

The data gathered in the preliminary interview stage proved to provide a rich and concise material that pinpointed and reinforced certain building blocks of the theoretical framework. The data analysis method used for the data gathered in this stage of research was theming (Eskola & Suoranata, 1998, 164), also known as ‘Subsuming Particulars into the General’ (Miles & Huberman, 1985, 223). In order to find trends within the material, comments from the interviewees were grouped under specific headings dictated by the subject of the respective question. This made it possible to categorize the answers of all respondents to specific issues all at once. The answers that were not in English were translated at this point.

When the material gathered was categorized, it was then further analyzed in the light of the theoretical framework, observations and then applied to the content and structure of the final questionnaire.

#### **3.3.2 The Final Questionnaire – Quantitative Research**

The basis of the data analysis for the final questionnaire is now presented. The theoretical backing was outlined in the literature review. Here the theoretical models are adapted and consolidated into a revised holistic model that illustrates the theoretical aspects against which the findings are reflected. The data acquired from the final questionnaire shall be analysed using the three elements of the theoretical framework:

- International Technology Transfer Process Model
- Determinants of intra-corporate knowledge outflows from and inflows to foreign subsidiaries
- The Metanational Corporation

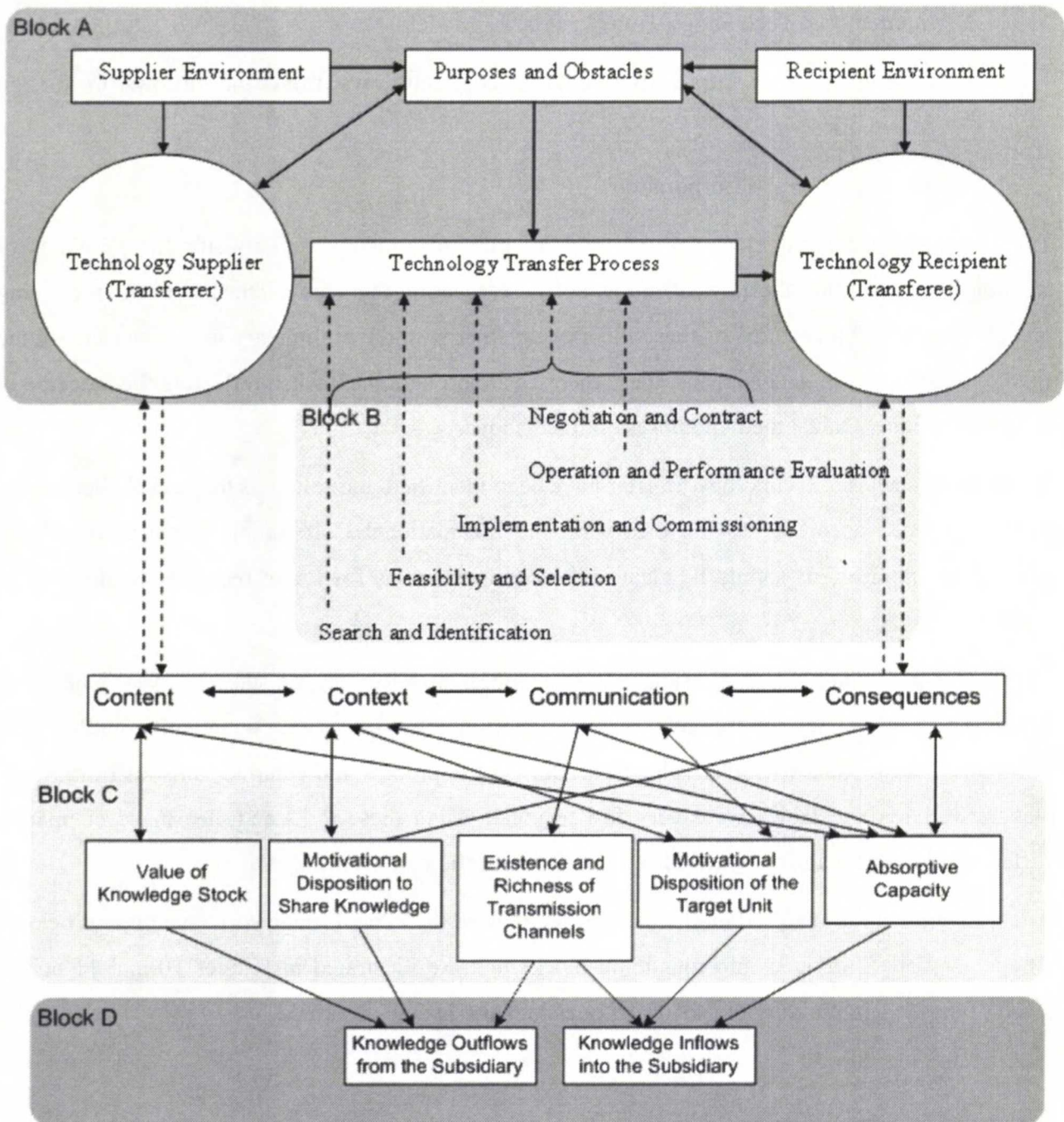
The first two theoretical elements are used in order to structure and specify the problems of technology transfer and the flow of innovation researched in this study. This has been an ongoing process throughout this study, as these theories together with the preliminary interviews shaped the final questionnaire. In data analysis, these theories are brought back when reflecting the outcome of the questionnaire against the hypotheses outlined above.

When the obstacles to technology transfer have been identified, the solutions to these challenges are to be suggested according to the theory on the Metanational Corporation. From this analysis, managerial implications should be clear and recommendations for future research should arise as well.

The actual processing of data, crunching of numbers and forming of statistics was done using Microsoft Excel. As the questionnaire was designed mainly to deal with quantitative multi-choice questions, the raw data was relatively straightforward to process and compile statistics from. Basic statistical charts and tables were very fast to create using these tools and also made comparing different sets of data against each other very fast and efficient.

The questionnaire is analysed on the basis of the revised theoretical framework (see Figures below). The framework is divided into four main blocks that are illustrated in Figures 10 and 11 below. Each of these main building blocks of the questionnaire is now described.





**Figure 10: Blocks of the Integrated Theoretical Framework**

Block A) This block is concerned about the supplier and recipient units' environmental factors and individual units' characteristics. Also network centrality of the unit or knowledge node falls in the scope of this block.

Block B) Here, the focus is on the phases of the technology transfer process: Search and Identification<sup>17</sup>, Feasibility and Selection, Implementation and Commissioning, Operation and Performance Evaluation, Negotiation and Contract.

Block C) Here the dimensions of technology transfer process are examined: Content, Context, Communication and Consequences. Also the model by Gupta & Govindarajan (2000) is integrated, i.e. the determinants of intra-corporate knowledge outflows from and inflows to foreign subsidiaries. In the questionnaire, questions related to

Block D) In the final block, the perceived amount and quality of the knowledge inflows and outflows to and from the individuals units are addressed. In the questionnaire, questions related to interaction with other units fall into Block D of the theoretical framework.

### 3.3.2.1 Questionnaire Questions Categorized

In this section, the questionnaire questions are categorized in order to show the linkage to the area of the theoretical framework that the individual question relates to. Also the link to the relevant hypothesis is shown. The areas of the theoretical framework are described as “blocks” and can be seen in Figure 10.

Question	Block				Hypothesis	
	A	B	C	D	1	2
1 Does your country unit have R&D-functions? *	X		X			
2 Do you know what to do when contacting Fujitsu people abroad, in order to find out about products for example?		X	X		X	
- Which people to contact		X	X			
- Sufficient communication channels		X	X			
- Access to foreign units' intranet		X	X			
3 Do you use the existing open communication channels such as the discussion forum in Café Vik? *				X		X
4 How easy would you say it is to contact foreign units and to find information you need? *		X			X	
5 How important do you think it would be to have and develop direct channels of communication between the subsidiaries?			X			X
6 How active do you see your unit to be in international technology and knowledge transfer from other Fujitsu units?				X		X
7 Has this kind of activity increased in the past year compared to earlier?				X		
8 How would you rate the level of innovation caused or coming from interaction with foreign units?				X		
9 Do you see that the products/services your unit offers were 'pushed' to the unit from the headquarters with no local adaptation or local development?			X			
10 Do you think that there is a need for a clear process covering all aspects of transferring technology from foreign units into your unit?		X			X	

<sup>17</sup> In the theory of Metanational, also termed "sensing"



11	Which practical obstacles do you think cause most difficulties in transferring technology and sharing resources between units?		X	X			
	- "Not Invented Here"-thinking			X			X
	- Problems with sharing development or administration costs		X				
	- Communications issues, language, channels			X			
	- Cultural differences			X			
	- Motivational problems of employees			X			
	- Lack of knowledge of what resources other units have to offer		X				
12	How important do you think innovation, research and development is for your unit?	X		X			
13	Do you think that your unit could benefit from innovations and technologies from units in other countries?	X		X			
14	Do you think it would be a good thing if the headquarters actively monitored (scanned) your unit's development, needs and market situation?			X			
15	Do you think the headquarters does this kind of scanning?			X			
16	Do you think it would be a good thing if the headquarters would form "hit teams" to introduce common offerings of innovative products/services to your country unit?		X				
17	Do you think that it is a conscious strategic vision of Fujitsu to increase innovativeness through cooperation across borders?	X					
18	Are more incentives needed to increase interaction among units across borders?	X		X			
19	Rate how effective you think these incentives for employees are to increase interaction and knowledge sharing between units	X		X			
	- Cash reimbursement	X		X			
	- Career advances	X		X			
	- International work opportunities	X		X			
	- Certificates	X		X			
	- Equipment	X		X			
20	How good an understanding do you think the headquarters has of the value of your unit's			X			X
	- Knowledge stock			X			X
	- Expertise			X			X
	- Market environment			X			X
21	Do you have an understanding about the knowledge stock of other units that you interact with?	X	X	X	X		X
22	How many foreign units have you interacted within the last 6 months? (Estimate if you cannot remember exactly)	X			X		
23	How would you rate the following as building blocks when creating an efficient global knowledge sharing community?		X	X			X
	- Dedication and motivation of employees			X			X
	- Incentives to share knowledge across borders			X			X
	- An open communication channel such as a forum that employees could use to share knowledge			X			X
	- Management's dedication to monitor this open channel and reward active participants (reimbursements, career advancements)			X			X
	- Clear contact persons in each country		X	X			X
	- A search engine by skills and specialist knowledge in each employee's profile		X	X			X
	- Informal networking by more inter-unitary occasions and get-togethers		X	X			X
	- Information sharing seminars, etc.		X	X			X

Table 2: Questions of the final questionnaire categorized

It should be noted that not all questions fall under the hypotheses. These questions are mainly support questions, which are of managerial interest and the results are used in the recommendations section. Some of the data is to be used in further research (see Section 6.4).

In Chapter 4, Findings and Analysis, findings to all questions are presented. Firstly, the results relevant to the hypotheses are explained and then other findings in Section 4.3.5.

### 3.3.3 Itemised Rating Scales

The questions which asked the responder to rank the choices by giving them different scores were done using a Likert scale (Likert, 1932, 55), where respondents are asked to indicate the amount of agreement or disagreement on a five-point scale in a multiple choice question. Likert scale is widely used for rating the degree of agreement or disagreement about the stimulus object (Malhotra & Birks, 2000, 296). After the data has been collected, each item may be analyzed separately or item responses may be summed in order to create a score for a group of items. Therefore Likert scales are often referred to as summative scales. A balanced scale was used, i.e. there were the same number of positive categories as there were negative ones, with a neutral choice in the middle (ibid, pp. 297-300).

It is common to treat the results from a rating scale such as Likert scale by calculating averages or more generally any arithmetic operations. Therefore for questions where the responders were asked to score certain choices, the scores were calculated by summing across all items (Malhotra & Birks, 2000, 296).

## 3.4 Quality of Research

The validity and reliability of the research are evaluated in this section. According to Yin (2003; 33), research quality of any empirical social research, including case studies, is commonly established using four tests:

Test	Case Study Tactic	Phase of research in which tactic occurs
Construct Validity	Use multiple sources of evidence	data collection
	Create a case study database	data collection
	Establish chain of evidence	
Internal Validity	n/a	n/a
External Validity	Use theory in single-case studies	research design
Reliability	Develop case study database	data collection
	Use case study protocol	data collection

**Table 3: Case Study Tactics for Four Design Tests (Adapted from Yin, 2003; 34)**



Yin (ibid) states that internal audit is of concern for evaluating the quality of case studies of explanatory or causal nature only. The research problem and research questions (see Sections 2.3 and 2.5) clearly illustrate the exploratory nature of the current research. Hence internal audit is excluded from the evaluation of the quality of research. Each of the tests (excluding internal validity) are now described in detail and applied to the current research.

### **3.4.1 Construct Validity**

In this section, the test of construct validity is described. Construct validity is one of four tests used widely in assessing all kinds of social science research methods (see Kidder & Judd, 1986). It is used in establishing the correct operational measures for the concepts being researched (Yin, 2003, 34).

Firstly, the principle of multiple sources of evidence and data triangulation is explained. Secondly, the principle of chain of evidence is presented.

#### **3.4.1.1 Multiple sources of evidence**

Multiple sources of evidence were used in the form of both qualitative and quantitative data. Four types of triangulation are discussed in the context of using multiple sources of evidence in research (Patton, 1987): Data triangulation, investigator triangulation, theory triangulation and methodological triangulation. For the purpose of this section, only data triangulation is relevant (Yin, 2003; 99), as it was used to collect data from different sources.

Preliminary interviews were conducted in order to focus on the relevant issues from the start. The questionnaire was used to gather the larger set of quantitative data upon which the analysis is based on. Observations were used to collect qualitative data and also the findings of past research were used in the theoretical foundation. In addition to the above mentioned sources of evidence, company intranet, website and earlier studies were used.

#### **3.4.1.2 Chain of Evidence**

The chain of evidence makes it possible for the reader of the case study to follow the derivation of any evidence, ranging from initial research questions to ultimate case study conclusions (Yin, 2003, 105). This is described in Section 3.1.1: The Components of Research Design. The data gathered in this research is based on questions that were derived from the theoretical framework. This theoretical framework was built upon the research gap, research objectives and research questions.

### **3.4.2 External Validity**

This test is concerned with the problem of knowing whether the findings of this study can be generalized beyond this case study. This test cannot be concluded upon, as the findings of the

current research should be tested against another case. Some aspects of this research are concretely related to the specific company researched and therefore may not be generalizable as such.

Researching multiple companies and comparing results for validating generalization is not in the scope of the current research and hence has to be left for further research. However, this is left as a possibility for further research, as is defined in the following section.

### **3.4.3 Reliability**

The main principle of this test is that if a later investigator followed the same procedures and conducted the same case study again, the later investigator would arrive at the same findings and conclusions as the current one (Yin, 2003, 37). This has been made possible by building a case study database, which is described next.

#### **3.4.3.1 Case Study Database**

The data collected with the questionnaire was put into a database. The data can hence be subject to a separate, secondary analysis, independent of any reports by the original investigator (Yin, 2003; 101). Also the findings of the interviews were all typed into and accepted by the interviewees themselves.

#### **3.4.3.2 Case Study Protocol**

In order to comply with the case study protocol (Yin, 2003; 69), the following sections are incorporated or used in the current study:

- An overview of the case study project
  - Chapter 1: Introduction – Which identified the objectives of the research, the main research questions and constructs used in this research.
  - Chapter 2: Literature Review – The perspectives adopted by the research and the argument linking the buildings block of the theoretical framework.
- Field procedures
  - Chapter 3: Methodology – In which the research methodology is described and justified.
- Case study questions
  - Chapter 3: Methodology, Sections 3.2 and 3.3
- A guide for the case study report
  - Chapter 4: Findings and Analysis



As suggested by Yin (*ibid*), the overview covers the background information about the research project, including relevant readings. Also definitions of central terminology are assessed. Field procedures are described in the current chapter on methodology. Also the actual questionnaire is enclosed in the appendices. The case study questions are covered also, and are also categorized in Section 3.3.2.1 to illustrate the connection to the theoretical framework and the hypotheses.

The guide for the case study report comprises of the plan for the reporting of the findings. The findings are grouped according to the hypothesis that the question addresses. As some of the questions were not directly related to a proposition, those findings were presented separately.

This concludes the chapter on methodology. In the next chapter, the findings of this research are presented together with the analysis of these findings.

## 4 Findings and Analysis

In this chapter, the findings of the various stages of the research process are presented, followed by the conclusion and recommendation in the next chapter. The data was collected between year 2005 and 2006. The preliminary interviews were conducted at the end of 2005 and the questionnaire was conducted during the autumn of 2006. Observations took place during all this time.

The findings of the first two research methods, observations and preliminary interviews, are presented first. These findings were used in drafting the final questionnaire in order to be able to increase the focus of the questionnaire. These serve the purpose to act as background research for the main data collection method of the research, the questionnaire. The theoretical framework was used as a background for the questions in both the preliminary stage and the final questionnaire.

### 4.1 Observations

It should be noted that the observations were made from the perspective of working in the Finnish subsidiary, Fujitsu Services Oy. Therefore they represent only that single unit's perception, technology, infrastructure and processes. However, observations about internal and international communications have a more universal quality to them.

#### 4.1.1 Fragmented Information Systems – A Need to Integrate

The information systems are *functionally orientated*, in the way that even though they may be adequate for collecting, recording, analysing, storing and distributing data, there may be a lack of *integration* between data systems. Therefore the flow of information between units is in many cases manual or 'on demand'. As a general consequence due to this problem, the amount of implicit knowledge is unnecessarily high. In addition, even though if the knowledge has been recorded (made explicit) in one system, it might not be available when needed by a user who does not have access to or awareness of that system. This may lead to confusion of who to contact, longer waiting times and at worst, the employee not getting the information needed.

Another outcome to leading the road to fragmented information systems and records is that they are increasingly difficult to consolidate and integrate. If the information resides in multiple places within the organization, it is very probable that future needs are fulfilled with additional information systems that are not integrated to the other systems. The more temporary solutions or fixes are applied and the longer the integration projects are put off, the more expensive solving the problem becomes.



The implication of fragmented information systems for the current research is that in order for the cross-border transfer of technology (knowledge) to be at optimum, the knowledge should be organized in such manner that it can be accessed easily and logically by the employee – and built in such manner that in the future these information systems could be integrated internationally.

#### **4.1.1.1 Corporate Intranet – Country-unit Intranets**

Local intranets are not connected in any way. Even though this is not necessarily an essential function, it still would be beneficial for the employees to have a clear vision of the structure of how the local intranets are positioned in the corporate intranet structure. In addition, the European level intranet requires authorisation and does not have a clear structure. There is no umbrella-level portal site for the whole of Fujitsu Group.

There is a ‘global phonebook’ existing in the intranet, but whether it is up to date is unclear. It is also unclear, whether the information stored in the phonebook could be used by other systems. Such as skill-profiles or specialist information cannot be recorded in the phonebook.

A global skill-register exists, but no corporate level efforts have been put in to enforce the use of it. It is not mandatory to keep one’s profile updated and the register does not work in all of the subsidiaries. The system is slightly fragmented, not up to date and hence the interface is not easy to use.

#### **4.1.2 Non-Uniform Organizational Structure of Units**

There have been efforts to unify the organizational structure, hierarchy and job descriptions of country-units. However, this work is still in progress and due to changes in recommended structure, some units have had to revise their organization.

The benefits of having a uniform set of job descriptions/titles and structure are clear in cutting confusion and increasing the ability of the employees in finding the relevant contact persons in other units.

#### **4.1.3 “Not Invented Here Syndrome” (NIH)**

As the Finnish subsidiary is active in R&D-sense, there is certain scepticism towards new innovations stemming from elsewhere, mainly UK. This seems to be mainly due to the differences in the market environment of UK, the primary source from where new products are introduced. Differences of the market environment cause different emphasis on the things that are developed and hence the innovations born in UK may not be fully compatible to the Finnish market. If a number of incompatible or outdated products or services are introduced and then fail time after

time, it seems to enforce the NIH-syndrome (Katz & Allen, 1982), especially against the country from which the innovation is originated from (Technology Supplier).

The same seems to work the other way around (Finland to UK). The reason may be the lack of resources, but the UK headquarters seem to be more active in 'pushing' products or services from UK to subsidiaries, but not as active in learning what new products or services are available in those subsidiaries. This phenomenon applies especially to Finland, as it is the only European subsidiary with R&D activities. Increasing resources could be the solution, as there does not seem to be mechanisms to see "scanning" the subsidiaries as productive work. Therefore employees in UK may not have an incentive to allocate time and other resources to this kind of activity.

#### **4.1.4 Effect of Language Skills**

There are times when a certain person needs to identify the innovation and act as a 'catalyst' for the technology transfer to take place. For example if foreign-speaking consultants or 'task forces' come and introduce innovative things, the effect of language can be substantial. Especially if the participants are not willing to address their concerns or questions, the technology transfer process can be watered down by inefficient exchange of knowledge. This has been noted by other researchers resulting in 'language nodes and gatekeepers' and social exclusion.

Communication has been found to centralize in the hands of employees with greatest relevant language skills (see e.g. San Antonio, 1987; Lahtinen, 2000; Charles & Marschan-Piekkari, 2002). Hence these individuals act as 'language nodes'. Another view has been for these individuals to act as 'gatekeepers' as they can control the flow of information (MacDonald & Williams, 1994, 123).

#### **4.1.5 Effect of Differences in Absorptive Capacity due to Technical or Business Backgrounds**

The people representing the technology supplier and recipient were in some cases from very different backgrounds. In the IT-industry, there is a coarse division between business and technology-oriented people. Even though this is a very generalized and strict separation and there are many shades of grey in between, the technology transfer process or exchange of knowledge is not going to be efficient unless the participants are communicating using the same terminology, views and mindset.

It has been found that training of employees is a significant factor in boosting absorptive capacity (Minbaeva et al., 2003, 596). The other two main prerequisites for high absorptive capacity of a subsidiary were found to be ability and motivation (ibid). It could be argued that, training affects ability and motivation facilitates learning and improving ability.



#### **4.1.6 Lack of Information about Other Subsidiaries**

Information about the people, markets and capabilities of subsidiaries that are involved in the technology transfer is in some cases lacking. This causes confusion about how the technology transfer should be initiated, who to contact, the viability of the technology being transferred and so on. Many times confusion and lack of linguistic or cultural self-confidence seems to lead to negligence and slackness. This can lead into kind of a “Shy Neighbour”-syndrome, which combined with the NIH-syndrome causes total inactivity and silence between the two subsidiaries (Figure 12).

##### **4.1.6.1 Lack of Market Knowledge across Units**

Quite understandably, different units cannot have a comprehensive view of the market conditions of other units. This can lead into confusion over the potential markets when, for example, exchanging or sharing information on production models, products or services. There may not be a good way other than increased communication to tackle this dilemma, but however it should be noted as an important factor in efficient exchange of knowledge and innovation.

Existence of such knowledge can translate straight into measurable benefits. For example partnership agreements made on local level could be done by the headquarters as global partnership agreements. Therefore economies of scale or volume discounts would step into the picture, hence benefiting not only the individual country unit, but the whole organization.

##### **4.1.6.2 Cultural Differences**

Cultural differences were observed to play a role, especially in communication between Finland and UK. Understandably, there was no considerable effect of culture within and between the Nordic countries. However, different communication culture and working practices resulted in some confusion and passivity between Finland and UK. In some cases, when action was required from UK counterparts, the interaction came to a halt.

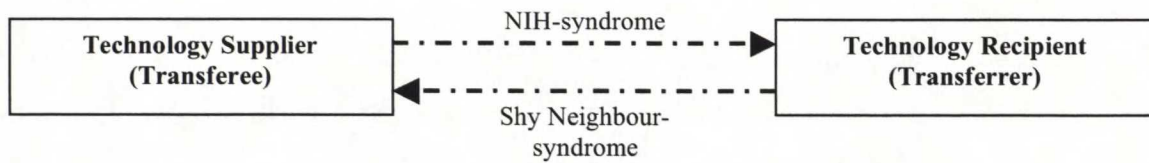
##### **4.1.6.3 Language Diversity**

Differences in language skills caused inactivity in the exchange of knowledge in some cases. Even though both sides might have the necessary language skills to understand each other, insecurities about using a foreign language can cause passivity. Please see Sections 4.1.4 and 4.1.7 for literary references relevant to language diversity.

##### **4.1.6.4 Shy Neighbour -syndrome**

Cultural differences, the effects of language diversity, lack of understanding between the technology transferees and differences in the level of knowledge or backgrounds can lead to total halt of technology transfer and knowledge exchange. I have named this phenomenon the “Shy

Neighbour”-syndrome (see Figure 11 below). This syndrome results in inactivity, avoiding of interaction and passivity, which can lead into severe inefficiencies within the technology transfer process. In this case, more interaction and use of the foreign language could remedy the situation in



**Figure 11: "Shy Neighbour"-syndrome Described**

building the individual’s confidence. As seen in Figure 11, “Shy Neighbour”-syndrome works in the opposite direction compared to NIH-syndrome. The problem is that the recipient does not give enough feedback or ask questions required to complete the ITT-process.

#### 4.1.7 Summary

The issues that were identified by direct observation are not a surprise or unexpected as most of them have been identified in the related business communications and management literature. For further exploration of language issues please see the suggested works<sup>18</sup>.

Observations were also made on ‘NIH-syndrome’ (Katz & Allen, 1982). However, this evidence is in contradiction with the findings from the questionnaire, which suggests that NIH is not a major issue in cross-border flow of innovation and technology transfer. It could be that NIH is a superficial attitude, which does not have a concrete impact. In addition, the lack of language skills can affect so called ‘shy neighbour syndrome’, which means that even though all of the other prerequisites of technology transfer are in place, technology transfer is hindered by lack of common language. Individual employees may therefore seem inactive due to shyness or embarrassment of their language skills.

Findings about the lack of information between subsidiaries however were in line with the questionnaire findings. The lack of integration between information systems (e.g. intranets) possibly contributes to this finding.

## 4.2 Preliminary Interviews – Open Questionnaire Related Findings

The findings from the preliminary interviews are presented in the following structure; the subheadings represent the main topics of the questions presented in the questionnaire. Then the answers from the various respondents are analyzed under these subheadings and a summary table

<sup>18</sup> e.g. Piekkari et al. 2005, 333; Bargiela-Chiappini & Harris, 1998; Nickerson, 2000, 1999; Marschan et al., 1997. Numerous recent studies have also addressed the issue of cultural differences and diversity (see e.g. Kirby & Harter, 2001; Raatikainen, 2002; Rajan & Harris, 2003; Rozenzweig, 1998; Orlando, 2000).



with the issues that were most frequent among the interviewees can be found at the end. In other words, the issues that were agreed to be of most relevance by most of the managers interviewed are presented. These interviews took place at the end of 2005, before the actual mass questionnaire was designed.

The main purpose of the preliminary interviews was to find the broad trends and main issues that the management sees within the scope of the current research. This greatly helped in defining the questions and the formulation of the mass questionnaire.

#### **4.2.1 Importance of Knowledge Transfer from Subsidiary to the Headquarters**

The answers to this question were quite well aligned and congruent. The most important thing that the respondents agreed (86%) was that subsidiary to headquarters communication leads to larger markets for the local solutions. In the shared second place (57%), came sharing R&D costs and financial coordination. This result is logical in the sense that if financial considerations are made for the R&D expenses, then certain financial coordination mechanisms must be in place too. It is worth noting, though, that financial coordination is a much larger entity than what sharing R&D expenses is. More about financial coordination can be found in the recommendations section.

The third most important thing (43%) was shared between the internal spreading of innovations and coordination. These can also be seen as complementary and slightly overlapping concepts, however with the exception that with coordination, the respondents wanted to stress the importance of headquarters acting more purely as the facilitator of the spread of innovations. In other words, the role of headquarters could therefore be seen not as a R&D centre, but rather the facilitator and coordinator of the flow of innovations between the subsidiaries.

In the fourth place (29%) are standardization and best practices. These were bundled into one, as they can be seen to mean the same thing. What this means is that certain global standards/best practices of products, services or processes are put to place, that may provide scale benefits and international credibility.

In the last place (14%), came scanning the country units and opportunities for employees. Scanning the country units is closely similar to coordination, so if these two were combined, they would be supported by 57% of respondents. Opportunities for employees is a valuable addition, because it could prove to be a powerful incentive in order to motivate employees in more proactive exchange of knowledge, leading to more efficient technology transfer process as well as more dynamic and streamlined flow of innovations across borders.

#### 4.2.2 Main Challenges to Knowledge Transfer from Subsidiary to the Headquarters

In this question there were numerically more points about the challenges, but also the answers were more harmonious. The first place (43%) was shared by five problems, which represent quite fundamental issues that are not new in either management literature or everyday work:

- Lack of financial Best Practices, Budgetary & Cost Sharing Models
- "Not Invented Here"-syndrome
- Problems associated with measuring the results of R&D
- Communications Issues
- Cultural Differences

The second place (29%) comprises of three issues:

- Administration & Bureaucracy, "Unproductive Work"
- Balance between control and innovative freedom
- Ability to Absorb

Here it was seen that the exchange of information from subsidiary to headquarters comprises mostly of reporting and administrative duties, which are seen as "unproductive work". There was also concern about the ability of the headquarters to absorb knowledge, technology or innovations. The innovative process is also seen as flourishing in "uncontrollable" ways, hence having the right balance of control and freedom is essential. The problem is finding this balance, because if freedom is the key ingredient to innovation, then control is the key ingredient to spreading them efficiently.

In the last category, four things were mentioned:

- Informal Networks
- "Not in Sight, Not in Mind"
- Differences in Market Environments
- Watering down Solutions

Relating to communications issues, informal networks are seen to have an effect. Researching informal networks is a fairly new research topic and is quite a large research topic. Also, there is a lack of global vision or mindset, and employees as well as management, quite understandably, are only concerned about local issues, hence "Not in Sight, Not in Mind". Also, differences in market environments and maturities were mentioned. This has direct implications to ability to absorb knowledge and innovations, as all markets are in different stages of maturity. Again, connected to the same theme, a risk of mutating solutions during the transfer process in such way that the original solution is watered down and not fully understood was mentioned.

The lack of development targets was also mentioned during the interviews.



### **4.2.3 Subsidiaries: Sales or R&D -units?**

Units are seen as being primarily local sales and servicing units (71%) with R&D centres being exceptions. Also, it was mentioned by a respondent that the problems described in the section above stem from the fact that units are seen as sales units. Hence they have not been given the opportunity to develop the processes and capabilities of acting in a more varied role, even though the potential could be there.

The Finnish country unit is seen to be a rare exception to the global norm. This was backed up by the fact that Finland is an extremely profitable subsidiary, but also it was pointed out that the Finnish subsidiary has a huge array of know-how, technical knowledge as well as a long history of R&D-activity. But the view was, that Finland needs to remain as profitable, in order for the R&D activities to be “allowed” to continue on a local basis. Also, the lack of development targets was mentioned, which however is more relevant to the former question, hence it is added under the former subheading.

### **4.2.4 The Importance of Innovation**

All of the respondents (100%) agreed that innovation for the Finnish subsidiary is very important. Two of the respondents did not elaborate on the reasons, but the other covered some interesting and important reasons for the importance of having the ability and facilities to innovate. They are as follows:

- Value Added through Local Adaptation (43%)
- Growth, New Product Areas (43%)
- Motivational Factor: Keeps good people in (43%)
- Organizational Culture, History (43%)
- More Efficient Production Models (14%)

### **4.2.5 Horizontal Technology Transfer between Subsidiaries**

Again, all of the respondents (100%) agreed that having a horizontal connection between subsidiaries, without a centralized ‘push’ of offering from the headquarters, would be beneficial to all parties. A number of considerations were pointed out concerning ‘peer to peer’ exchange of knowledge:

- Already happening through Informal Networks (43%)
- Need for coordination by the headquarters (43%)
- Importance of having “Task Forces” (43%)
- Shared programs combined with local liberty and decentralization (14%)

- Internal Marketing (14%)
- Absorptive Capacity between subsidiaries is better than between subsidiary and headquarters (14%)

The important thing is that the horizontal communication is already taking place through informal activities. It should be noted, that this exchange of technology or innovation is not formally conducted. This leads to the situation where the headquarters does not necessarily know about these developments, hence it is impossible to scan these activities or estimate budgetary implications. The next point about the need for coordination from the headquarters very much enforces the notion that the headquarters' role is more as a coordinator and facilitator of the flow of innovations and technology transfer, rather than the main source of technology or innovations (Technology Supplier).

Having internal "Task Forces" is found to be a popular way of transferring technology between country units. A Task Force consists of experts of a certain solution that can efficiently transfer different technologies or innovations to other units. Also internal marketing was mentioned to having a role in getting new products to spread across borders.

Shared programs were mentioned to be beneficial, but they should be complemented with freedom at the local level and parallel programs with decentralized management.

The last point is that the absorptive capacity between subsidiaries is better than between subsidiaries and the headquarters. This is not necessarily the case always, but is nevertheless a very important point. If horizontal connections could be such that the flow of innovations and technology transfer process would not be a 'push-process', but rather the subsidiaries would have access to something like a 'corporate search engine of products, services and innovation', then the flow of knowledge could be self-guided. Having less middle-men or steps in the process would mean that the risk of the content being distorted by "Chinese whispers", differences in absorptive capacity, documentation and language barriers would be lessened.

#### **4.2.6 Headquarters' Role in Scanning Country Units' R&D-activities**

Almost all of the respondents (86%) agreed that scanning the country units' R&D activities is a good thing. However, it was also pointed out that the headquarters should not intervene in the innovation process, because then they may disrupt it severely.

All of the respondents brought up these interesting points:

- The headquarters should concentrate mainly on large scale R&D projects and potential new areas of R&D



- The identification of similar R&D projects is important, as then resources could be shared
- Requirements of country units should also be scanned

An idea about the Finnish subsidiary acting as a R&D bridge from Japan to Europe was also introduced. This would facilitate the ‘translation’ of Japanese innovations to suit the European markets better. Hence it would be easier from the start to adapt them to suit local needs.

#### **4.2.7 Country Units’ R&D-expenses**

A number of general models of financing R&D expenditure are proposed here. The interesting thing here is that when it comes to financing R&D costs, the simpler the model, the better. Hence one model should be chosen as a best practice as a corporate decision. The propositions are as follows:

- Headquarters should finance long-term and large projects. Country units should finance local, individual and smaller projects.
- Profitable units should be allowed a larger percentage of the profits for R&D
- The unit that sells the finished product should pay for the R&D expenses

#### **4.2.8 Country Units’ R&D-expenses when the Innovation has International Value**

Some respondents incorporated their answer to this question in the answer to the previous question. However, most agreed (57%) that in the case of an innovation that has international value, the headquarters should have a budget for strategic R&D and “beneficial for all” projects. In other cases, country units would pay each other, i.e. the unit that sells the product pays for it. According to the fact that financial coordination was shown to be an important factor in the previous questions, certain best practice corporate coordination would be needed. Licensing and royalties were mentioned (43%) as well as other kinds of one-off agreements between subsidiaries (29%).

#### **4.2.9 Summary**

In this section, the main issues that were identified in the preliminary interview stage are summarised. This summary used together with the theoretical framework will form a basis for the topics covered by the mass questionnaire. Because a large number of issues came up in the preliminary interviews, as expected, only the most central ones are going to be researched further. This is because otherwise the scope of the questionnaire would be too large and the time expected of the respondents would grow to be too long. In the following table, top three issues to each question are listed.

<b><u>1. Why is the transfer or flow of new products and production models from a country unit to the headquarter an important thing? Benefits?</u></b>	<b><u>2. What do you see as the main challenges to this?</u></b>	<b><u>3. Does the headquarter see the country units more like as R&amp;D-centers or sales units? The Finnish case?</u></b>	<b><u>4. How important is innovation and innovating to the Finnish country unit?</u></b>
Larger markets	“Not Invented Here”	Local sales units	Very important
Sharing costs	Budgetary and cost sharing models	Finland is allowed to R&D if profitable	Growth through new product areas
Financial coordination	Communication issues / Cultural differences	R&D centers are exceptions	Motivational factor

<b><u>5. Would a 'horizontal connection' between the country units be beneficial?</u></b>	<b><u>6. Should the headquarters be more active in scanning the country units' R&amp;D activities?</u></b>	<b><u>7. Who should pay for the R&amp;D-activities of country units?</u></b>	<b><u>8. Who should pay for the R&amp;D-activities of country units, if the local innovations can be used commercially in other units?</u></b>
Very good	Yes	Small and local projects by the country unit	HQ for strategic “beneficial for all” projects
Already happening: Informal Networks	The HQ should not intervene in the R&D process	The unit that sells the finished product	Licensing & Royalties
Need for HQ coordination	Large scale R&D projects	Long term and large projects by HQ	Smaller scenarios: Units pay each other

**Table 4: Summary of major results of the Preliminary Interviews**



### 4.3 Questionnaire Related Findings

The final questionnaire was designed on the basis of the theoretical framework and the results of the preliminary interviews. The importance of the preliminary interviews should be noted as they gave a very practical insight that balanced out the academic nature of the theoretical framework.

This section presents the findings of the main questionnaire by exploring the replies relevant to a specific question. In this way, more in-depth analysis on the detailed findings on a specific question can be represented. The more general findings are grouped under the section 5.3.1, which follows.

#### 4.3.1 Demographic Findings

The total number of responders was 588. The overall demographics of this group of responders is presented in this section, including nationality, age structure, gender respondent unit and work description. Also education background of the responders is shown.

##### 4.3.1.1 Respondent Nationality

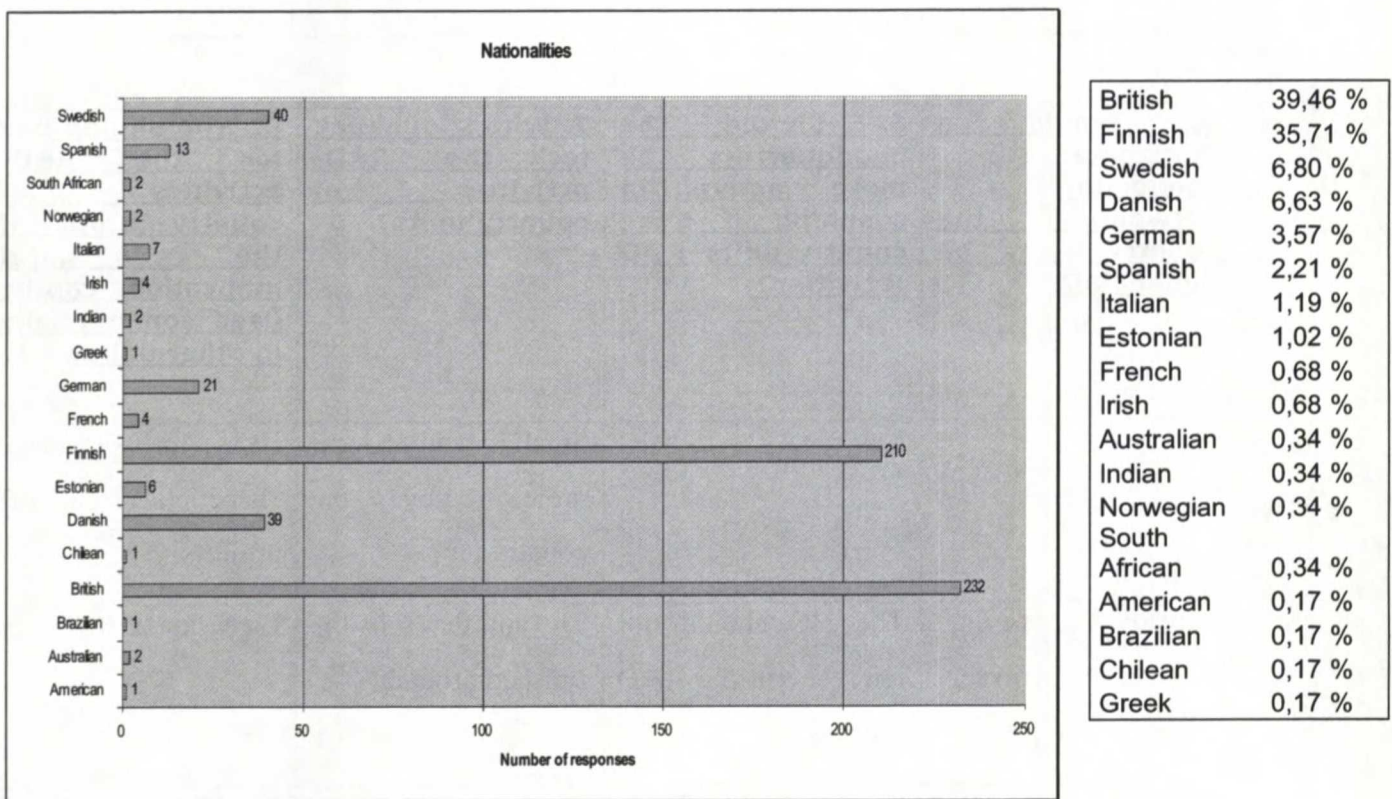
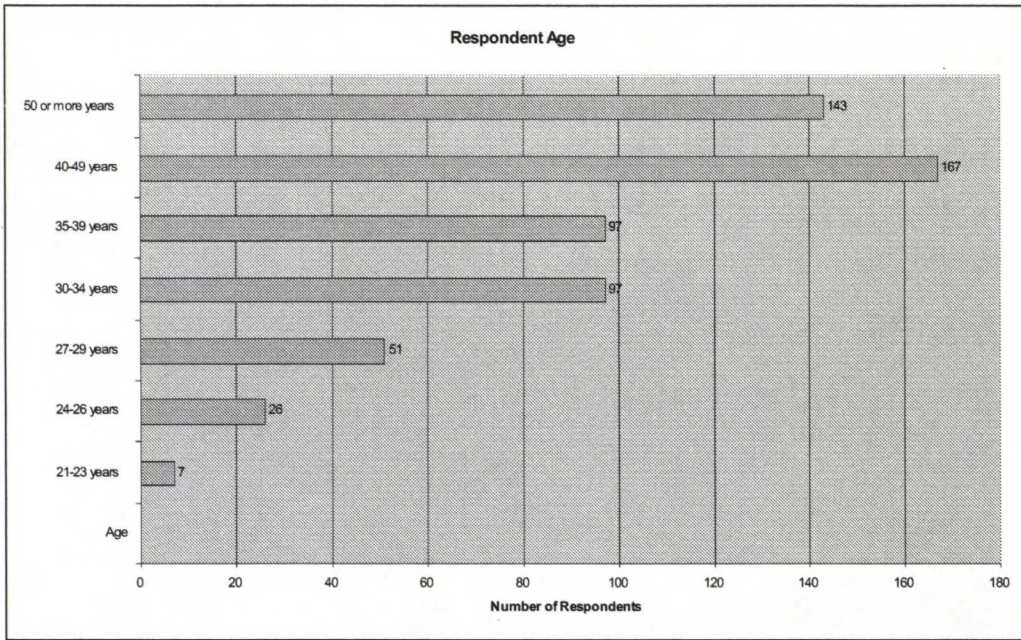


Figure 12: Nationalities of the respondents

It is no surprise that the respondents are mainly from the largest units of the company. It seems that the workforce is not very international in Europe and that there is not much expatriation even within Fujitsu, with some exceptions of course.

### 4.3.1.2 Age Structure



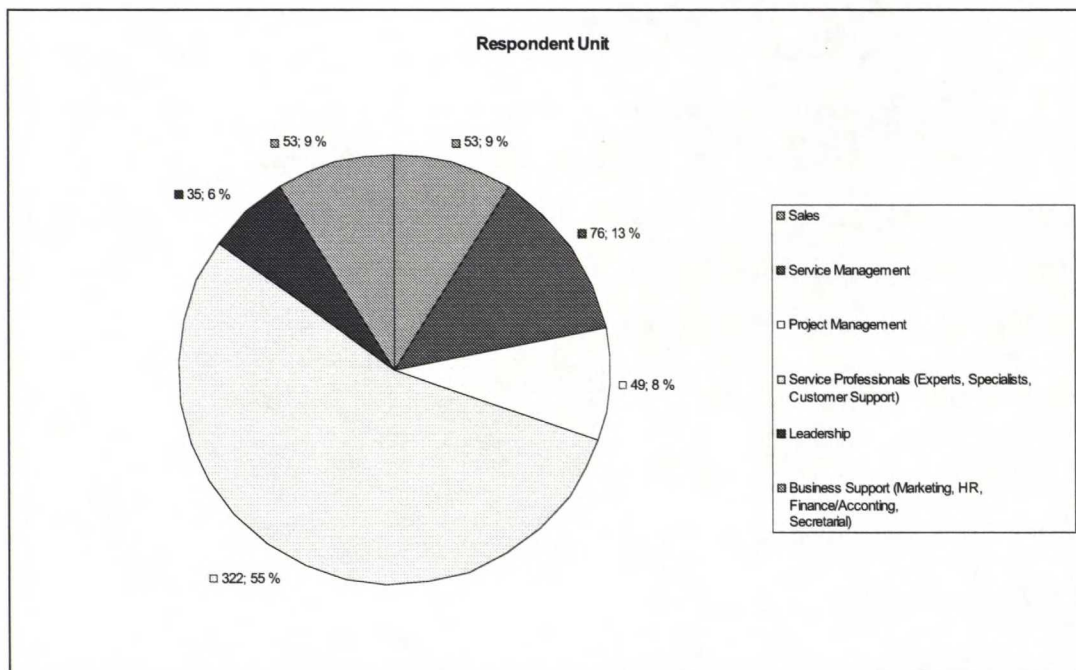
**Figure 13: Age structure of the respondents**

What was interesting to see is that most of the respondents are over 35 years old. Most of the respondents described themselves as Service Professionals or Experts (54.8%).

### 4.3.1.3 Gender

81.5% of the respondents were male and 18.2% female. 0.3% of the respondents did not answer.

### 4.3.1.4 Respondent Unit



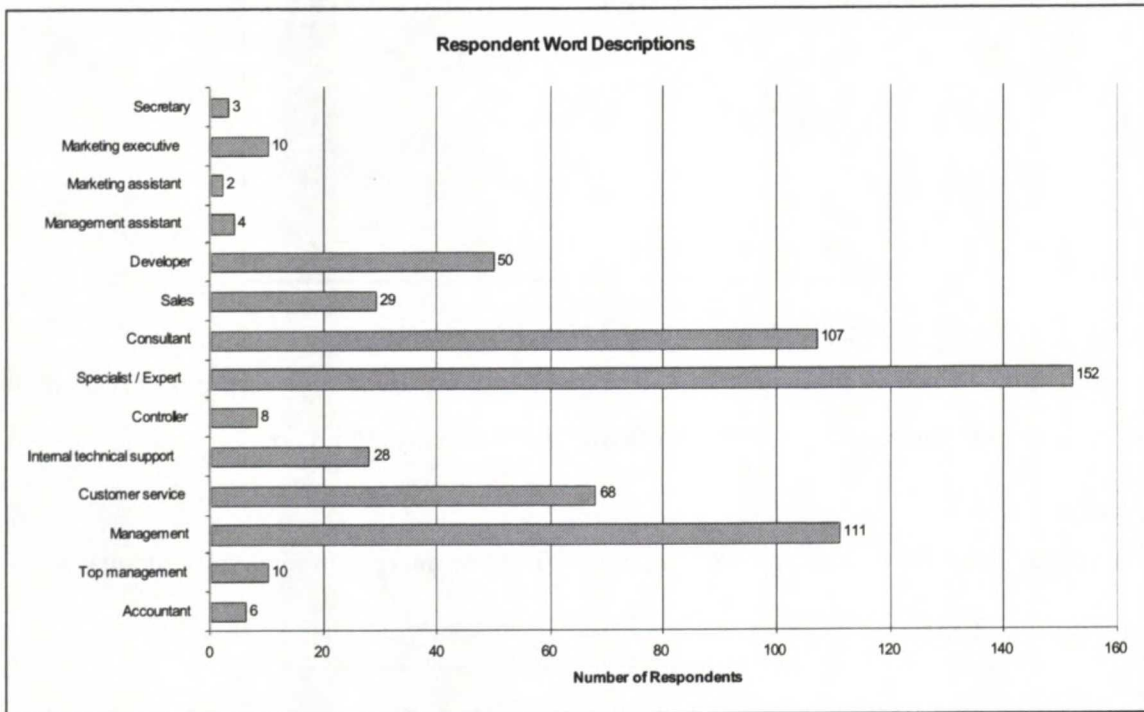
**Figure 14: Respondent unit**



More than half of the respondents (54.8%) described themselves as belonging to Service Professionals group. After that, the largest groups were Service Management (12.9%), Sales (9%), Business Support (9%), Project Management (8.3%) and Leadership (6%).

Even though there is a large majority in the service production group, it was surprising how many higher management responses this research attracted. Compared to the relative number of employees in each group, this result is considered good.

#### 4.3.1.5 Respondent Work Description



**Figure 15: Respondent Work Descriptions**

As mentioned earlier, largest group of respondents would classify themselves as specialists or experts. However, there are enough responses in the other categories for reliable and fair representation of varied functions. The following work descriptions are represented sufficiently well in order for generalisations and comparisons to be made:

- Specialist / Expert (25.9%)
- Management (18.9%)
- Consultant (18.2%)
- Customer Service (11.6%)
- Developer (8.5%)
- Sales (4.9%)

### 4.3.1.6 Education

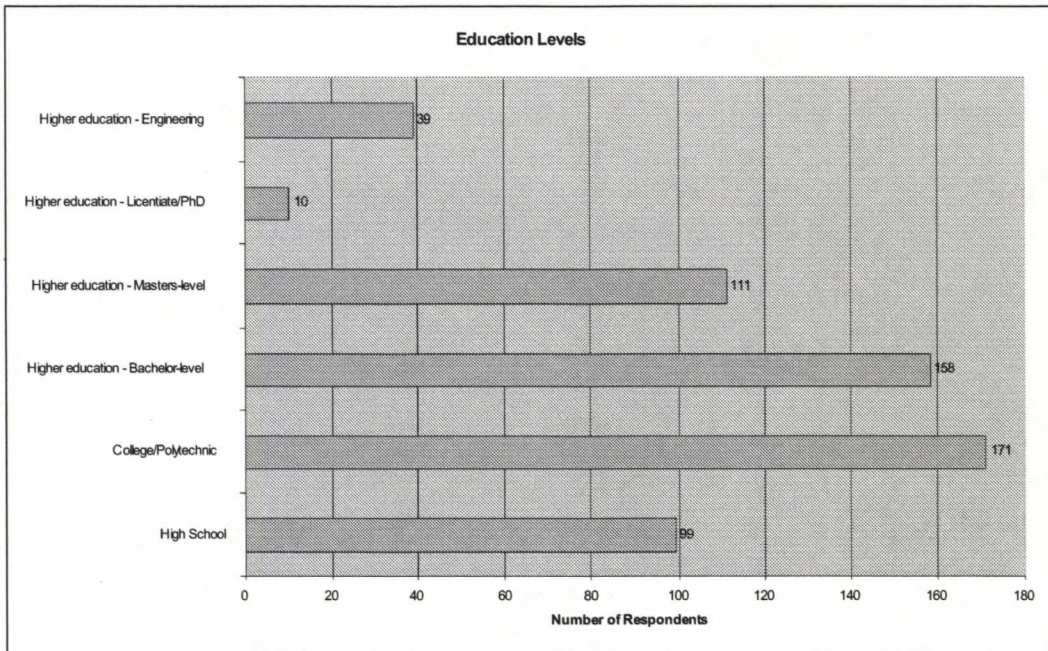


Figure 16: Level of Education

There were approximately equal numbers of respondents from college/polytechnic educational background as there were bachelor-level graduates at 29.1% and 26.9%, respectively. Master's level graduates were slightly less at 18.9% and high school at 16.8%.

As was expected, the majority had a technical education (59.9%). Business or commercial education came in second with 22.4%.

### 4.3.2 Findings in Relation to Hypothesis 1

Hypothesis 1 was stated earlier (Section 3.6.1.3) as:

- **Hypothesis 1a:** No clear process for inter-unitary technology transfer is seen to exist.

In addition to the hypothesis, the questionnaire researched whether the responders think that there is a need for such a process. In this part, the findings of the relevant questions to this hypothesis are set out and explained.

#### 4.3.2.1 Does a Process Exist for Inter-Unitary Technology Transfer?

In Question 2 of the questionnaire, the responders were asked:

*“Do you know what to do when contacting Fujitsu people abroad in order to find out about products for example? Please rate from 1 to 5, with 1 being poorest and 5 being best.”*

The responders were then given three basic areas in which to initiate the process of technology transfer and they were asked to rate them. These areas were:



- a. Which people to contact
- b. Sufficient communication channels
- c. Access to foreign units' intranets

The question was worded so that it gives practical and concrete areas of technology transfer to be rated, rather than just bluntly asking whether there is a technology process or not. In this way, the responders are given equal opportunity to give their opinion on the matter as perception of "process" per se may differ across the responders.

It is clear from the responses that all of these areas are seen as hugely problematic. The most problematic area is seen to be the lack of contact people (with 70% rating it 2 or below), followed by access to foreign units' intranets (with 63% rating it 2 or below). Sufficient communication channels were seen to be poor or very poor by 60% of responders.

In Question 4 of the questionnaire, the responders were asked:

*"How easy would you say it is to contact foreign units and to find information you need?"*

Only 6 responders (1% of total) felt that it is very easy to find information from a foreign subsidiary. 127 responders (22% of total) felt it was easy, 240 (41% of total) felt it was not very easy and 215 (36%) felt it was difficult or very difficult.

As the responders saw these basic areas of technology transfer process initiation to be this problematic, it can be concluded that a clear inter-unitary technology transfer process does not exist or if it does, it is not followed. Now that there is no evidence that an efficient process exists, next section determines whether a need for such a process exists, according to the responders.

#### **4.3.2.2 Is There a Need for a Process for Inter-Unit Technology Transfer?**

In Question 10 of the questionnaire, the responders were asked:

*"Do you think that there is a need for a clear process covering all aspects of transferring technology (products/services/production models) from foreign units into your unit? (including financial, marketing, technological, etc. aspects)"*

What is surprising is not that the majority of responders thought that there is a need for a process for transferring technology, but that 23% of responders thought the opposite. 77% thought that there was a need for it.

The responders were given an opportunity to give comments on the question. Some interesting comments were made. Here is a selection of them (please see Appendices for the full commentary):

*“There is a waste of resources to develop the same matter in many separate countries.”*

*“How else are we supposed to become a pan-European organisation if we don’t communicate and share?”*

*“More cooperation, less local implementations would be welcome”*

*“A pull mechanism for obtaining skills from foreign units would be preferred, but the closed information culture and competitive setup of the organisation effectively stops all attempts. First a culture of openness would have to be adopted.”*

*“There are units ‘re-inventing the wheel’ all over Fujitsu.”*

Not only is there a need for a clear set of instructions – a process – for inter-unitary technology transfer, but it is also suggested that sharing of knowledge would result in less “re-inventing the wheel”.

Drafting such a process is not without challenges, as one comment points out: *“The process has to be built each time in a different way depending on lots of drivers”*. This is a valid point and should be taken in account when designing a set of instructions of how to commence when initiating technology transfer. It should also be noted that this only applies to the transfer of more formal products or services, rather than just knowledge. Knowledge and innovation can also flow through open communication channels with no formalized process.

Another worry that stems from the commentary is bureaucracy: *“No, because there is a danger of it being too bureaucratic: some processes are necessary, but ‘all aspects’ sounds in danger of being too heavy”*. Again, the process might be best implemented as ‘instructions’ and ‘best practices’ that can be applied according to the situation, if dealing with transferring formalized technologies. As said before, knowledge or innovation could flow more freely.

#### **4.3.2.3 Summary**

It seems that there is evidence for the accuracy of both parts of Hypothesis 1. The responses reflect the fact that the responders were unsatisfied about the clarity of some rudimentary elements of the technology transfer process and indicated that finding information from foreign subsidiaries is not easy. The responders also felt that such a process would be useful and that it would increase the exchange of knowledge across borders, facilitate the development of Fujitsu towards a pan-European company and make sharing of best practices more efficient, thus decreasing doing the same development work twice.



### 4.3.3 Findings in Relation to Hypothesis 2

Hypothesis 2 was stated earlier (Section 2.6.3.1) as:

- Hypothesis 2a: A clear strategic vision encouraging the flow of innovation and technology transfer is a prerequisite for efficient knowledge sharing management processes.
- Hypothesis 2b: There is a need for better and more open communication channels between international units.
- Hypothesis 2c: The corporate stock of knowledge is fragmented into “Pockets of Knowledge” across subsidiaries
- Hypothesis 2d: The existing communication channels are not widely used.

In this part, the findings of the questions that are relevant to the parts of Hypothesis 2 are set out and explained.

#### 4.3.3.1 Is Sharing of Innovations and Technology Transfer Seen as Fujitsu’s Strategic Vision?

In Question 17 of the questionnaire, the responders were asked:

*“Do you think that it is a conscious strategic vision of Fujitsu to increase innovativeness through cooperation across borders?”*

The vast majority of responders at 74% agreed, but 51% thought that the vision was not defined clearly. 10% of the respondents disagreed with the question and 17% were not sure.

It is clear that interaction of employees across borders is not encouraged clearly as a strategic goal of Fujitsu. Therefore the first part of Hypothesis 2a can be declared accurate as no clear strategic vision was found.

Baetz & Bart (1996, 528) state that mission statements are important for ‘providing’ a common purpose/direction transcending individual and departmental needs. Hence such a statement may provide a part of the solution to improving the flow of innovation and technology transfer between subsidiaries.

#### 4.3.3.2 The Need for Better Open Communication Channels across Borders

In Question 5 of the questionnaire, the responders were asked:

*“How important do you think it would be to have and develop direct channels of communication between the subsidiaries (such as shared intranets, phonebooks, instant messaging, etc.)?”*

The responders were given four alternatives to choose from: Very important, Important, Not very important and Not important at all. A total of 87% of responders found it important or very important to have and develop direct communication channels between subsidiaries. Approximately 13% did not think having or developing direct channels of communication was important.

In findings revealed in further questions, this view was enforced. In Question 11, the responders were asked:

*“Which practical obstacles do you think cause most difficulties in transferring technology and sharing resources between units? (Scaled from 1 being less of a problem to 5 being most problematic)”*

Concerning communication channels, even though they were not seen as the most problematic (which was the lack of knowledge about what other units had to offer), 37% of the responders ranked communication channels as first or second most problematic part of technology transfer or sharing resources.

#### **4.3.3.3 Is the Corporate Stock of Knowledge Fragmented into “Pockets of Knowledge” across Subsidiaries?**

In Question 21, the responders were asked:

*“Do you have an understanding about the knowledge stock (products, R&D-activity, innovations) of other units that you interact with?”*

The replies were as follows:

- Yes: 3.2%
- Yes, but not enough: 41.5%
- No: 41.7%
- I don't know: 13.6%

The replies confirm quite clearly that a small minority considers having a clear picture of other units' offerings and research activities. When combined with results from the next question, a conclusion about the perceived fragmentation of knowledge can be drawn.

In Question 20, the responders were asked:

*“How good an understanding do you think the headquarters has of the value of your unit's: (Scale from 1 being poor to 5 being complete)”*

- Knowledge stock



- *Expertise*
- *Market environment*

In terms of knowledge stock, the responses were varied: 39.3% rated the headquarters' understanding of knowledge stock at 3 (Average). 16.5% thought it was above 3 and 44.2% thought it was below 3. Clearly, the majority thinks that the headquarters' understanding of his/her unit's knowledge stock is below average.

When asked about levels of understanding on the unit's expertise, the pattern was very similar to the previously presented findings. 40.6% of responders thought that the understanding was on average level. 19.6% thought that it was above average. 39.8% rated the headquarters' understanding of his/her unit's expertise at below average.

Approximately the same pattern repeated again when asked about market environment. The headquarters' market environment understanding was seen to be average by 41.8% of responders. 24% thought it was above average and 34.2% thought it was lower than average.

To conclude, most of the responders thought that they themselves did not have an adequate understanding of other subsidiaries' stock of knowledge. A clear majority of the responders also thought that the headquarters had an average or below average understanding of the knowledge stock, expertise or market environment of the responder's unit. Therefore it could be suggested that as responders seem to think that both themselves and the headquarters have an inadequate view of the knowledge resources of individual units.

#### **4.3.3.4 Building Blocks of an Efficient Global Knowledge Sharing Community**

In Question 23, the responders were asked to rate individual 'building blocks' of a knowledge sharing community:

*"How would you rate the following as buildings blocks when creating an efficient global knowledge sharing community (Scale of 1 being not important to 5 being very important)?"*

- *Dedication and motivation of employees*
- *Incentives to share knowledge across borders*
- *An open communication channel such as a forum that employees could use to share knowledge*
- *Management's dedication to monitor this open channel and reward active participants (reimbursements, career advancements)*

- *Clear contact persons in each country*
- *A search engine with skills and specialist knowledge in each employee's profile*
- *Informal networking by more inter-unitary occasions and get-togethers*
- *Information sharing seminars, etc."*

The responders were only asked to rate these 'building blocks', rather than list them in the order of preference. Hence also the possibility of even preferences could come across. In order to rank the results, weighted scores were calculated using the following formula:

When points are calculated for each building block, they were ranked simply according to how many points they acquired. These points were simply calculated by multiplying the score by the amount of votes the particular score got and then these were summed together. Please refer to Section 3.3.2.2 for further discussion of the itemised rating scales and scoring.

1. Clear contact persons in each country (2370 points)
2. Dedication and motivation of employees (2357 points)
3. An open communication channel such as a forum that employees could use to share knowledge (2223 points)
4. Incentives to share knowledge across borders (2175 points)
5. A Search engine by skills and specialist knowledge in each employee's profile (2097 points)
6. Information sharing seminars, etc. (2062 points)
7. Management's dedication to monitor this open channel and reward active participants (reimbursements, career advancements) (2058 points)
8. Informal networking by more inter-unitary occasions and get-togethers (2026 points)

The order of the list is not fully compliant to the hypothesis proposed, but certainly demonstrates a clear and rational logic. Having clear contact people and having a dedicated and motivated workforce have almost the same points. Third are communication channels. It is self-evident that in order for the communication channels to be used, one must be motivated to do that and also know who to try and contact.



The next question explores whether the existing channels are used at the moment.

#### **4.3.3.5 How active are Employees in Using Existing Channels of Communication and Interacting with Other Units?**

In this section, questions regarding usage of existing channels such as Café Vik discussion forums as well as the level of interaction between units are explored.

In Question 3, the responders were asked:

*“Do you use the existing open communication channels such as the discussion forum in Café Vik?”*

The results are as follows:

- Yes, weekly 7.1%
- Yes, monthly 6.0%
- Few times a year 26.7%
- No 56.6%
- Don't know 3.6%

The vast majority replied that they do not use open communication channels such as the discussion forum in Café Vik. Only approximately 13% seem to use it regularly and 26.7% only use it very occasionally. 56.6% of responders do not use these discussion forums at all.

#### **4.3.3.6 Summary**

According to the responses, there is clear evidence that even though a substantial amount of responders thought that Fujitsu has a vision of sharing of innovations and technologies across borders, most of the responders thought that this vision was not clear. The findings of the lack of communication between subsidiaries and the lack of knowledge of other subsidiaries together with the absence of a clear vision suggest that Hypothesis 2a is valid.

A clear majority thought that having and developing open communication channels between units is desirable. Hypothesis 2b can therefore be considered validated. However, it should be noted that this hypothesis only states the need for *better* open communication channels, but does not define how to make the communication channels better. It is also interesting that ‘motivated workforce’ and ‘incentives to share knowledge’ surpassed open communication channels as the most important ‘building blocks’ of a global knowledge sharing community. This is an important and valuable point to be considered when drafting up the managerial implications of the findings, as it is very

logical that motivation and incentives are critical for the success of implementing such things as open communication channels for example.

Validating Hypothesis 2c was divided into two parts. Firstly, responders were asked how well they perceived the headquarters' understanding of the responder's unit's knowledge stock. Secondly, the responder was asked how good his/her understanding of other units' knowledge stock is. In both cases, the results support the hypothesis: The corporate knowledge stock is fragmented into "pockets of knowledge", spread out to individual subsidiaries.

Hypothesis 2d, the lack of usage of existing open communication channels proved correct. However, it should be noted that the question only covered the discussion forums in Café Vik, but when conducting the research, no alternative open communication channels were known of by the researcher.

#### **4.3.4 Other Findings**

In this section, results relevant to questions that did not fall directly within any of the proposed hypotheses are presented. They therefore serve as supporting questions for the research that are of interest to the topic and may provide important information for the section on recommendations and managerial implications. Also further research may benefit from these findings.

##### **4.3.4.1 Local Adaptation or Standardized Products**

In question 9, the responders were asked:

*"Do you see that the products/services your unit offers were 'pushed' to the unit from the headquarters with no local adaptation or local development?"*

- *Yes*
- *To some extent*
- *No"*

The responders were also given an opportunity to comment freely on this question.

Only 8.2% of responders thought that products and services were pushed from the headquarters with no local adaptation. 37.8% thought that the products and services were pushed to 'some extent'. A majority of 54.1% thought that products and services were not pushed to their unit and that the products and services were locally adapted or adaptable.



Here are some of the more interesting comments<sup>19</sup>, (please see the appendices for the complete list of comments):

*"We use local tools even when there would be room for shared/uniform ones"*

*"In the UK there is little visibility of what is happening in other countries. Cultural and business differences in the two environments may mean that the unit taking up the new technology may need to tailor any standard offering to be sensible."*

*"Products were chosen by us."*

*"My line of business was created locally by the demand of the local customers"*

*"We want more products/services from the HQ."*

*"We need products/services that are wanted in our marketplace."*

It seems from the comments, that having uniform ways of doing things is not fully desirable. What is quite clear is that the products/services or production models that are 'pushed' or uniform, should be chosen by the individual unit. The decision whether to implement or internally 'import' those products or services should be by their choice. Secondly, it should be thought of, whether it is possible to produce services in a uniform best practice fashion. And if they can, why they are not produced centrally anyway?

#### **4.3.4.2 Worst Obstacle to Sharing Resources between Units: Lack of Knowledge about other Units**

In Question 11, the responders were asked to rate obstacles to inter-unitary interaction:

*"Which practical obstacles do you think cause most difficulties in transferring technology and sharing resources between units? (Scaled from 1 being less of a problem to 5 being most problematic)*

- *Not Invented Here -thinking*
- *Problems with sharing development or administration costs*
- *Communication issues, language, channels*
- *Cultural differences*
- *Motivational problems of employees*
- *Lack of knowledge of what resources other units have to offer"*

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<sup>19</sup> Spelling mistakes were corrected during the writing of this study

All but the last alternative followed pretty much the same pattern of replies: The majority rated the choice as being in between the scale (please see the appendices for exact voting). However, the last choice, lack of knowledge of what resources other units have to offer, broke this pattern. A clear majority of 67% voted this to be 4 or 5 on the scale, so the last choice rose above the rest as the single on most problematic obstacle to international technology and knowledge transfer. The answers were scored by simply multiplying the score by the number of votes that particular vote received. Please refer to Section 3.3.2.2 for further discussion of the itemised rating scales and scoring. The results were as follows:

1. Lack of knowledge of what resources other units have to offer (2270 points)
2. Problems with sharing development or administration costs (2024 points)
3. Communication issues, language, channels (1827 points)
4. Not Invented Here -thinking (1685 points)
5. Motivational problems of employees (1677 points)
6. Cultural differences (1626 points)

In addition to the above findings, in Question 13, the responders were asked:

*“Do you think that your unit could benefit from innovations and technologies from units in other countries?”*

Almost all of the responders agreed that they would benefit from innovations and technologies from other units: Approximately 90% of the replies agreed that their unit would benefit at least some of foreign units' knowledge. 7.5% replied that they do not know.

#### **4.3.4.3 Effectiveness of 'Hit Teams'**

In Question 16, the responders were asked:

*“Do you think it would be a good thing if the headquarters would form 'hit teams' (with targets and budget) to introduce common offerings of innovative products/services to your country unit?”*

58.8% of responders thought that forming 'hit teams' to spread innovative technologies to their unit would be a good or a very good thing. 27.4% were neutral and 7.8% did not know. Only 6% thought that it would be a bad thing. It is quite clear from the responses that a team actively introducing technologies would be welcomed by subsidiaries.



#### 4.3.4.4 Incentives to Increase Interaction between Units

It is seen by the majority of responders that more incentives are needed in order to boost interaction across units. In Question 18, the responders were asked:

*“Are more incentives needed to increase interaction among units across borders?”*

66.5% thought that more incentives were needed. 8.5% thought that no incentives are necessary, whereas a quarter of responders (25%) did not know. Against this backing, the responders were asked, which incentives they thought were most effective.

In Question 19, the responders were asked to rank certain incentives:

*“Rate how effective you think these incentives for employees are to increase interaction and knowledge sharing between units: (Scale from 1 being ineffective to 5 being effective)”*

- *Cash reimbursements*
- *Career advances*
- *International work opportunities*
- *Certificates*
- *Equipment”*

The responses were scored in a similar fashion to the responses to Question 23 in Section 4.3.4.1, simply by multiplying the score number by number of votes for that score. Please refer to Section 3.3.2.2 for further discussion of the itemised rating scales and scoring. The results are as follows:

1. Career Advances (2200 points)
2. International Work Opportunities (2137 points)
3. Cash Reimbursements (1958 points)
4. Equipment (1745 points)
5. Certificates (1631 points)

The results are clear: Advances in career and possibility to work abroad are preferred over the other alternatives in the selection. These particular incentives imply a need for an active managerial interaction closely tied together with the channels and processes involved with inter-unitary technology and knowledge transfer. In this way, career advances and international work opportunities can be given out to the individuals that contribute significantly to the global knowledge community within the company.

These findings are shared by Doz et al. (2001, 107). They argue that offering incentives such as paying out bonuses to operational staff who contribute to knowledge databases are usually ignored.

#### **4.3.4.5 How Much Interaction Is There at Present**

In Question 6, the responders were asked:

*“How active do you see your unit to be in international technology and knowledge transfer from other Fujitsu units?”*

Whereas 26.5% of responders thought that their unit was at least active in technology and knowledge transfer from other units, 73.5% thought that their unit was not very active, not active or passive.

The findings above can be complemented by results of Question 22, where the responders were asked:

*“How many foreign units have you interacted within the last 6 months? (Estimate if you cannot remember exactly)*

- *10 or more*
- *5 to 9*
- *1 to 4*
- *None”*

Only 7.8% of responders had interacted with more than 5 to 9 foreign units in the last 6 months. This seems like there is a small group of very active employees, but majority interacts with a more limited number of units. 40.8% of responders had interacted with 1 to 4 units in the last 6 months and a staggering 51.4% with no foreign units. Clear conclusions cannot be drawn from these findings though, as no information was available on how various responder-groups answered, or how much overall interactivity with other units the responder-groups had had.

In Question 7, the responders were asked if international technology and knowledge transfer has increased within a year:

*“Has this kind of activity increased in the past year compared to earlier?”*

Approximately 37% agreed that knowledge transfer had increased within the past year. 30% thought it hadn't changed and a clear minority of 2.2% thought it had decreased. Surprisingly, just under 31% of responders did not know. That could be because they do not engage in any kind of



inter-unitary activity, hence making it impossible for them to know whether the activity has increased or not.

In Question 8, the responders were asked about the innovation that stemmed from interaction with foreign units:

“How would you rate the level of innovation caused or coming from interaction with foreign units?”

- Very frequent – We cooperate actively with foreign units to come up with new solutions for our customers
- Frequent – We sometimes come up with new solutions due to international cooperation
- Not very frequent – We have in the past innovated due to international cooperation, but not within the last year
- Not at all – We have never come up with a new solution due to international cooperation”

26.2% of the responders replied “Very frequent” or “Frequent”, which is a fairly satisfactory level. However, 73.8% replied “Not very frequent” or “Not at all”. It should be noted though, that many services are not ‘innovation intensive’. If more than a quarter of respondents thought that they are active or very active in innovating with foreign units, that probably focuses on those services or products that are in R&D-stage.

#### **4.3.4.6 General Comments about the Research**

At the end of the questionnaire, the responders were given an opportunity to freely comment on the research topic and how it was conducted. Some very interesting comments were made and here is a selection of comments. Due to some comments having personal and confidential corporate information included, all of the comments are not presented.

*“This is a good start in interacting with employees across the board which hopefully will help in any future corporate decision making, as in today’s fast moving IT-environment employees should be treated as assets.”*

*“It is very valuable to provide easy access to knowledge and innovation of other units and to establish more active communication channels. But be careful not to push too much to country organisations at the same time. Let countries check and decide case by case whether new services fit to their mid-term plan and local situation.”*

*"I have long experience of collaboration tools outside Fujitsu and have suggested that Fujitsu adopts and deploys many of the tools such as IM, Text Conferencing and Forums to improve communication and reuse. Reinventing the wheel is expensive and time consuming."*

*"I believe that both IRC and forums should be used by Fujitsu, if it is serious about cohesion across borders and multi-national projects."*

*"Knowledge, information and experience sharing can be the key to the creation and subsequent success of innovative solutions. Innovations in their own right should be shared wherever possible as multiple and repeated use shares the costs of development across multiple projects and can lead to a significantly increased return on investment."*

*"Our company has a long way to go to become a global Tier 1 service provider in most areas. I think it is important to listen to those of us who have come from competitors of Fujitsu which have a higher level of maturity and carefully consider the ideas / suggestions to improvements at the strategic levels which are offered. One critical area is the development of a 'Reference Architecture' or delivery strategy."*

*"I am sad to say that the impression that this questionnaire left is that Fujitsu is obsessed with a top-down managed innovation improvement campaign that in my opinion only can fail. I would strongly suggest that Fujitsu instead became a citizen in the Web 2.0 world and started promoting blogging, openness and interaction individual to individual as a way of driving innovation. Innovation happens elsewhere anyway, but Fujitsu can have lots of capability to harvest the innovation!"*

*"Anything that can help to break down barriers and cut across administrative borders must improve innovation, and should raise company morale."*

*"Innovation is not a managed event; it is creating an environment where things happen."*

It is quite clear from these comments that the responders had thought about the issues of this research and had a genuine interest in the field. Some of the responses made raised important points and perspectives that should be taken into consideration not only in this study, but also in future research.



## **5 Discussion of Findings and Conclusions**

In this final section of this study, discussion on the main findings and conclusions of the research are presented. After summarizing the challenges to technology transfer and the flow of innovation distinguished in the research, recommendations are made according to the preferences of responders identified in the research. Where possible, the findings are used to suggest solutions for the problems that were distinguished in the research, but topical literature is also used.

### **5.1 Main Findings – Overall Summary**

In this section, the findings presented above are summarized in order to clarify the points that are then discussed in the next chapter.

- A clear process or vision encouraging international technology transfer does not exist. Especially the lack of clear contact people is seen as a problem.
- The existing communication channels between units are not actively used.
- There is a need and will for inter-unit exchange of knowledge. Both formal and informal transfer of knowledge is hoped for. It is not perceived as a clear strategic vision of Fujitsu at the moment.
- Employees do not have a clear understanding of other units' stock of knowledge or service offerings. Also access to information sources such as intranets is limited. Hence, the information is fragmented into 'pockets of knowledge' across units.
- Of the given choices, the following were seen as the three most problematic obstacles to technology transfer and sharing resources:
  - Lack of knowledge of what resources other units have to offer
  - Problems with sharing development or administration costs
  - Communication issues, language, channels
- It is seen that units should have control over what knowledge to exchange with other units and which technologies to implement and how to adapt them so suit the unit's local environment.

- Career advances are seen as the most effective incentive to encourage resource sharing. Out of the given choices, the following three were seen as the most effective incentives:
  - Career Advances
  - International Work Opportunities
  - Cash Reimbursements

From the comments and general replies, it can also be observed that strictly standardized best practices, offerings or services are not beneficial, especially in terms of innovation. Innovation is seen as a process that should be facilitated by efficient communication channels, flexibility and dedication of employees. Freedom to choose which knowledge to exchange and openness seems to be the desired state in order for innovation to flourish. Strictness may actually hinder this process.

## 5.2 Recommendations

*“They must relinquish their goal of projecting a homegrown formula and instead seek to build advantage by learning from the world. This new strategy must be backed by important changes in organizational culture, processes, structure, staffing, performance measurements, and incentives.”*

*(Doz et al., 2001, 26)*

These recommendations are made according to the findings of the research, combined with the theory of the Metanational (Please see Section 3.6.4). It is worth noting, that the theoretical framework does not suggest remedies to the issues that arose from using the framework in identifying the issues. It should therefore be pointed out, that the theoretical framework was merely used to give structure to the identification of the obstacles to technology transfer the the flow of innovation.

The basic fundament behind the made recommendations is to enable units to communicate and exchange knowledge between one another, rather than having to rely on intermediaries or the headquarters. In this way, each unit becomes a sensing unit and by using communication tools, is able to codify, transmit and publish knowledge to all the other units in the organisation. In this way, knowledge gathered in each individual subsidiary is ‘unlocked’ and made available to the global organisation.



According to Doz et al. (2001, 83), there are six capabilities that the multinational corporation should develop in order to be able to *sense*, *mobilize*, and *operationalize* the knowledge inside the organization and its environment. The six capabilities are (ibid, 83-84):

1. **Prospecting Capabilities:** Being able to recognize relevant knowledge ahead of competitors.
2. **Accessing Capabilities:** Having an established knowledge network, facilitating rapid access to knowledge across the multinational company.
3. **Moving Capabilities:** Having such “magnets” that can identify and move globally dispersed knowledge so that it can be harnessed for innovative problem-solving.
4. **Melding Capabilities:** Being able to apply the available knowledge into technologies (products and services) in order to satisfy customer needs.
5. **Relaying Capabilities:** Ability to operationalize newly created solutions.
6. **Leveraging Capabilities:** Ability to leverage innovations across global customer segments.

These recommendations are developed using the findings of the research and literature relevant to this study.

### **5.2.1 Clear Strategic Vision**

Fujitsu should be seen by its employees as a global pool of knowledge at their fingertips. The company should strive to become a globally operating and open expert organization that encourages and rewards knowledge transfer across borders in order to deliver the most innovative, efficient and customer-specific service in the marketplace. Cooperation between subsidiaries should be seen as a real everyday activity in order to develop, optimize and design customer solutions and production models. Information on country-specific offerings and expertise should be made available and accessible easily and efficiently, but also in an open and flexible way so that the control of knowledge exchange remains with the individual units: An open community of Fujitsu.

### **5.2.2 First Point of Contact for Internal Enquiries**

For each country, a person or an instance (such as an email distribution list or forum) should be named for any internal enquiries. These enquiries could be about locating resources, information on certain services, technical consultation or market knowledge. What is relevant is that each country-unit would not be a closed entity, but seen as an approachable part of the organisation. This first point of contact could then act as an intermediary between the enquirer and the knowledge.

In order to communicate contact persons or instances, a shared information source is needed, please refer to the section on consolidated corporate intranets.

### **5.2.3 Cost Sharing Model**

In order to account for work done for other subsidiaries, cooperation between subsidiaries should be recognized on managerial level. Reporting, work descriptions and time management tools should be adjusted accordingly.

Internal transfer pricing should also be made simple and efficient in order for subsidiaries to be able to share production resources and platforms.

### **5.2.4 Consolidated Global Corporate Intranet**

In order for the employees to be able to research other units' offerings, resources and other information, they should have access to other subsidiaries' intranets. Naturally, the individual intranets are most probably in that country's native language, but certain sections could be made in English. For example a section on offerings (with service descriptions and sales material) could be in English as well as the local language. Also contact persons (Product Managers for example) for specific services and products could be communicated in this way.

Another benefit of a consolidated and hierarchical corporate intranet is that the top-level would be shared by each unit. Information about first points of contact and global announcements and news could be communicated via the front page. From that page, the user would then commence to a sub-site specific for his or her unit.

A consolidated and open corporate intranet would also facilitate some of the open communication channels, such as discussion forums. The use should be made simple, so that all employees have instant access to the public areas without login screens or the need to register.

#### **5.2.4.1 A Corporate Service Catalogue**

A list of all services and products sorted, searchable and assigned with relevant keyword could be incorporated into the global intranet. In this way, information on local offerings in other subsidiaries could be searched. Therefore subsidiaries can find new services and products that may be relevant to their local markets.

In addition, many IT-services are not geographically bound anymore. Therefore employees could find the most cost-efficient place for a service to be produced and therefore increase the margins of offered services. Such services could include e-mail services, web conferencing, storage capacity and other generic hosted services.

### **5.2.5 Open and Integrated Communication Channels**

Especially from the comments that were made by the responders, an important factor for facilitating innovation is that the support processes and tools are just that: Support. Rather than controlling the



knowledge or innovation, the flow should be facilitated. This leads into open communication channels, that enable individual employees to proactively and voluntarily to be able to share knowledge. Not surprisingly, without the existence of rich transmission channels, knowledge flows cannot occur (Gupta & Govindarajan, 2000, 475; Ghoshal & Bartlett, 1988). These ideas for open communication channels are not revolutionary, but they have not been implemented in such a way that would encourage their use. In this section, suggestions are made on how to make these solutions more appealing to the end-user.

In terms of the theoretical framework, open communication channels would contribute greatly to sensing, mobilizing and implementing knowledge into operations (please see Figure 10). By using these communication tools, employees would themselves be able to request and share knowledge, hence *sensing* and *mobilizing* the relevant information needed (Doz et al. 2001). Experts and operational personnel could use this information that was produced and published by another colleague in another subsidiary. Also other employees could see this exchange of knowledge and also benefit from the information exchange.

By having a 'global magnet' such as a service architecture and business model, having sufficient open and flexible communication channels between subsidiaries would facilitate the flow of innovation between subsidiaries. As was found by the research, facilitating inter-unit exchange of knowledge is highly supported by employees.

#### **5.2.5.1 Corporate Discussion Forum**

As described above, a discussion forum that is *easily* accessible would require an integrated corporate intranet. The users should not be required to login separately to different parts and services of the corporate intranet, but the use should be logical and easy. The interface of the forum is also important. Great care should be paid into making the use efficient, but also the information management and search functions should be powerful enough to manage the knowledge that is entered into the system. The way messages are posted, structuring the discussion threads, discussion areas, quoting of previous posters and search functions all contribute to a whole that makes or breaks a forum.

The aim should be such that when a problem or enquiry is posted on the forum, a solution can be worked out quickly and efficiently by the participants of the discussion community. Therefore a culture of active participation from the onset is vital to the success of the forum. Once the ball is rolling, the system feeds itself and keeps up momentum. The two main driving forces for the online community are: The ability to create an 'online reputation'. This "identity of purpose", as Simon

Holberton calls it (Simon Holberton, "Corporate Restructuring: *Esprit de corps*: life-blood of the matrix", *Financial Times* May 14, 1990, p. 13) illustrates the ability of world-class companies to share throughout the company. The second driving force is incentives related to sharing knowledge, this is explained more thoroughly in Section 5.2.6.

#### **5.2.5.2 Instant Messaging and VoIP**

The employees should be able to contact each other directly. This is possible using e-mail and telephone. But users can never be certain whether and when they receive replies to their e-mails, and there is certain gap to use the telephone because of time differences, uncertainty of the status of the person being called and so on.

Instant messaging provides a way for an employee to see the status of the other users. In this way he or she can choose the best way to contact the other used: Instant message, e-mail, audio connection, telephone, video-conference or data sharing session. Users can connect more users to the session and share and edit documents in real time. Using IP-networks for conferencing and a substitute for conventional telephone also cuts costs of travelling and expensive telephony.

The status information could be incorporated into the discussion forum, so that if a person posts a question on the discussion forum and someone on the other side of the world replies, they could instantly start a instant messaging session and cooperate.

#### **5.2.5.3 Global Phonebook with Profiles**

Again, facilitated by the global corporate intranet, a truly global phonebook with profiles could be implemented. This profile should integrate into the discussion forum, as well as different methods of communication, such as instant messaging. All employees should have access to the same phonebook and also the individual units should not have overlapping separate phonebooks. However, each country unit should have access to manage their own phonebooks, rather than plain centralized managing. The units would have at least one person who is responsible for the phonebook for that unit. In this way the phonebook would remain up to date.

The information on each employee should not be too complicated and it should not be left entirely to the individual to manage his or her profile. Having such global phonebook would require the harmonization of employee data. For example work descriptions should follow certain logic throughout the organization.

#### **5.2.6 Managerial Commitment to Encourage Resource Sharing**

Even though there was no problem to motivate employees to share resources with colleagues from other subsidiaries or countries, incentives may be needed to encourage resource sharing. Also, as



Doz et al. argue (2001, 160), management should recognize the dual role of units as both knowledge sensing units and operational units. This has direct consequences on costing and resourcing. As also shown in the research, there may not be time allocated for international resource sharing. In other words, inter-unitary cooperation might at first be work done on top of normal tasks.

Managers and superiors should therefore be aware of such corporate level strategy to increase innovativeness and sharing of resources. In theoretical sense, these incentives combined with efficient and open tools for communication would act as the 'magnet' (Please refer to Figure 7, Section 3.6.4). Magnet here refers to the self-sufficient process of sensing, mobilizing and implementing knowledge, which is scattered across the organization. By having a motivated workforce that has access to open communication channels and also the incentives to use it and to create 'an online reputation' for themselves. This process would feed itself, when employees seek and share innovative information as well as personal benefit.

These three incentives were seen to be the most effective to increase resource sharing:

- Career Advances (2200 points)
- International Work Opportunities (2137 points)
- Cash Reimbursements (1958 points)

These would be straightforward to implement, as managers could monitor the use of open communication channels, as well as ask for recommendations for employees with significant merits in inter-unitary knowledge sharing.

### **5.3 Conclusion**

It seems like there is real willingness among the employees in Fujitsu becoming a truly global knowledge sharing community. Therefore it seems contradictory that "Not Invented Here"-thinking would pose a significant threat to increasing technology transfer and the flow of innovation across borders. The employees seem to strive for innovativeness and also international work opportunities as a result of global exchange of knowledge and technology.

Concerning the managerial recommendations made in the study, careful design and planning should be made before implementing any of the proposed solutions. The success of an individual system or solution is usually interdependent on other factors and systems as well as the interface, internal marketing and other practical variables.

Another obviously important factor is the people. The good thing is that the response to this research was very positive. Hence it could be seen that there truly is willingness to increase cooperation and knowledge transfer across borders. What is also important is that these people should also be naturally curious and active in order to be motivated to find more about these 'pockets of knowledge' within the company. As mentioned, incentives always help to motivate even further.

The benefits of harnessing global 'pockets of knowledge' to be used by the whole global organization are obvious. However, implementing such structures that support and facilitate this without suffocating it with too much standardization or bureaucracy is a challenging task. In this study, the most problematic obstacles were researched, identified and suggestions of possible remedies were made. It must be noted however, that this topic is an extremely complex one and this study was merely an opening to map out the larger issues at hand. There is a lot of ground for further, more thorough research done in this field and recommendations for further research are made in the next section.

#### **5.4 Further Research**

As mentioned before, the scope of this study is very large and it touches quite a number of management topics. It would be easy to list a large number of interesting fields for further research, but in order to remain within relevance, only suggestions that are related directly to the findings of the current study are made.

##### **1) Further analysis of the data gathered**

The data gathered was very rich in the way that the demographic questions makes it possible to group the responders efficiently. Unfortunately, for the current study cross-referencing was not made for two reasons: The data was sent in an incompatible format and hence the time constraints meant that it could not be analysed, so only an analysis on the overall results was conducted. Secondly, the scope of the current study would have been extended considerably, possibly too much. It is therefore left for further studies to explore the possibilities of deeper analysis of the data gathered.

##### **2) Extension of the sample population**

Even though the sample population was diversified, it mainly represented the views of two countries. Hence conducting a more in-depth research that would include the whole workforce could provide interesting results. In this kind of research, more efficient tools for gathering and



analysing the data would be needed. This means that higher levels of investment into the research would be needed.

### 3) Network centrality analysis of units

Network theory could be used to examine units in relation to their views on technology transfer, as well as their levels of activity in such exchange of knowledge. An analysis that is based on individual units, their network centrality and other characteristics could shed light on how unit to unit knowledge sharing could best be optimized.

### 4) Simulating the technology transfer process

Another very interesting field for further research would be to 'simulate' the process. This way, the process could be modelled, graphically for example, and hence problem areas could be distinguished. The process could be simplified, optimized and the problem areas could be solved. Especially in terms of budgeting, internal invoicing, resourcing and measuring performance this would provide interesting information of actual practical transfer of technology.

### 5) Researching the technology transfer process in the internationalizing stage of the firm

The current study focused on the transfer of technology and the flow of innovation between subsidiaries and headquarters on a day-to-day basis, that is happening currently. For current research, examining the actual globalization or internationalization process and how technology transfer is managed then would be extremely interesting.

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APPENDICES

**APPENDIX 1: QUESTIONNAIRE RESULTS**

**APPENDIX 2: PRELIMINARY INTERVIEW QUESTIONS**

**APPENDIX 3: QUESTIONNAIRE E-MAIL**

### Detailed Results

The report key below indicates which sets of data have been shown on the report, along with the total number of unique responses. For more information about the total number of responses, see the **Report Notes** at the end of this report.

#### Report Key



Overall Results

588 unique responses

#### What is your nationality? \*

A

Australia		0.3%	2
Brazil		0.2%	1
Chile		0.2%	1
Denmark		6.6%	39
Estonia		1.0%	6
Finland		35.7%	210
France		0.7%	4
Germany		3.6%	21
Greece		0.2%	1
India		0.3%	2
Ireland		0.7%	4
Italy		1.2%	7
Norway		0.3%	2
South Africa		0.3%	2
Spain		2.2%	13
Sweden		6.8%	40
United Kingdom		39.5%	232
United States		0.2%	1
	0% 50% 100%		
			Total number of responses: 588



**In which country do you work at the moment? \***

B				
Denmark		6.3%	37	
Estonia		1.0%	6	
Finland		34.9%	205	
France		0.5%	3	
Germany		3.9%	23	
Ireland		0.2%	1	
Italy		1.2%	7	
Spain		2.4%	14	
Sweden		7.7%	45	
United Kingdom		41.8%	246	
		0%		50%
				100%
				Total number of responses: 588

**What is your age? \***

C				
21-23 years		1.2%	7	
24-26 years		4.4%	26	
27-29 years		8.7%	51	
30-34 years		16.5%	97	
35-39 years		16.5%	97	
40-49 years		28.4%	167	
50 or more years		24.3%	143	
		0%		50%
				100%
				Total number of responses: 588

**What is your gender? \***

D				
Male		81.5%	479	
Female		18.2%	107	
Do not want to answer		0.3%	2	
		0%		50%
				100%
				Total number of responses: 588

**Which of the following describes your unit the best? \***

E				
Sales		9.0%	53	
Service Management		12.9%	76	
Project Management		8.3%	49	
Service Professionals (Experts, Specialists, Customer Support)		54.8%	322	
Leadership		6.0%	35	
Business Support (Marketing, HR, Finance/Accounting, Secretarial)		9.0%	53	
		0%		50%
				100%
				Total number of responses: 588

**Which of the following best describes your work description? \***

F				
Accountant		1.0%	6	
Top management		1.7%	10	
Management		18.9%	111	
Customer service		11.6%	68	
Internal technical support		4.8%	28	
Controller		1.4%	8	
Specialist / Expert		25.9%	152	
Consultant		18.2%	107	
Sales		4.9%	29	
Developer		8.5%	50	
Management assistant		0.7%	4	
Marketing assistant		0.3%	2	
Marketing executive		1.7%	10	
Secretary		0.5%	3	
	0%	50%	100%	
				Total number of responses: 588

**Which of the following orientations best describes your work? \***

G				
Business		35.5%	209	
Technology		45.1%	265	
Administration		12.1%	71	
Other		7.3%	43	
	0%	50%	100%	
				Total number of responses: 588

**Your level of education? \***

H				
High School		16.8%	99	
College/Polytechnic		29.1%	171	
Higher education - Bachelor-level		26.9%	158	
Higher education - Masters-level		18.9%	111	
Higher education - Licentiate/PhD		1.7%	10	
Higher education - Engineering		6.6%	39	
	0%	50%	100%	
				Total number of responses: 588

**Your line of education? \***

I				
Business/Economics		22.4%	132	
Technical/Engineering		59.9%	352	
Humanities		5.1%	30	
Other		12.6%	74	
	0%	50%	100%	
				Total number of responses: 588



**Specialist courses/certifications? \***

**J**

Yes		70.9%	417
No		29.1%	171
	0% <span style="margin-left: 150px;">50%</span> <span style="margin-left: 150px;">100%</span>		
Total number of responses:			588

**Do you have subordinates (people working for you)? \***

**K**

30 or more		3.7%	22
10 to 29		6.6%	39
1 to 9		15.5%	91
No		74.1%	436
	0% <span style="margin-left: 150px;">50%</span> <span style="margin-left: 150px;">100%</span>		
Total number of responses:			588

**How long have you worked for Fujitsu? \***

**L**

10 years or more		32.0%	188
5 - 9 years		28.6%	168
3 - 4 years		7.0%	41
1 - 2 years		15.6%	92
Less than 1 year		16.8%	99
	0% <span style="margin-left: 150px;">50%</span> <span style="margin-left: 150px;">100%</span>		
Total number of responses:			588

**Have you ever worked outside your home country? \***

**M**

Yes		39.3%	231
No		60.7%	357
	0% <span style="margin-left: 150px;">50%</span> <span style="margin-left: 150px;">100%</span>		
Total number of responses:			588

**Does your country unit have R&D-functions? \***

1	Yes		64.8%	381
	No		35.2%	207
		0% 50% 100%		
				Total number of responses: 588

**Do you know what to do when contacting Fujitsu people abroad, in order to find out about products for example? Please rate from 1 to 5, with 1 being poorest and 5 being best. \***

2	<b>Which people to contact</b>			
	1		46.3%	272
	2		23.5%	138
	3		18.0%	106
	4		10.4%	61
	5		1.9%	11
	0% 50% 100%			
				Total number of responses: 588

**Sufficient communication channels**

	1		34.7%	204
	2		25.5%	150
	3		27.6%	162
	4		10.2%	60
	5		2.0%	12
	0% 50% 100%			
				Total number of responses: 588

**Access to foreign units' intranet**

	1		39.1%	230
	2		24.3%	143
	3		21.8%	128
	4		10.9%	64
	5		3.9%	23
	0% 50% 100%			
				Total number of responses: 588

**Do you use the existing open communication channels such as the discussion forum in Café Vik? \***

3	Yes, weekly		7.1%	42
	Yes, monthly		6.0%	35
	Few times a year		26.7%	157
	No		56.6%	333
	Don't know		3.6%	21
	0% 50% 100%			
				Total number of responses: 588



**How easy would you say it is to contact foreign units and to find information you need? \***

<b>4</b>	Very easy - First contact is always correct		1.0%	6
	Easy - By going through a few people you get the information needed		21.6%	127
	Not very easy - You spend many days trying to find the right person or information		40.8%	240
	Difficult - Sometimes you cannot get a response or find the right person or information		22.3%	131
	Very difficult - Never or almost never you get the information you need		14.3%	84
		0% 50% 100%		
				Total number of responses: 588

**How important do you think it would be to have and develop direct channels of communication between the subsidiaries (such as shared intranets, phonebooks, instant messaging, etc.)? \***

<b>5</b>	Very important		36.6%	215
	Important		50.3%	296
	Not very important		12.2%	72
	Not important at all		0.9%	5
			0% 50% 100%	
				Total number of responses: 588

**How active do you see your unit to be in international technology and knowledge transfer from other Fujitsu units? \***

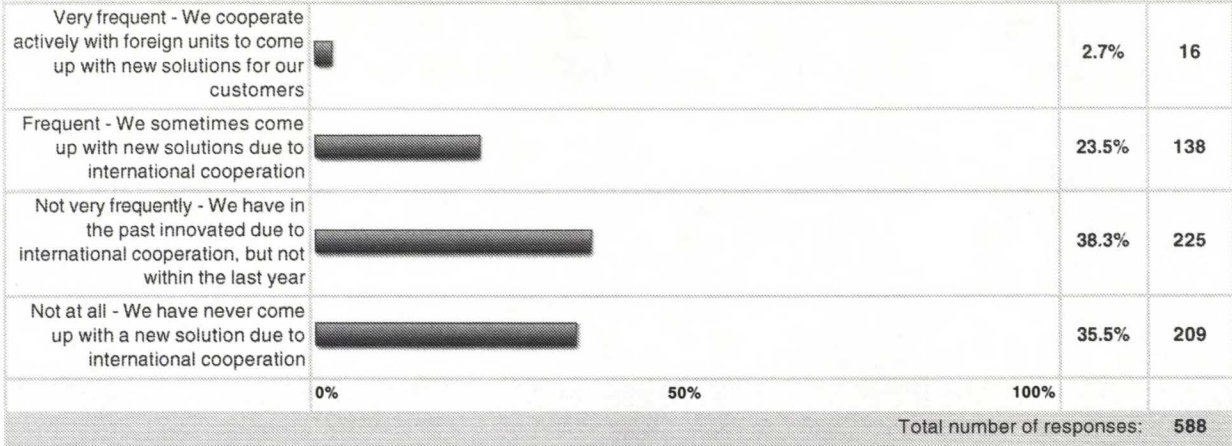
<b>6</b>	Very active - Interaction with units abroad many times within a week		5.4%	32
	Active - Weekly interaction		21.1%	124
	Not very active - Maybe monthly interaction		28.6%	168
	Not active - Very occasionally		28.7%	169
	Passive - No interaction with foreign units		16.2%	95
		0% 50% 100%		
				Total number of responses: 588

**Has this kind of activity increased in the past year compared to earlier? \***

<b>7</b>	Yes, a lot		11.4%	67
	Yes, a little		25.5%	150
	No		30.1%	177
	It has decreased		2.2%	13
	Don't know		30.8%	181
		0% 50% 100%		
				Total number of responses: 588

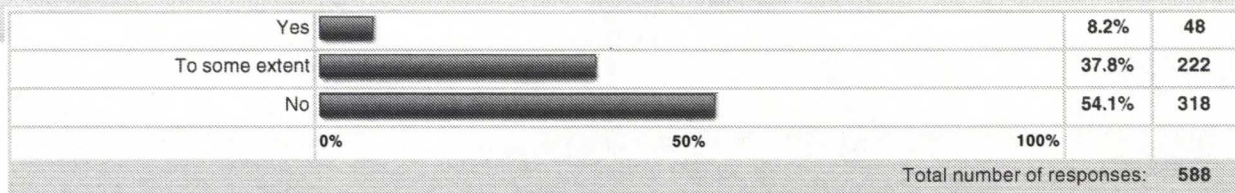
How would you rate the level of innovation caused or coming from interaction with foreign units? \*

8





Do you see that the products/services your unit offers were 'pushed' to the unit from the headquarters with no local adaptation or local development? \*

9










10 Do you think that there is a need for a clear process covering all aspects of transferring technology (products/services/production models) from foreign units into your unit? (including financial, marketing, technological etc. aspects) \*

Yes		77.0%	453
No		23.0%	135
	0%	50%	100%
Total number of responses:			588






Which practical obstacles do you think cause most difficulties in transferring technology and sharing resources between units? (Scaled from 1 being less of a problem to 5 being most problematic) \*

11






"Not Invented Here" thinking

1		18.0%	106
2		20.2%	119
3		29.6%	174
4		21.4%	126
5		10.7%	63
	0% 50% 100%		
Total number of responses:			588






Problems with sharing development or administration costs

1		3.7%	22
2		13.6%	80
3		34.5%	203
4		31.0%	182
5		17.2%	101
	0% 50% 100%		
Total number of responses:			588






Communications issues, language, channels

1		7.0%	41
2		24.7%	145
3		31.0%	182
4		25.5%	150
5		11.9%	70
	0% 50% 100%		
Total number of responses:			588

Cultural differences

1		13.1%	77
2		29.9%	176
3		31.5%	185
4		18.4%	108
5		7.1%	42
	0% 50% 100%		
Total number of responses:			588

Motivational problems of employees

1		11.4%	67
2		27.9%	164
3		32.8%	193
4		19.9%	117
5		8.0%	47
	0% 50% 100%		
Total number of responses:			588



Lack of knowledge of what resources other units have to offer			
1		2.9%	17
2		7.7%	45
3		22.4%	132
4		34.5%	203
5		32.5%	191
	0% 50% 100%		
Total number of responses:			588

12 How important do you think innovation, research and development is for your unit? *			
Very important		42.0%	247
Important		44.9%	264
Not important		10.5%	62
Non-existent		2.6%	15
	0% 50% 100%		
Total number of responses:			588






13 Do you think that your unit could benefit from innovations and technologies from units in other countries? *			
Yes, a lot		34.5%	203
Yes, some		54.3%	319
No		3.7%	22
I don't know		7.5%	44
	0% 50% 100%		
Total number of responses:			588

14 Do you think it would be a good thing if the headquarters actively monitored (scanned) your unit's development, needs and market situation? *			
Very important		17.5%	103
Important		55.3%	325
Not very important		22.3%	131
Not important		4.9%	29
	0% 50% 100%		
Total number of responses:			588

15 Do you think the headquarters does this kind of scanning? *			
Yes		12.9%	76
Yes, but not enough		20.1%	118
No		29.3%	172
I don't know		37.8%	222
	0% 50% 100%		
Total number of responses:			588





Do you think it would be a good thing if the headquarters would form "hit teams" (with targets and budget) to introduce common offerings of innovative products/services to your country unit? \*

16

Yes, very good		22.4%	132
Yes		36.4%	214
Neutral		27.4%	161
No		6.0%	35
I don't know		7.8%	46
	0% <span style="margin-left: 150px;">50%</span> <span style="margin-left: 150px;">100%</span>		
Total number of responses:			588




Do you think that it is a conscious strategic vision of Fujitsu to increase innovativeness through cooperation across borders? \*

17

Yes		22.3%	131
Yes, but not clearly		51.4%	302
No		9.5%	56
I don't know		16.8%	99
	0% <span style="margin-left: 150px;">50%</span> <span style="margin-left: 150px;">100%</span>		
Total number of responses:			588

Are more incentives needed to increase interaction among units across borders? \*

18

Yes		66.5%	391
No		8.5%	50
I don't know		25.0%	147
	0% <span style="margin-left: 150px;">50%</span> <span style="margin-left: 150px;">100%</span>		
Total number of responses:			588



19

Rate how effective you think these incentives for employees are to increase interaction and knowledge sharing between units: (Scale from 1 being ineffective to 5 being effective) \*

Cash reimbursement			
1		6.8%	40
2		13.3%	78
3		37.4%	220
4		25.2%	148
5		17.3%	102
	0% 50% 100%		
			Total number of responses: 588

Career advances			
1		2.9%	17
2		6.0%	35
3		25.5%	150
4		45.4%	267
5		20.2%	119
	0% 50% 100%		
			Total number of responses: 588

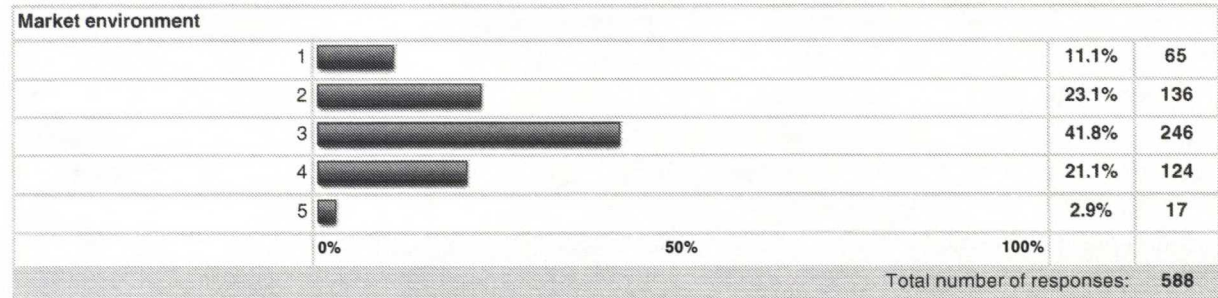
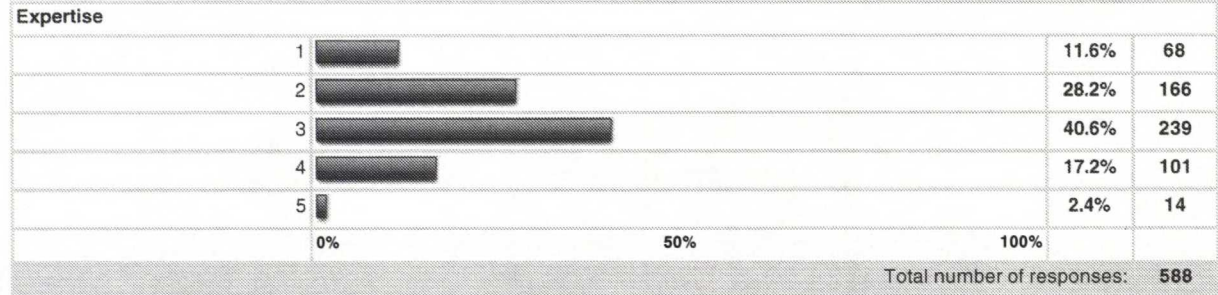
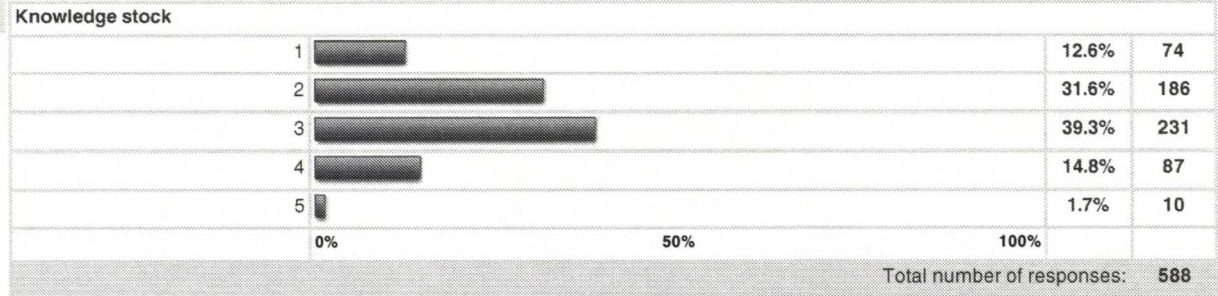
International work opportunities			
1		4.3%	25
2		9.2%	54
3		27.6%	162
4		36.9%	217
5		22.1%	130
	0% 50% 100%		
			Total number of responses: 588

Certificates			
1		13.1%	77
2		27.9%	164
3		33.8%	199
4		18.9%	111
5		6.3%	37
	0% 50% 100%		
			Total number of responses: 588

Equipment			
1		9.2%	54
2		21.8%	128
3		40.1%	236
4		20.9%	123
5		8.0%	47
	0% 50% 100%		
			Total number of responses: 588

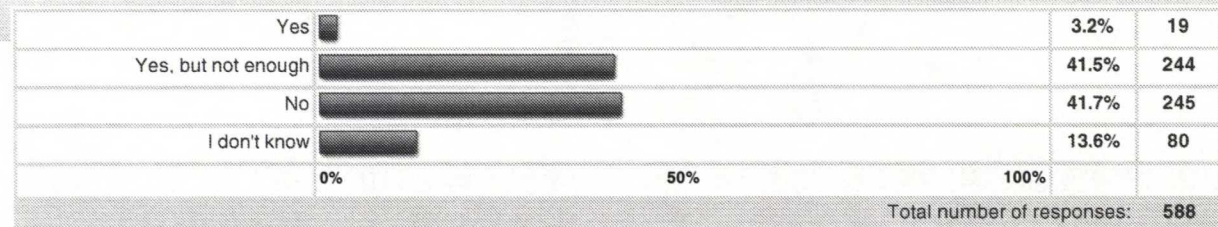
How good an understanding do you think the headquarters has of the value of your unit's: (Scale from 1 being poor to 5 being complete) \*

20



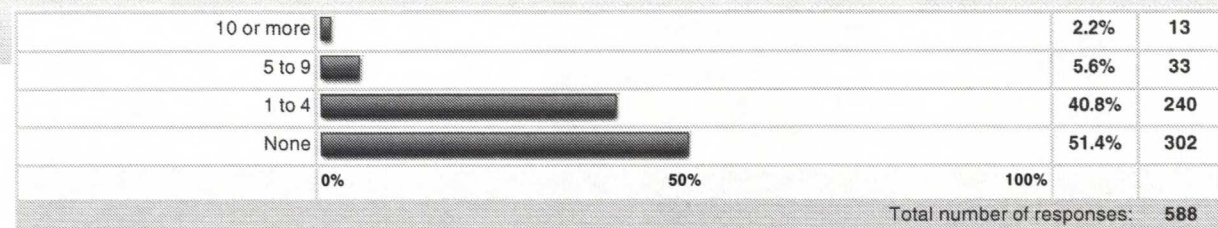
Do you have an understanding about the knowledge stock (products, R&D-activity, innovations) of other units that you interact with? \*

21



How many foreign units have you interacted within the last 6 months? (Estimate if you cannot remember exactly) \*

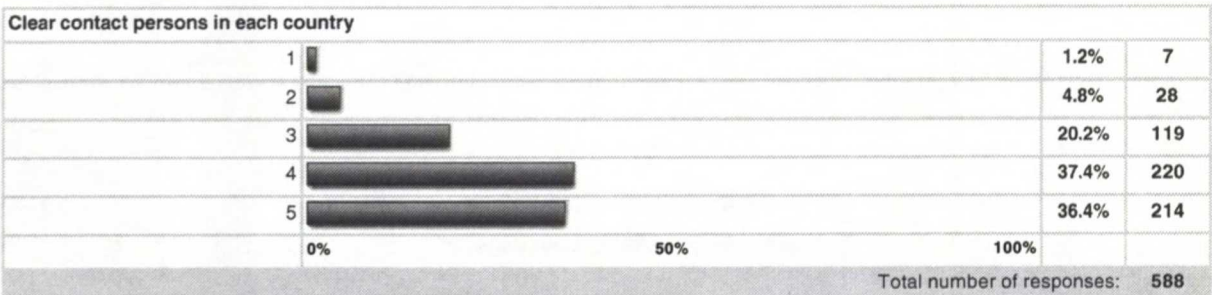
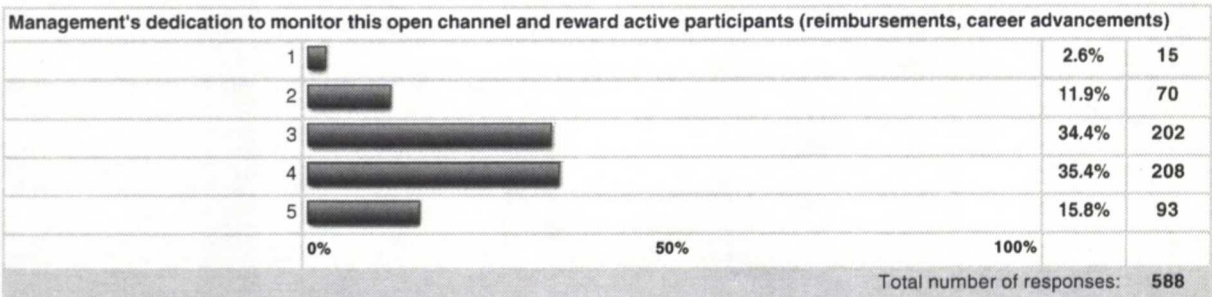
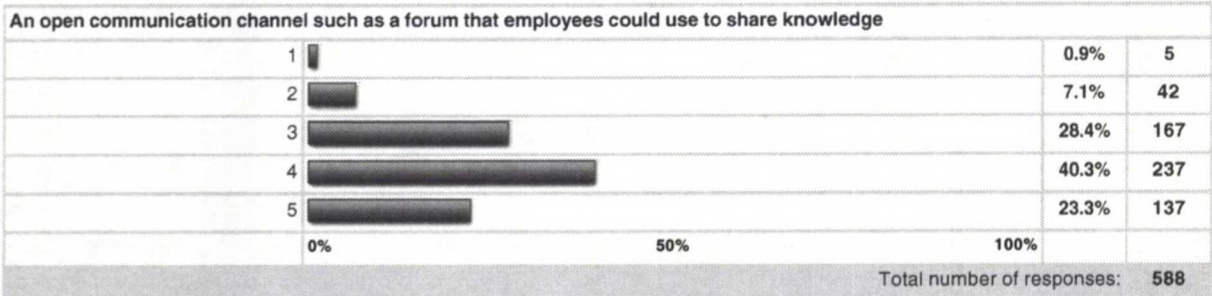
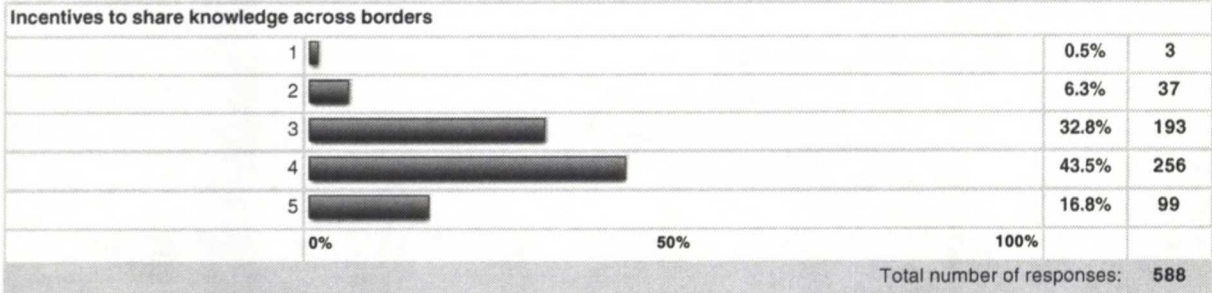
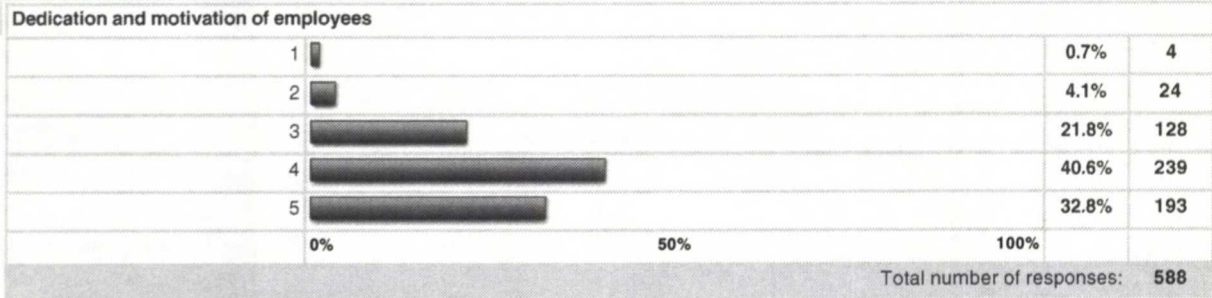
22




















23

How would you rate the following as building blocks when creating an efficient global knowledge sharing community: (Scale of 1 being not important to 5 being very important) \*



A search engine by skills and specialist knowledge in each employee's profile			
1		2.4%	14
2		12.2%	72
3		30.4%	179
4		36.2%	213
5		18.7%	110
	0% 50% 100%		
Total number of responses:			588

Informal networking by more inter-unitary occasions and get-togethers			
1		2.6%	15
2		11.9%	70
3		38.9%	229
4		31.6%	186
5		15.0%	88
	0% 50% 100%		
Total number of responses:			588

Information sharing seminars, etc.			
1		2.2%	13
2		11.9%	70
3		33.8%	199
4		37.1%	218
5		15.0%	88
	0% 50% 100%		
Total number of responses:			588



## **Master's Thesis Preliminary Interviews**

Interviewee:

Title:

Unit:

Country:

Years with the company:

**Instructions: Please answer to the questions using your own words. These are preliminary questions, upon which the final questionnaire is going to be based on. A few sentences to each question is fine! Thank you!**

- 1. Why is the transfer or flow of new products and production models from a country unit (subsidiary) to the headquarter an important thing? Benefits?**
- 2. What do you see as the main challenges to this?**
- 3. Why is the transfer or flow of innovations from headquarters to country units (subsidiaries) important? Why?**
- 4. Does the headquarter see the country units more like as R&D-centers or sales units?**
- 5. How important is innovation and innovating to your unit?**
- 6. Would a 'horizontal connection' between the country units be beneficial? (i.e. the units would have efficient communication channels, as well as the permission to bypass the headquarters even concerning important decisions)**
- 7. Should the headquarters be more active in scanning the country units' (subsidiaries) R&D activities?**
- 8. Who should pay for the R&D-activities of country units (subsidiaries)?**

9. **Who should pay for the R&D-activities of country units (subsidiaries), if the local innovations can be used commercially in other units?**



## Improving Innovation – Win an iPod Nano!



*"We strive to achieve innovativeness here at Fujitsu. This research will map out the thoughts of our employees on the issue of innovation. Please find the time to answer the questionnaire and help us to become a dynamic and global innovation community through better understanding and through Triole!"*

Taija Engman

Director, Nordic Solution Group

**Please click here to answer the questionnaire!**

Password: **Fujitsu**

## Improving Innovation in Fujitsu, Your help needed!

Fujitsu is the second largest IT-service provider in the world. It is obvious that a global presence offers huge opportunities in being innovative: Each part of the world has its own distinct market characteristics, which trigger innovation in order to better serve the customer.

In order to better understand the flow of innovation within Fujitsu, your thoughts and input on innovativeness are needed. The aim of the research is to improve sharing of resources and the sharing of technologies between countries. Ultimately Fujitsu should strive to develop towards a global pool of expertise, where innovative solutions to any local needs are found efficiently and rapidly.

Please take half an hour of your time to complete the questionnaire and you could be a happy new owner of an **iPod Nano!**

**Please click here to answer the questionnaire!**

Password: **Fujitsu**

### What happens next?

**Mid-October:** The link to the questionnaire is e-mailed out.

**8<sup>th</sup> of November:** The deadline for completing the questionnaire.

**Mid-November:** The results are analyzed and the winner of the prize draw is published.

**End of November:** The lucky winner is sent a new and shiny iPod Nano!

**December:** The report and analysis are published

If you cannot open the links above, please paste this URL into your browser:

<http://www.nf02.com/fujitsu/innovation1006>

Password: **Fujitsu**