

**INTRA-ORGANIZATIONAL KNOWLEDGE TRANSFER PROCESS
IN VIETNAM'S INFORMATION TECHNOLOGY COMPANIES**

Thesis

presented to the Faculty of Economics and Social Sciences
at the University of Fribourg (Switzerland)
in fulfillment of the requirements for the degree of
Doctor of Economics and Social Sciences

by

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Accepted by the Faculty of Economics and Social Sciences on September 18th, 2008

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Fribourg, Switzerland

2008

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(Decision of the Faculty Council of January 23rd, 1990).*

ACKNOWLEDGEMENTS

I wish to express my deepest gratitude to my first supervisor, Professor Dr. Andreas Meier, for his invaluable academic advice, his insight and direction as well as other support beyond his academic duty. His enthusiasm was a great inspiration to me and encouraged me to complete the study.

I would like to express my sincere thanks to Professor Dr. Marino Widmer and Professor Dr. Laurent Donzé for their constructive comments and accurate guidance. My sincere thanks are also extended to Dr. Nguyen Dac Hoa for his time, dedication and guidance on thesis writing, formatting and proofreading. His support and encouragement in my work are deeply appreciated.

I am grateful to the Swiss-AIT-Vietnam Management Development Program (SAV) for the generous financial support, which gave me a unique opportunity to achieve my doctoral studies. I would like to thank Dr. Hans Stoessel, SAV Director, Ms. Bui My Nhung and all the SAV staff for their constant support and encouragement throughout my studies. I am especially grateful to the administrative staff of the Faculty of Economics and Social Sciences at the University of Fribourg, who help me to fulfill all the required administrative procedures.

I also owe special thanks to all managers and staff of FPT Corporation and FSS Company for their enthusiasm in providing me information needed for conducting a case study research.

My appreciation is extended to Mr. Keith Miligan for checking the language used in my thesis. I would also like to thank all my dear colleagues and friends for their help and continuous encouragement.

Finally, I would like to express my special thanks to my parents, my brothers, my husband and my little son for their support and unconditional love, which help me to realize my dream.

ABSTRACT

Intra-organizational knowledge transfer has attracted much attention of researchers and practitioners in recent years since knowledge transfer has been considered as a critical determinant of an organization's capacity to confer sustainable competitive advantage. Despite extensive research on knowledge transfer issues, the effect of knowledge transfer on organizational performance still has not been fully examined or attracted adequate empirical testing. Therefore, the objective of this study is to investigate organizational factors influencing intra-organizational knowledge transfer, and examine the relationship between knowledge transfer process, its antecedents and organizational performance.

Drawing on several theoretical streams, an integrated theoretical model of intra-organizational knowledge transfer together with 13 hypotheses were developed and tested in the context of IT companies in Vietnam.

To achieve the objectives, a triangulation of quantitative and qualitative studies was applied. A quantitative survey was employed to test hypotheses in the conceptual model derived from relevant literature. Data were collected from a survey of 218 managers and technical staff working in 36 IT companies located in Hanoi and HoChiMinh City. Multiple regression techniques were used to analyze the data. A case study research was conducted with the aim of illustrating the intra-organizational knowledge transfer process within a company operating in a transition economy like Vietnam. Data for case study were mainly collected by interviewing managers and technical staff during a one-month field study in the FPT Software Solutions Company.

The main findings showed that intra-organizational knowledge transfer is most affected by organizational culture, incentive system and organizational structure. Adaptability and solidarity are two culture values enabling the transfer process. A transparent and flexible incentive system motivates individuals to exchange and apply knowledge in their daily work. High level of centralization creates difficulties for social interaction and reduces autonomy and active involvement of employees,

which are essential for successful knowledge transfer. High formalization facilitates the knowledge transfer process by providing a clear direction for employees and enhancing communication flow through an extensive monitoring and reporting requirement.

The frequency of using IT tools did not significantly influence the intra-organizational knowledge transfer process after other independent variables were added in the regression model. This suggests either that IT tools may not directly influence the process, or that their effects remain weak. Moreover, technology in itself is not enough to ensure successful knowledge transfer. Therefore, to facilitate knowledge transfer process, it is important to foster knowledge-sharing attitude through providing greater opportunities for deeper involvement of users in the system.

Although the knowledge transfer process was found not to mediate the relationship between its antecedents and organizational performance, the process itself moderately predicts organizational performance. This suggests that intra-organizational knowledge transfer process should be considered as one of the factors contributing to company performance.

The research has filled gaps in existing literature in several ways. Firstly, it extends our understanding of the important facilitators of intra-organizational knowledge transfer process. Secondly, it attempts to integrate both soft and hard organizational factors to create a comprehensive model of intra-organizational knowledge transfer. Thirdly, it clarifies the role of the intra-organizational knowledge transfer process in improving the company's performance in a transition economy.

Overall, the results of the study contribute to the advancement of research in the area of intra-organizational knowledge transfer and provide practical implications for managers of IT companies in Vietnam by shedding light on determinant factors of knowledge transfer process and examining the link between knowledge transfer process and firm performance.

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LIST OF ABBREVIATIONS

A

ADSL	Asymmetric Digital Subscriber Line
ANOVA	Analysis of Variance
ASEAN	Association of South East Asian Nations

C

CEO	Chief Executive Officer
CIEM	Central Institute of Economics and Management
CMM	Capability Maturity Model

D

DMS	Defect Management System
-----	--------------------------

E

E-mail	Electronic Mail
ERP	Enterprise Resource Planning

F

FDI	Foreign Direct Investment
FIFA	Financial Information and Fixed Assets
FPT	Corporation for Financing and Promoting Technology
FSS	FPT Software Solutions

G

GDP	Gross Domestic Product
GNP	Gross National Product
GSO	Vietnam's General Statistics Office

H

H	Hypothesis
HCMC	HoChiMinh City
HR	Human Resource
HTML	Hypertext Markup Language

I

ICT	Information and Communication Technology
IMAP	Internet Message Access Protocol

IP	Internet Protocol
IS	Information System
ISO	International Standard Organization
ISP	Internet Service Provider
IT	Information Technology
IXP	Internet Exchange Access Providers
K	
KM	Knowledge Management
KMS	Knowledge Management System
L	
LAN	Local Area Network
M	
MANOVA	Multivariate Analysis of Variance
MBO	Management by Objective
MIS	Management of Information System
MNC	Multinational Corporation
MPT	Vietnam's Ministry of Post and Telematics
O	
OC	Organizational Culture
ODA	Organizational Development Aid
OECD	Organization for Economic Cooperation and Development
OS	Organizational Structure
P	
PEST	Political – Economic – Social – Technological (PEST Analysis)
POP	Post Office Protocol
Q	
QA	Quality Assurance
R	
R&D	Research and Development
R ²	Coefficient of multiple determination in regression analysis

S

SD	Standard Deviation
SECI	Socialization – Externalization – Combination - Internalization
SPSS	Statistical Package for Social Science
SWOT	Strength - Weakness - Opportunities – Threat (SWOT Analysis)

U

UK	United Kingdom
UN	United Nations
US\$	United States Dollar
USA	United States of America

V

VCCI	Vietnam Chamber of Commerce and Industry
VIF	Variable Inflation Factor
VINASA	Vietnam Software Association
VNPT	Vietnam Post and Telecommunications Corporation

W

WAN	Wide Area Network
WTO	World Trade Organization

INTRODUCTION

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1.1 Rationale of the Study

Interest in knowledge transfer research has increased in recent years (e.g., Szulanski, 1996; Al-Alawi et al., 2007; Cabrera et al., 2006; Lai and Lee, 2007; Chen and Huang, 2007). This growing body of literature, however, has not successfully addressed four issues in the study of knowledge transfer. First, there is a great need for an integrated approach in studying knowledge transfer. Research from different disciplines has tended to study it from different angles, using different concepts, and focusing on one or a few elements that matter for knowledge transfer (Becker and Knudsen, 2006). Rarely have all factors influencing knowledge transfer been taken into account.

Secondly, while researchers view knowledge transfer as a critical determinant of an organization's capacity to confer sustainable competitive advantage (Gupta et al., 2004; Osterloh and Frey, 2000), the effect of knowledge transfer on organizational performance has not been fully examined or attracted adequate empirical testing. Most of the previous research attempted to examine the factors affecting the process of knowledge transfer rather than to examine the link between intra-organizational knowledge transfer and organizational performance (Becker and Knudsen, 2006).

Thirdly, most research on intra-organizational knowledge transfer has been extensively conducted in developed countries, where companies operate in a developed market infrastructure with transparent organizational systems and low-context cultures. In other words, most studies implicitly assume institutionalized market, transparent organizational design and procedures, and clear individual roles and responsibilities as preconditions for facilitating knowledge transfer among individuals and units. In contrast, a key characteristic of transition economies like Vietnam is that they do not have a developed market infrastructure. Most companies are small and medium sized without transparent organizational systems. Intra-organizational knowledge transfer is examined in the high-context culture. This raises the question of whether intra-organizational knowledge transfer model generalizes to IT companies operating in transition economies.

Fourthly, given the importance of knowledge transfer and the significant research in this domain, intra-organizational knowledge transfer remains a big challenge for organizations' leaders and managers. Prior research on knowledge transfer within an organization revealed that knowledge transfer is influenced by both hard and soft factors. Alternative categorization suggests three sets of factors: knowledge-related, context-related and source and recipient-related. In relation to the characteristics of knowledge source and recipient, the absorptive and retentive capacity, the motivation, and the relationship between the source and recipient, either facilitate or hinder the knowledge transfer process (Szulanski, 1996). For the nature of knowledge, the higher the tacit level of the knowledge, the more difficult the knowledge transfer process. Moreover, since knowledge resides with individuals and people tend to hoard rather than share, not all knowledge that is known within an organization is readily codified. Therefore, the effectiveness of knowledge transfer requires more involvement of the source and recipient as well as their interactions. As the result, the context-related factors such as organizational culture, leadership, social capital as well as information technology applications are taken into account. The key issue is how could managers create a favorable environment enabling intra-organizational knowledge transfer?

These issues suggest that there is a great need to develop an integrative model of intra-organizational knowledge transfer and test it in the setting of Vietnam's IT companies. The research's findings are expected to be helpful for leaders/managers in building organizational capabilities that enable effective knowledge transfer to better utilize their employees' intellectual capital, which in turn will contribute to enhance competitiveness and performance of the company.

1.2 Research Problem

Operating in the knowledge-based economy, one of areas that concern Vietnamese IT companies is the need to pursue effective knowledge transfer within an organization. Effective knowledge transfer will facilitate the conversion process of tacit knowledge to explicit knowledge and vice versa and this will eventually influence the learning process and organizational performance.

This research is expected to examine how knowledge is transferred within an IT company, the impact of organizational factors on effectiveness of knowledge transfer process, the relationship between knowledge transfer and company performance, and to suggest factors from an organizational capabilities perspective to enhance the environment for enabling effective knowledge transfer inside the organization.

1.3 Research Questions

The main objective of the study is to build and test a model of determinants of knowledge transfer within IT companies in Vietnam. The following are specific research questions:

- What factors influence effective knowledge transfer within Vietnamese IT companies?
- How do those factors influence the intra-organizational knowledge transfer process within the companies?
- Does the intra-organizational knowledge transfer process mediate the relationship between organizational factors and organizational performance?

- How does intra-organizational knowledge transfer influence the company's performance?

1.4 Research Strategy

To achieve the objectives, a triangulation of quantitative and qualitative studies was applied. A quantitative survey was employed to test hypotheses in the conceptual model derived from relevant literature. A case study was conducted with the aim of illustrating the intra-organizational knowledge transfer process within a company operating in a transition economy like Vietnam. The complex and dynamic nature of the intra-organizational knowledge transfer suggests that a combination of methods is appropriate. The research proceeds as follows:

Conceptualization

Previous literature on intra-organizational knowledge transfer process was reviewed. As no comprehensive model of intra-organizational knowledge transfer has been developed in Vietnamese context, different research streams were combined to develop an integrated model and induce 13 hypotheses from the model.

Quantitative Research

The survey research aimed at testing the conceptual model of intra-organizational knowledge transfer in a setting of Vietnam' IT companies. The sample was 218 individuals working at 36 IT companies located in Hanoi and HCMC. The data collected were analyzed using regression statistical techniques.

A Case Study

The case study aimed at providing insights of an intra-organizational knowledge transfer process within an IT company in a transition economy. The case study was illustrations of how knowledge is being transferred among individuals and how does the company do in order to facilitate the transfer process.

Figure 1.1 illustrates the overall research strategy.

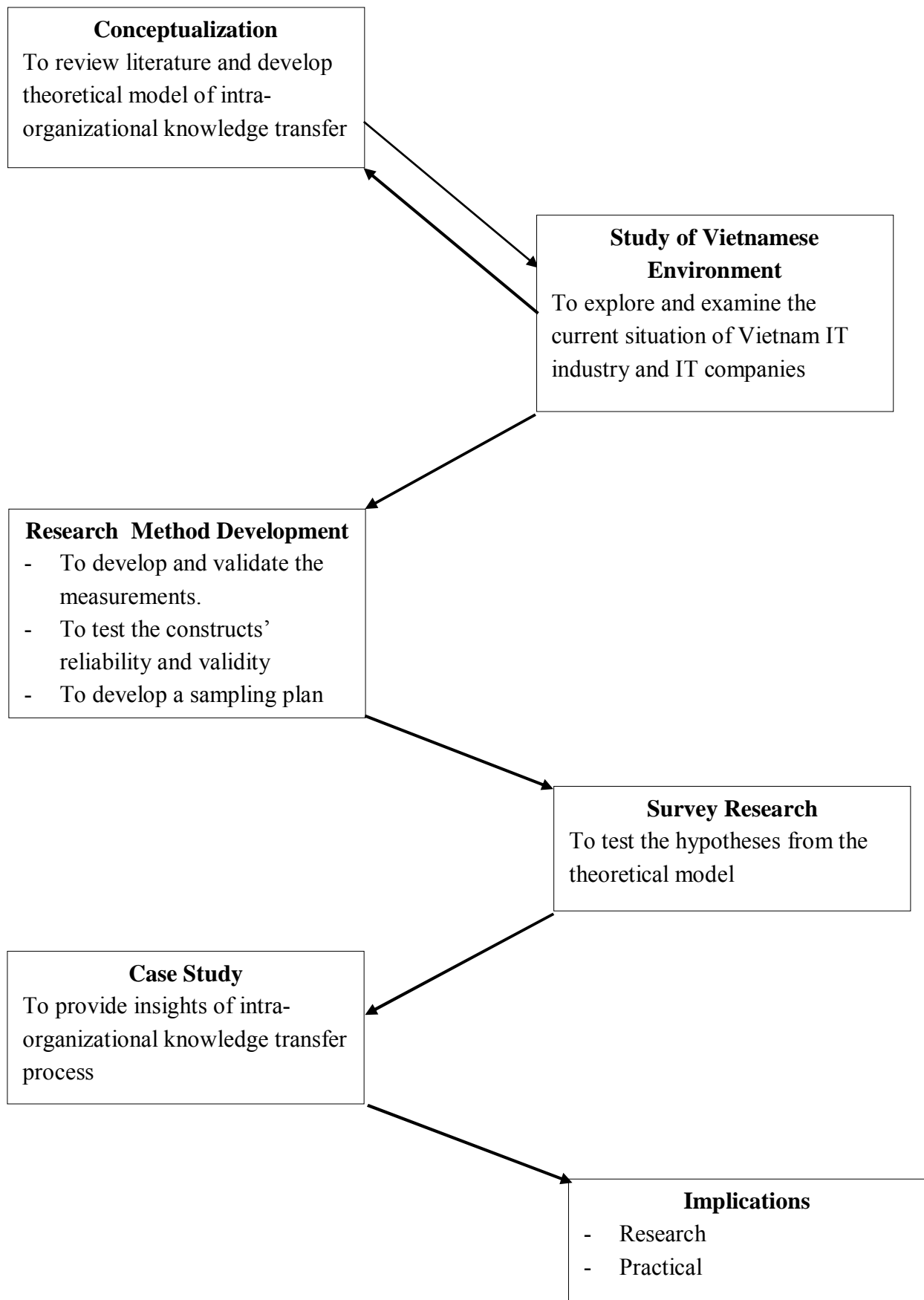


Figure 1.1: Research Strategy

1.5 Scope of the Study

The main study is to examine the impact of organizational factors on the knowledge transfer in IT companies including software service companies, software production companies, hardware companies belonged to the Vietnamese Software Association (VINASA) and listed in the Business Directory of the year 2007 provided by the Vietnam Chamber of Commerce and Industry. The scope of this research focuses on investigating the middle managers and directors of those companies who directly manage and control enterprises' operations. Technical staff are also another source of information and they can provide information for better understanding the leaders' behavior, culture, the mode and level of interaction, and their impact on their own attitudes and willingness in sharing knowledge with others as well as the level of knowledge transfer among them.

The information technology industry is a good context in which to examine the issue of knowledge transfer for several reasons:

- IT is a newly emerging industry. In both HCMC and Hanoi, a growing number of companies provide advanced software services. Most of these companies are newly established and only a few have operated for more than ten years. Vietnam's IT companies are still at the early stage of development and have a high capacity potential. Although the industry size is still small in comparison with that of other Asian countries, it has grown rapidly over the past 10 years. The average growth rate of the industry over the last 10 years is 28% per annum with revenue of US\$ 3 billion in the year 2006 (ICT Outlook, 2007). At present, ICT sector is quickly increasing its contribution to GDP growing from less than 1% in 1993 to 8% in 2006. Although the government is aware that the IT industry plays a key role in future economic development, the development of Vietnam's IT industry is still severely hampered by a lack of infrastructure, a restrictive legal and regulatory environment, inadequate manpower and low managerial skills. In order to compete internationally, Vietnam's IT companies not only need support from

government, but also need to build their own capabilities to better utilize the intellect and experience of their own employees.

- Workers in IT companies are mainly IT engineers, IT specialists, and programmers and are considered as highly-skilled workers (so called knowledge workers). In IT companies, most work is of an intellectual nature and the major part of the workforce consists of well-educated and qualified employees. Currently, Vietnam IT companies faced a shortage of high-skilled workers both in quantity and quality. The workforce for IT industry is a small proportion (around 20 thousand) of the overall 40 million working population. Only 20% of IT workforce is experienced. Although the government has policy to train and upgrade skills of IT workforce, the IT companies themselves have to find the most cost-effective way to train their own employees by facilitating the process of transferring expertise and experiences among employees.
- Vietnam's economy is being integrated into the global economy. The government is strongly determined to develop the IT industry and considers it as a priority for boosting economy development. In order to play in international market and compete against foreign companies in domestic markets, Vietnam's IT companies have to find the will and more effectively utilize their own workforce's intellectual capital to improve performance and innovation.

Empirical investigation was undertaken to generate data and information in support of the conceptual model. IT companies having more than 50 employees were targeted as these businesses need significant organizational capabilities in order to (i) manage process of knowledge transfer, and (ii) exploit the intellectual capital of their knowledge employees who possess diversified knowledge areas in management and expertise. Targeted companies are mainly located in Hanoi and in two software parks in HCMC.

In this research, the author focuses on investigating the organizational factors/context-factors influencing the intra-organizational transfer of task-related knowledge among employees of target companies.

1.6 Structure of the Thesis

The thesis consists of seven chapters including this Introduction Chapter. Chapter Two reviews the literature on knowledge management, and intra-organizational knowledge transfer models. The previous researches on organizational factors influencing intra-organizational knowledge transfer are also discussed and the theoretical framework and hypotheses developed for the research are presented. However since most of the reviewed studies have been conducted in developed countries, the theoretical hypotheses may not be readily generalized to the setting of Vietnam's IT companies. Chapter Three addresses this issue by presenting a brief overview of Vietnam IT industry and characteristics of IT companies. Chapter Four describes the research methodology. Both quantitative and qualitative methods are used. Data collection methods, and instrument development and measurements for all constructs and case study methods are presented. Chapter Five is devoted to data analysis and discussion of the main results of the empirical study. Chapter Six focuses on describing the intra-organizational knowledge transfer process within a chosen Vietnamese IT company. The deviation of the results between an empirical study and the case study is discussed. The final chapter concludes with summary of findings, managerial implications, limitations of the research and possible directions for future research.

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2.1 Knowledge Conceptualization

2.1.1 Knowledge Definition

The question of the knowledge nature is challenging. Although philosophers have been discussing the issue for many years, the search for a formal definition continues. The review of the literature has resulted in several definitions of knowledge.

For example, knowledge is a justified personal belief that increases an individual's capacity to take effective action (Nonaka, 1994). Action in this context refers to physical skills and competencies, cognitive/intellectual activity or both. It is described as "information combined with experience, context, interpretation and reflection", and "valuable information in action" (Davenport et al., 1998). Knowledge is "a dynamic human process of justifying personal belief towards the truth" (Nonaka and Takeuchi, 1995). Knowledge is defined as a set of structural connectivity patterns (Meyer and Sugiyama, 2007). The term "structural connectivity patterns" allows the inclusion of knowledge on different collective levels (individual and organizational). Knowledge is also defined as (i) facts, information, and skills acquired by a person through experience or education, the theoretical or practical understanding of a subject, (ii) what is known in a particular field or in total; facts and information; or (iii) awareness or familiarity gained by experience of a fact or situation (Wikipedia, 2007). Knowledge is not absolute, but dynamic in nature and context specific.

For the purpose of this study, the concept of knowledge developed by Davenport and Prusak (1998) is adopted because it is quite complete and reflects the contextual and personal aspects of knowledge:

Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates in the minds of knower. In organizations, it is often embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms.

Knowledge is fluid as well as formally structured; it is intuitive and therefore hard to capture in words or understand completely in logical terms. Knowledge is neither individually owned nor static, but embedded in individual employees, project teams, departments, and business units. It also resides in trading systems, business operations, innovation systems, thus it is dynamic and fluid in organizational processes and practices.

2.1.2 Data, Information and Knowledge

The distinction between data, information and knowledge has often been made in the literature. The three concepts can be arranged on a single continuum depending on the extent, to which they reflect human involvement with, and processing of, the reality at hand (Tsoukas and Vladimirou, 2001). This means data requires minimal human judgment, whereas knowledge requires maximum judgment. Judgment arises from the self-conscious desire to reorder, to rearrange and redesign what one knows and thus creates new angles of vision or new knowledge for a particular purpose.

Data represents raw numbers, objective facts and observations. It has no context and is not directly meaningful (Zack, 1999). Information is the result of placing data within a meaningful context. It can be conceived as processed data with relevance and purpose (Chennamaneni, 2006). Knowledge is something more than information (Greiner et al., 2007). It is validated and authenticated information that is ready to apply to decisions and actions (Alavi and Leidener, 2001). Knowledge involves the processing, creation or use of information in the mind of the individual. Knowledge is information combined with experience, context, interpretation, reflection and perspective (Davenport et al., 1998; Al-Alawi et al., 2007) that adds a new level of insight.

The above discussion suggests that: (i) a great deal of emphasis is given to understanding the differences between data, information, and knowledge and drawing implications from the difference, (ii) because knowledge is personalized, in order for an individual or a group's knowledge to be useful for others, it must be expressed in such a manner as to be interpretable by the receivers; and (iii) hoards of information are of little value, only that information which is actively processed in the mind of an individual through a process of reflection, enlightenment, or learning can be useful.

2.1.3 Knowledge Classification

Regarding the attribute of knowledge, most knowledge experts agree that knowledge is either explicit or tacit (Nonaka and Takeuchi, 1995; De Long and Fahey, 2000; Steward, 1999, Greiner et al., 2007; Lee et al., 2007).

Tacit knowledge is personal, intuitive, insightful, context-sensitive, dynamically created and experienced-based, subjective and experiential (Nonaka, Toyama and Nagata, 2000; Greiner et al., 2007), and resides within the minds of people (Steward, 1999). It is hard to formalize and communicate to others. Tacit knowledge is deeply rooted in an individual's actions and experience, as well as in the ideals, values or emotions he or she embraces (Nonaka and Konno, 1998). It is something known but not easily articulated (Dixon, 2000). It is more problematic because it is not so easily disseminated (Mullin, 2005). This suggests that tacit knowledge is non-transferable without the exchange of key personnel and all the systems that support them, and may be best transferred through more interpersonal means and using processes that are less structured.

By contrast, explicit knowledge is knowledge that has been or can be articulated, codified, and stored in certain media (Greiner et al., 2007). It can be readily transmitted to others. The most common forms of knowledge are manuals, patents, reports, documents, assessments, and databases (Wikipedia, 2007). This suggests that explicit knowledge can be transferred through more technology-driven, structured processes such as information systems (Martensson, 2000). Organizations need to be aware that the type of knowledge may be critical factor in deciding on the type of process needed to facilitate the knowledge management process in general, and the knowledge transfer process, in particular.

In addition to classification of the nature of knowledge, according to the view of the social system, knowledge can be classified as human knowledge, social knowledge and structured knowledge (De Long and Fahey, 2000) or declarative, procedure, and causal knowledge (Quinn et al., 1996). Human knowledge or individual knowledge constitutes what individuals know or know how to do. It manifests in skill or expertise and usually combines both explicit and tacit knowledge. Social

knowledge exists only in relationships between individuals or within groups. It is largely tacit knowledge shared by group members and develops only because of interaction among individuals. Structured knowledge is embedded in an organization's systems, processes, tools and routines. Knowledge in this form is explicit.

Table 2.1. Classification of Knowledge

Knowledge Type	Definitions	Sources
Tacit	Knowledge is rooted in actions, experience, and involvement in specific context. It is created through intensive interaction, formal and informal communication, and shared long-term goals and vision.	Dixon (2000) Mullin (2005) Greiner et al. (2007) Lee et al. (2007)
Explicit	Articulated, generalized knowledge. Explicit knowledge can be formally codified, stored, and easy to be transferred by using ICT. It is under a form of transcriptions of work processes, paper or electronic documents.	Martensson (2000) Greiner et al. (2007) Lee et al. (2007) Mullin (2005)
Individual	Created and inherent in the individual.	De Long, Fahey (2000)
Social	Created and inherent in collective actions of a group.	
Structure	Embedded in an organization's systems, processes, tools and routines.	De Long, Fahey (2000)
Declarative	Know-what: is knowledge of the things.	Lowendahl et al. (2001) Quinn et al (1996)
Procedure	Know-how: is knowledge of how to do things.	
Causal	Know-why: requires a deeper understanding of interrelationships across knowledge areas-it may require a systematic perspective and provides more robust knowledge framework for grounding decisions and actions in complex, uncertain context.	
	Care-why: requires socially contextualized knowledge.	

2.2 Knowledge Management Activities

2.2.1 Knowledge Management Definitions

There are numerous definitions of knowledge management existing in the literature due to the wide range of interest, perspectives and issues represented by various authors. There is an agreement that three major paradigms of knowledge management exist: (i) information technology paradigm, (ii) humanist paradigm; and (iii) holistic approach paradigm (Maier, 2002; Gloet and Berrell, 2003).

Table 2.2: Knowledge Management Definitions

KM Paradigm	Definitions of Knowledge Management	Sources
IT Paradigm	KM is defined as the “collection of processes that govern the creation, dissemination and utilization of knowledge to fulfill organizational objectives”.	Alavi, Leidner (2001)
	“For the most part, KM efforts have focused on developing new applications of information technology to support the capture, storage, retrieval, and distribution of explicit knowledge”.	Grover, Davenport (2001)
	“KM envisions getting the right information within the right context to the right person at the right time for the right business purpose. KM includes the entire cycle of the discovery, creation, storage, dissemination, and utilization of knowledge”.	Kim, Trimi (2007)
	“KM is the generation, representation, storage, transfer, transformation, application, embedding, and protecting of organizational knowledge”.	Schultze, Leidner (2002)
Humanist Paradigm	“KM is achieving organizational goals through the strategy-driven motivation and facilitation of knowledge workers to develop, enhance and use their capability to interpret data and information, experience, skills, culture, character, personality through a process of giving meaning to these data and information”.	Beijerse (1999)
	KM is a “systematic and organizationally specified process for acquiring, organizing, and communicating both tacit and explicit knowledge of employees so that other employees may make use of it to be more effective and productive in their work”.	Alavi, Leidner (1999)

KM Paradigm	Definitions of KM	Sources
	KM is a “conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve organizational performance”.	O’Dell, Jackson (1998)
	“KM is the process of capturing firm’s knowledge and using it to foster innovation through a spiral of organizational learning”.	Nonaka, Reinmoeller (2000)
	“KM refers to the critical issues of organizational adaptation, survival and competence against discontinuous environmental change. Essentially, it embodies organizational processes that seek synergistic combination of data and information-processing capacity of information technologies, and the creative and innovative capacity of human beings”.	Malhotra (2000)
	“KM is the process of capturing and making use of a firm’s collective expertise anywhere in the business within the framework of trading partners – on paper, in documents, in databases or in people’s minds”.	Kumar, Thondikulam (2006)
	KM includes all the activities that utilize knowledge to accomplish the organizational objectives in order to face the environmental challenges and stay competitive in the market place.	Greiner et al. (2007)

Information Technology Paradigm: IT paradigm focuses on information technology as the main tools to support the knowledge management process. It focuses on the tangible aspects of knowledge management. Consequently, issues of technology application tools, hardware and software systems are the main concerns. KM is considered as a mean of processing information for various business activities that ensure getting the right information to the right person at the right time.

Humanist Paradigm: The concept of a people-oriented perspective of knowledge management is the notion that individuals in organizations have knowledge that must be moved to the level of groups and the organization as a whole, so that it can be used to advance the goals of the organization (Grant, 1996). This perspective focuses on process of facilitating individuals to develop, enhance and use their capability to interpret and give meaning to data and information. KM is the

collective learning processes that take place at different levels of the organization (Stenmark, 2001). KM is conceptualized as a process of creating, transferring and integrating individual knowledge within the organization to drive for organizational knowledge that is a source of competitive advantage.

The humanist paradigm mainly focuses on human factor and is more concerned with tacit forms of knowledge and factors affecting the human learning and behavior such as organizational culture, structure and leadership. There is increasing recognition of the role of individuals in the knowledge management process and a growing interest in the perspective of knowledge in organizations. The key to successfully manage knowledge depends on the connections among individuals within an organization.

Holistic Approach: The holistic approach encompasses both IT and humanist paradigms. Nevertheless, even the more holistic concepts do not really integrate the two directions (Maier, 2002). Most holistic approaches seem to focus on the human-oriented side and mention technology as one of the enabling factors without integrating it.

In the holistic approach, KM is defined as the management function responsible for the regular selection, implementation and evaluation of goal-oriented knowledge strategies, aimed at improving an organization's way of handling both internal and external knowledge in order to improve organizational performance, face the environmental challenges and stay competitive in the market place (Greiner et al., 2007). The implementation of knowledge strategies comprises all person-oriented, organizational and technological instruments that are suitable for dynamically optimizing the organization-wide level of competencies, education and learning ability of the members, as well as for developing collective organizational intelligence (Maier, 2002).

Despite the differences in knowledge management definitions, it seems that there are some common parameters in those definitions:

- Knowledge management is seen as the vehicle for organizational effectiveness and competitiveness.

- Knowledge or information, and/or experience, expertise are focal points.

However, most working definitions in the literature fundamentally point to the common idea that KM incorporates any or all of the following four components: (i) business processes, (ii) information technologies, (iii) knowledge repositories; and (iv) individual behaviors with the aim of improving organizational productivity and competitiveness. These four components permit organizations to methodically acquire, store, access, maintain and re-use knowledge from different sources.

2.2.2 Knowledge Management System

There are several definitions of KMS. Knowledge management systems are tools to effect the management of knowledge and are manifest in a variety of implementations (Davenport et al., 1998) including document repositories, expertise databases, discussion lists, and context-specific retrieval systems incorporating collaborative filtering technologies.

According to Alavi and Leidner (2001), “KMS refers to a class of information systems applied to managing organizational knowledge”. They are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage, transfer and application. “Knowledge management system is also considered as a system for managing knowledge in organizations, supporting creation, capture, storage and dissemination of expertise and knowledge” (Wikipedia, 2007). It enables employees to have access to the organization’s knowledge of facts, sources of information, and solutions. Then, they can use that knowledge in the context of their own roles. KMS offers organizations the ability to be flexible and response more quickly to changing market conditions, the ability to be more innovative, as well as improving decision-making and productivity (Alavi and Leidner, 2002).

2.2.3 Knowledge Management Process

There is an agreement among researchers on the process of knowledge management in the literature. The most current literature on knowledge management considers knowledge management as a process of creation (acquisition, or generation, or

identification), storage (codification), transfer (dissemination, or sharing, or distribution), utilization (application, validation) and renewal of purposeful knowledge that: (i) is needed by knowledge workers and aligned with an organization's business goals and strategies, (ii) addresses a problem or an opportunity for the organization; and (iii) is provided to the right person, at the right place and time (Bhatt, 2001; Alavi and Leidner, 2001, Moteleb and Woodman, 2007).

(a) Knowledge Creation

Knowledge creation refers to the development of new organizational expertise and capability (Nonaka et al., 2001). Knowledge originates within individuals or social systems. At the individual level, knowledge is created through cognitive processes such as reflection and learning. Through social and collaborative processes as well as individual's cognitive processes, knowledge is created, shared, amplified, enlarged, and justified in an organizational setting (Nonaka and Toyama, 2002). Social systems generate knowledge through collaborative interactions and joint problem solving.

(b) Knowledge Storage

Knowledge storage or knowledge codification refers to development of organizational memory (i.e., stocks of organizational knowledge) and the means for accessing its content. It is "the capture and representation of knowledge so that it can be re-used either by an individual or by an organization" (Ruggles, 1998). There are two types of organizational memory: internal and external. Internal memory refers to the stocks of knowledge that reside within individuals or groups of individuals in an organization. It consists of individuals' skills and organizational culture. External memory contains codified and explicit organizational knowledge databases.

Knowledge storage and retrieval seek to overcome the problem of knowledge loss through employee departure, by capturing and storing knowledge so that it survives the "knower", and can be retrieved easily and efficiently. This process involves organizing, identifying and accessing relevant knowledge from the organization's

memory, which may be in the form of written documentation, organizational procedures and structured information (Alavi and Leidner, 2001). Knowledge storage is a valuable process as it promotes knowledge re-use and prevents organizations from having to “reinvent the wheel” due to lost or inaccessible knowledge, thereby saving money, time and other resources (Davenport and Prusak, 1998).

(c) Knowledge Transfer

The knowledge transfer process involves the transmission of knowledge from the initial location to where it is needed and is applied. It is considered as an important facet of knowledge management. Some scholars have argued that it provides a firm grounding for developing a sustainable competitive edge in a business environment characterized by high levels of turbulence and innovation (Argote et al., 2000). There is a growing realization that knowledge transfer is critical to knowledge creation, organizational learning and performance achievement (Bartol and Srivastava, 2002).

Knowledge transfer enables knowledge to be accessed beyond the originating person or department to locations in the organization, where it is required and can be used (Alavi and Leidner, 2001). This can be accomplished through channels such as communication processes, information flows, informal seminars, conversations and the like. The effectiveness of these channels is contingent on the perceived value of information, the richness of transmission channels, and the motivational disposition and absorptive capacity of the people involved. Knowledge transfer adds value simply by enabling knowledge to be leveraged organization-wide. Knowledge transfer inside an organization is discussed in detail in Section 2.3.

(d) Knowledge Utilization

This is an activity of manipulating existing knowledge to generate new knowledge or produce an externalization of knowledge. This also refers to the use of knowledge for decision-making and problem solving by individuals and groups in organizations (Holsapple and Joshi, 1998). Through this process, knowledge gains value in the eye of the recipient (Grover and Davenport, 2001).

2.3 Intra-organizational Knowledge Transfer Process

2.3.1 Knowledge Transfer Concept

Although the concept of knowledge transfer is simple, its execution in an organizational setting is not. This is because organizations often do not know what they know and often have internal factors that hinder the transmission of different forms of knowledge between their various locations.

Along the development of the concept, several streams of literature have contributed to our understanding of different aspects related to this phenomenon. A literature search reveals several viewpoints.

The simplest approach to knowledge transfer is to consider knowledge transfer as knowledge sharing among people (Dyer and Nobeoka, 2000). Knowledge sharing implies the giving and taking of information framed within a context by participants involved. The received information is framed by the knowledge of the recipient. Since the source and the recipient may be different in their prior knowledge and their identities, they may have different perceptions and interpretations of the same information. The knowledge received by the recipient is not identical with that of the source. Knowledge sharing implies generation of knowledge in the recipient (Yang, 2007). According to Dixon (2000), there are five main types of knowledge transfer/sharing. These include serial transfer, near transfer, far transfer, strategic transfer, and expert transfer. Each of these differs according to the purpose, method, and ways in which they are implemented.

Some researchers view knowledge transfer as a process through which knowledge moves between a source and a recipient and where knowledge is applied and used (Szulanski, 1996, 2000; Carlile, 2004; Szulanski, Cappetta and Jensen, 2004). Within an organization, knowledge can be transferred among individuals, between different levels in the organizational hierarchy and between different units and departments. Szulanski (1996, 2000) defines knowledge transfer as “dyadic exchanges of knowledge between a source and a recipient in which the identity of the recipient matters”. The level of knowledge transfer is defined by the level of knowledge integrated within an individual and the level of satisfaction with

transferred knowledge expressed by the recipient. Almeida, Song and Grant (2002) view knowledge transfer as a process of creation, transfer, application and subsequent development through combination of the transferred knowledge with the recipient's existing knowledge.

Others focus on the resulting changes to the recipient by seeing knowledge transfer as the process through which one unit is affected by the experience of another (Argote et al., 2000). Similarly, Davenport and Prusak (2000) suggested that the knowledge transfer process involves two actions: (i) transmission of knowledge to potential recipient; and (ii) absorption of the knowledge by that recipient that could eventually lead to changes in behavior or the development of new knowledge.

Given the various definitions of knowledge transfer, key aspects of knowledge transfer are knowledge movement and its application by the recipient that could lead to creation of new knowledge or changes in behavior. In this research, the author takes both the process view and the outcome view on knowledge transfer by emphasizing three key dimensions of knowledge transfer. They include the volume of knowledge movement, the extent to which individuals incorporate acquired knowledge in their work within an organization, and the changes in behavior and/or performance of a recipient as a results of the knowledge transfer process.

To direct individual knowledge for organizational purposes, an organization should develop and nurture an environment of knowledge sharing, transformation and integration between its employees (Nonaka and Toyama, 2002). The core of transfer is often described in terms of finding effective ways to let people talk and listen to one another (Davenport and Prusak, 1998).

2.3.2 Knowledge Transfer Models

The two models of knowledge transfer are derived from existing literature: the communication model developed by Szulanski (1996, 2000) and the knowledge spiral model proposed by Nonaka, Toyama and Konno (2001). The communication model views transfer as a transmission from source to a recipient while the spiral model focuses more on the transformation of knowledge from tacit to explicit and

vice versa. This transformation occurs while knowledge moves from individual level to the organizational level.

In this study, the author adopted the knowledge transfer model of Szulanski (2000) since it is the most cited in existing literature and is suitable for examining the transfer of knowledge among individuals and/or units within an organization.

(a) The Communication Model

In the communication model, transfer is seen as a message transmission from a source to a recipient in a given context. The process follows four stages: Initiation, Implementation, Ramp-up, and Integration.

Initiation

This phase begins with the formation of the transfer idea and comprises all events that lead to decision to transfer. In this stage, organizational participants need to be aware that this knowledge exists within the context of the organization and they need to be aware that it may be feasible to use this knowledge to address their needs. In addition, organizational participants need to know what knowledge they need, what knowledge they use, and where that knowledge belongs. They also must know this to be able to collect information on how, when and where the knowledge can be of use to fulfill the purpose of implementing the knowledge transfer process. It is important to decide which information is useful and how it will be stored in the system, since the collection of uninteresting and meaningless information wastes time and other resources and should therefore be avoided (Davenport and Prusak, 1998). In this stage, the organizational participants need to be able to recognize the knowledge to be transferred.

To sum up, the initiation stage of knowledge transfer involves all events leading to a decision to transfer. This includes recognizing a need for knowledge, searching to satisfy that need, and exploring the feasibility of transferring knowledge identified to meet the need.

Implementation

This stage begins with decision to proceed. This decision may be taken formally in centralized authoritative manner, or informally, and in some cases, even it is unobservable. Once the decision to transfer knowledge has been taken, resources (pieces of communication and documents) can be released by one party and received by the other. In this stage, the adaptation of the knowledge occurs in both the sources and recipients. Knowledge is changed at the source location to meet the perceived need of the recipient. The ease of this transfer depends on the experiences the parties have acquired in earlier transfer, the similarity of the source and recipient, and the quality of the knowledge itself.

In summary, the implementation stage of knowledge transfer commences once a transfer decision is made. It encompasses the flow of knowledge resources from source to recipient, establishing social ties between recipient and source, customizing the transfer to suit recipient needs, and avoiding problems that may have been encountered in prior transfer.

Ramp-up

The ramp-up stage begins when the recipient starts using the transferred knowledge, i.e., after the first day of use. In this stage, the new knowledge will be proved valuable in a different context. The recipient of the knowledge starts to apply the knowledge to solve problems in his/her daily work. In this stage, the recipient starts to evaluate the knowledge according to its ease of implementation and application, and the success it will bring to solving his/her problem.

Integration

The integration stage begins after the recipient achieves satisfactory results of applying transferred knowledge. In this stage, the recipient gradually applies the knowledge in solving problems that arise during their work. Use of the transferred knowledge gradually becomes routine. As the time passes, a shared history is developed and knowledge transfer between the sources and the recipients is

increased. The knowledge can flow more freely and adds new applications to existing knowledge.

(b) The Spiral Model

The spiral model (knowledge conversion model) was firstly developed by Nonaka and Takeuchi (1995), and then expanded by Nonaka, Toyama and Konno (2001). They view knowledge creation as a continuous process involving a continual interplay between tacit knowledge and explicit dimensions of knowledge. The model of knowledge creation consists of three elements: (i) the SECI process, (ii) “Ba” as a shared context for knowledge creation; and (iii) knowledge assets, the inputs, outputs, and moderators for knowledge creating process

SECI is a process of knowledge creation through conversions between tacit and explicit knowledge. It consists of four modes including Socialization, Externalization, Combination and Internalization that facilitates the conversion of knowledge from the individuals to organizational level.

- Socialization (tacit to tacit) is the exchange of tacit knowledge among members to create common mental models and abilities. Socialization transfer of tacit knowledge most frequently occurs through the medium of shared experience. It takes place through joint activities, observation, imitation and practice rather than written or verbal instructions.
- Externalization (tacit to explicit) is the process of articulating tacit knowledge and transforming it into models, concepts, analogies, stories, and metaphors that can be communicated by language. Externalization is considered to be a key phase in the creation of new knowledge and is induced by dialog, collective reflection, writing. Computer-based techniques (visual modeling, decision support systems etc.) are able to support individuals to describe, express and explain their inherent conceptualization and are prominent in the externalization phase.
- Combination (explicit to explicit) is the process of combining or reconfiguration of bodies of existing explicit knowledge in order to generate new explicit

knowledge. Knowledge combination is strongly supported not only by computer-based technologies, as in externalization, but also by networks. Databases, classification methodologies, web-based tools, intranet and the Internet are focal tools.

- Internalization (explicit to tacit) is the process of adding to explicit knowledge (principles, procedures, methodologies) and new tacit knowledge (in the form of sensations, memories, images) through experimenting in various ways, such as through real life experience, or simulation through the use of software. The individual acquiring the explicit knowledge embodied in action and practice can re-experience what others go through.

The knowledge spiral model has helped us to understand how intimately connected the processes of transferring and creating knowledge are. The ideal creation of knowledge in organizations is a process that amplifies the creation of knowledge by individuals and adds its results to the knowledge network of the organization. In the model, the basis of knowledge creation in organizations is a continuous interaction (transfer) among individuals, and continuous conversion from tacit into explicit knowledge (and vice versa) by individuals, supported by the group.

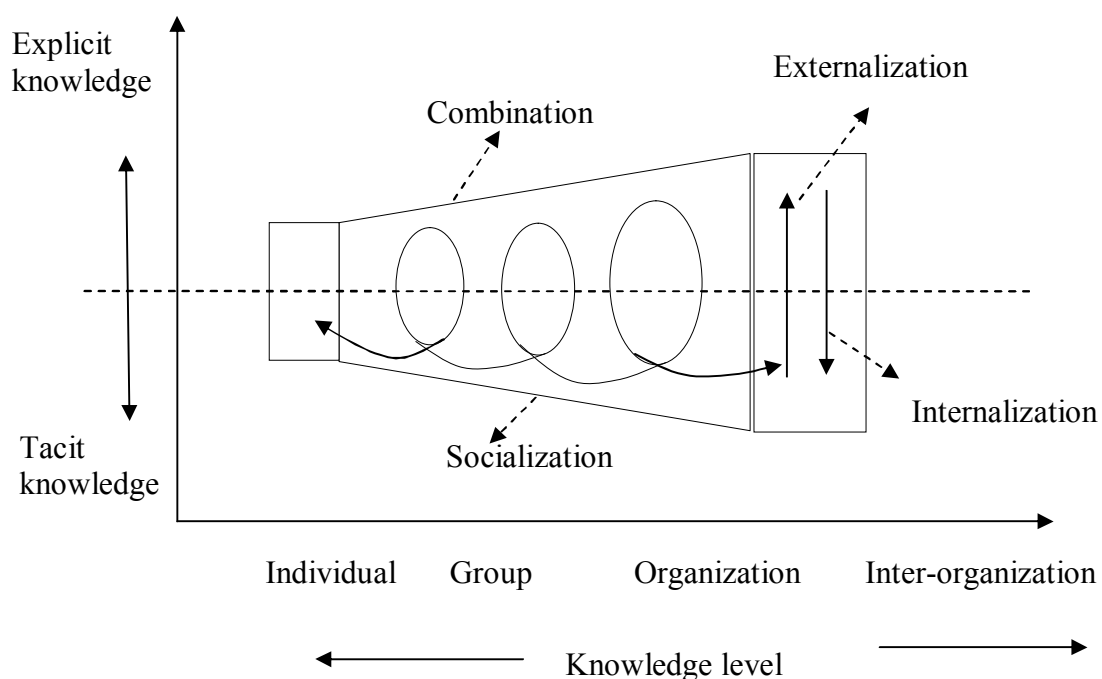


Figure 2.1. Knowledge Transfer Model adapted from Nonaka and Takeuchi

However, the SECI process alone is not enough for knowledge creation and conversion. It requires “ba”, a shared space for emerging relationships. These relationships enable the conversion of knowledge within the SECI model, thus providing a platform for individual and collective knowledge. For each mode of knowledge transfer in the SECI model, there is a corresponding type of “ba” suited to that conversion mode. Originating “ba” is where people share feelings, emotions, experiences and mental models through physical, face-to-face contact. It is the primary “ba” where the knowledge creation process begins. Interacting “ba” is characterized by dialogue through which individual knowledge is converted into shared terms and concepts. It is marked by extensive use of metaphors. In contrast, cyber “ba” is a place of interaction in the virtual world, facilitated by the use of information technology such as on-line networks and groupware. Exercising “ba” facilitates the conversion of explicit knowledge to tacit knowledge for the individual, which is enhanced primarily by using explicit knowledge in real life or simulated applications.

The two models of knowledge transfer complement each other. On the one hand, the communication model demonstrates the steps involved in the process of knowledge transfer among individuals and organizational units. On the other hand, the spiral model shows how the conversion between tacit knowledge and explicit knowledge, through the interaction among individuals, could facilitate the conversion of knowledge from individual to organizational levels.

2.4 Role of Knowledge Transfer in an Organization

Knowledge itself or holding knowledge does not necessarily lead to a competitive advantage. Only effective use of the knowledge, for example, efficient integration of knowledge or combining new and existing knowledge may lead to a best practice (Grant, 1996). Knowledge transfer may enable firms to capitalize on best practices and create advantages such as strengthening of the organizational knowledge base and better flexibility in responding to the firm’s environment (Argote and Ingram, 2000). Knowledge flows enable the transmission of unique solutions from one unit to others, the coordination of various connected units, and the collaboration among

them. As a result, knowledge flows enable global managers to seize a larger scope of opportunities more quickly and more efficiently.

2.5 Factors Influencing Intra-organizational Knowledge Transfer

This section provides an in-depth review of four organizational factors that are mostly cited as influencing factors in knowledge transfer. The relationship of these factors and intra-organizational knowledge transfer is discussed in detail.

2.5.1 Information Technology Tools

(a) Information Technology Classification

Information technologies are classified by different ways in earlier literature. Researchers classify information technologies either by technological functions or by their support for critical knowledge management activities and strategies.

Huber (1990) defines advanced information technology including computer-assisted communication technologies (e.g., email, video conferencing, electronic bulletin boards) and computer-assisted decision-aiding technologies (e.g., decision support systems, expert systems). This classification has received broad acceptance, for it captures the core functions of different information technologies and provides a good conceptual theory for conducting empirical work (Song et al., 2001).

From a broader view of information technology, Kendall (1997) proposes a classification that includes production-oriented technologies, coordination-oriented technologies, and organizational-oriented technologies. This system of classification provides comprehensive coverage of a wide range of technologies. Typical elements of production-oriented technologies are speech recognition and expert systems, which can improve user interaction with decision models, make data entry more efficient and effectively organize and retrieve information. Coordination-oriented technologies (e.g., email, video conferencing, group support system, wiki) provide ways to enable, intensify, or expand the interactions of multiple agents in the execution of a decision. The technologies can be used to help reduce geographical and/or time constraints and result in better coordination of distributed business activities (Greiner et al., 2007). Organizational-oriented technologies include

support functions that allow individuals and organizations to accomplish typical office tasks more efficiently and effectively.

Mentzas et al. (2001) classify information technologies using two dimensions reflecting Hansen et al.'s (1999) two knowledge management strategies: process-centered, versus product-centered. In the process-centered approach, knowledge is closely tied to the person who develops it. It is also shared mainly through person-to-person contacts. The main purpose of information technologies (e.g., email, real-time messaging, and discussion groups) in this approach is to help people communicate knowledge, not to store it. This approach is also referred to as the personalization approach. The product-centered approach focuses on knowledge documents, their creation, storage and reuse in computer-based corporate memories. This approach is also referred to as “codification” approach. The information technologies used in this approach include file management system, structured document repositories, intranet, knowledge maps, etc.

On the other hand, some researchers (e.g., Apostolou and Mentzas, 1998; Laudon and Laudon, 2004; Kim and Trimi, 2007) categorize IT in accordance with the core tasks of knowledge management: knowledge creation, knowledge storage, knowledge transfer and knowledge applications.

In this study, information technology is categorized according to its functions and its support for the knowledge transfer process within an organization. Table 2.3 lists several key communication-aiding technologies and decision-aiding technologies that are commonly used to support knowledge transfer.

Table 2.3. Information Technology Tools Supporting Knowledge Transfer

IT Tools	Descriptions	Functional Aspects	Sources
Collaboration Support Systems	Integrated information and communication technologies designed to facilitate interactions among individuals in support of organizational collaboration during task performance.	- Aims at improving group collaborative interactions by providing techniques for structuring task interactions and systematically directing the pattern, timing, content and recall of group discussions.	Alavi and Leidner (2001)

IT Tools	Descriptions	Functional Aspects	Sources
Intranet	An internal network based on Internet and WWW technology and standards. It is the application of internet technology for a prescribed community of users. It does not only permit sharing information, but it also views the organization's information through Web browsers like Internet Explorer and Netscape Navigator.	<ul style="list-style-type: none"> - A cost-effective standardized technological solution to deal with information chaos. - The central building block for robust infrastructures to help facilitate knowledge flows within an organization and to identify trends and connections based on facts and figures that would be impossible for human minds to process. - A communication tool to facilitate the direct conversion/creation of both contingently and inherently tacit knowledge. - A tool to help organizations create a richer, more responsive information environment. A principal use of intranets has been to create online repositories of information that can be updated as often as required. - A rich set of tools for creating collaborative environments in which members of an organization can exchange ideas and share information regardless of their physical location. - A tool, which is widely used to expand an organization's access to information and knowledge. 	<p>Laudon and Laudon (2004)</p> <p>Damsgaard and Scheepers (2001)</p> <p>Hall (2001)</p> <p>Goh (2002)</p> <p>Kim and Trimi (2007)</p>

IT Tools	Descriptions	Functional Aspects	Sources
Internet	A worldwide system of computer servers from which users at any computer can extract information or knowledge.	- The unified surface and access to various sources of information make this technology perfect for the distribution of knowledge.	Wagner et al. (2005)
Electronic Bulletin Board	A place where a question can be posted electronically and various knowledgeable experts who know the answer can then respond with the required knowledge.	- Having such a network in place can be extremely useful since problems can occur at any time, and having a network of experts available when problems arise is a valuable resource.	Dixon (2000)
Blog	A web log is a web application, which contains periodic posts on a common webpage. Such a website would typically be accessible to any internet user. The format of Web logs varies, from simple bullet lists of hyperlinks, to article summaries with user provided comments and ratings. Individual web log entries are usually dated and time-stamped, with the newest post at the top of the page.	<ul style="list-style-type: none"> - Many web logs enable visitors to leave public comments. - Blogs allow individual users or groups to maintain ongoing (usually daily) diary-like postings that can be read and commented on by all visitors. Unlike wikis, blog, and klog entries can only be edited by the author. - These tools do a great job of “humanizing” the technology used for knowledge sharing because they represent the voice and personality of the author. 	Ras et al. (2005) Wikipedia (2007)
Wiki	A webpage whose contents can be edited and added by its visitors. The users are allowed to design not only the contents but also the structure. Any content in a wiki can be changed, updated or deleted by anyone.	The biggest advantage with the wiki was that users could easily update and add information. This way they could share solutions and development tips with others without having to go, as earlier, via the infomaster.	Ras et al. (2005) Wikipedia (2007) Greiner et al. (2007)

IT Tools	Descriptions	Functional Aspects	Sources
Enterprise Information Portal	Application that enables company to provide users with single gateway to internal and external sources of information.	<ul style="list-style-type: none"> - Aims at directing individuals to digital knowledge objects and information system applications. - Helps individuals make sense of the volume of information that is available and showing how organizational knowledge resources are interconnected. - Is a useful tool to facilitate knowledge transfer between knowledge repositories and individuals. 	Alavi and Leidner (2001)
Groupware	<p>Groupware includes software for group writing, and commenting, information sharing, electronic meetings, scheduling, email and a network to connect the members of group as they work on their own desktop computers, often in widely scattered locations.</p> <ul style="list-style-type: none"> - Groupware can provide the medium for organizational dialogues, which create a computable record of semi-structured documents. 	<ul style="list-style-type: none"> - Supports person-to-person collaboration, maximizes human interaction while minimizing technology interference - Offers a platform for communication within a firm and for cooperation among employees. - Allows people to freely exchange opinions and collaborate. It helps to externalization of tacit knowledge by permitting collaboration and exchange of non-structured messages. Groupware with typical applications of discussion group, email and chat, can facilitate an interaction with a quality near to face-to-face conversation. 	<p>Laudon and Laudon (2004)</p> <p>Carvalho and Ferreira (2001)</p> <p>Coleman (1999)</p> <p>Alavi and Leidner (2001)</p> <p>Kim and Trimi (2007)</p>

IT Tools	Descriptions	Functional Aspects	Sources
Knowledge Repository	A collection of documented internal and external knowledge in a single location for more efficient management and utilization by the organization. It is an online computer-based storehouse of expertise, knowledge, experiences, and documentation about particular domain of expertise.	- In creating knowledge repository, knowledge is collected, summarized and integrated across sources. Such repositories are sometimes referred as “corporate memories”.	Laudon and Laudon (2004)
Video-Conferencing	Teleconferencing in which participants see each other over video screen. Teleconferencing allows a group of people to confer simultaneously via telephone, email.	- Enables real time sharing documents, text, or video within a group. Conferencing can support both scheduled and spontaneous sharing of information, ideas, knowledge and expertise.	Laudon and Laudon (2004) Silver (2000)
Decision Support Systems	Computer-based systems that support unstructured decision making in organizations through direct interactions between data and analytical models.	- Useful tool for combining highly structured information with unstructured information in a problem-specific context.	Alavi and Leidner (2001) Arnott (2004)

(b) Role of Information Technology in Supporting Knowledge Transfer

Organizations routinely engage in the generation, capture, and use of knowledge in order to develop and deliver their products and/or services, and to compete effectively in the market place. Recently, however, there has been a trend toward the application of advanced information technologies (e.g., the Internet, intranet, data warehouse, etc.) to systematize, facilitate an organization’s knowledge. Many organizations employ information technologies to facilitate sharing and integrating of knowledge (Kankahalli et al., 2003; Tsui, 2005).

The role of IT in knowledge management has caused considerable controversy in the literature. On the one side, information technology is recognized as a key for

knowledge management. It is the critical resource for supporting KM (Edwards et al., 2005; Kim and Trimi, 2007). On the other side, IT is considered as a peripheral issue compared with the fundamental problems of knowledge management.

Information technologies influence knowledge transfer in various ways as follows:

On the one hand, communication aiding technologies help to accelerate the speed of knowledge transfer (Davenport and Prusak, 1998; Kim and Trimi, 2007) and increase transmission capacity, which enable exchange of a vast amount of information (Robert, 2000), which dramatically reduce costs (Edwards et al., 2005). In addition, these technologies help to overcome space and time constraints in communication, increase range and depth of information access and ultimately enable knowledge to be shared more rapidly, more conveniently, and yet less expensively (Lucas, 1998). They enable co-presence without co-location (Robert, 2000). In other words, information technologies enable people's communication regardless of physical distance.

On the other hand, decision-aiding technologies help individuals or organizations to create models and develop alternatives and solutions for their tasks. Advancement in decision-aiding technologies has expanded "decision aiding" to include not only decision-making but also planning, idea generation, and negotiation (Song et al., 2001; Arnott, 2004). While communication-aiding technologies are concerned with communication, decision-aiding technologies are concerned with tasks. Functions of decision-aiding technologies, in general, include "storing and retrieving large amounts of information rapidly, more accurately combining and reconfiguring information, and more compactly using the inputs and models developed by experts" (Huber, 1990).

2.5.2 Organizational Culture

(a) Definition of Organizational Culture

There are many ways to define organizational culture in the literature. These definitions range from the simple to the complex, and incorporate, extend previous

definitions. The definitions of organizational culture can be grouped into two classes:

Definitions Based on Shared Values

A number of scholars have focused on shared values as the central feature and distinguishing characteristic of a culture. Values refer to the relationships among abstract categories that are characterized by strong effective component, and imply a preference for a certain type of action (Robin, 2001). Once a value is learned, it is integrated into an organized system of values where each value has a relative priority. This value system is relatively stable in nature but can change overtime, reflecting changes in culture.

Along this view, perhaps, the most commonly known definition is “the set of values, beliefs and norms, meanings and practices” shared by personnel in an organization (Robbin, 2001), and guiding the action and thinking of people in an organization (Mullins, 2005). Culture serves as a sense-making mechanism that guides and shapes the values, attitudes, and behaviors of employees.

The given definitions of organizational culture suggested that organizational culture consists of patterned ways of thinking, based on value, that are shared across people in an organization. These values influence individuals’ cognition, attitude, and behavior.

Definitions Based on Outcome

Rather than trying to define culture from the perspective of its composition, another group of scholars has looked at the outcomes of culture. They focus on problem solving aspect. Schein (1992) views culture as “the sum total of all the shared and taken-for-granted assumptions that a group has learnt throughout its history”. Here, culture involves learning within a group as that group solves its problems of survival in an external environment and its problem of internal integration. Goffee and Jones (1996) define community culture as an outcome of how people relate to one another. Denison and Mishra (1995) define culture as “the underlying values... that serve as foundation for management practice”. Lastly, Moran and Stripp (1991)

give a goal-oriented definition of culture as “a group of problem-solving tools that enables individuals to survive in a particular environment”.

As discussed above, organizational culture may be a set of values, norms, a set of outcomes, or a way of being that is shared by people in an organization. It shapes, guides and influences the way people think and act in an organization.

(b) Dimensions of Organizational Culture

Organizational culture is reflected in both the visible and invisible aspects of the organization that can be observed at multiple levels in an organization (DeLong and Fahey, 2000). It manifests in artifacts (also called practices), espoused values (norms), and basic assumptions within an organization (Schein, 1992). Of these three aspects, the basic assumptions are the core dimension of an organizational culture. The most visible level of the culture is artifact. This includes physical space and layout, written and spoken language, and overt behavior. The next level is espoused values. Espoused values are non-discussable assumptions supported by an articulated set of beliefs, norms, and operational rules of behavior shared by the employees of a company. Values and beliefs become part of the conceptual process by which an organization's members justify their actions and behavior. The least visible level is basic assumptions. Basic assumptions over the years have become taken for granted and shared by the whole group. They are not debated and might be very difficult to change. They are implicit assumptions that actually guide behavior and determine how group members perceive, think and feel about things. Organizational culture often originates from the values and vision of the company's founders. It is shaped by top management's actions and behaviors.

Organizational culture serves three functions: legitimization, motivation, and integration. First, it provides members of the organization with socially legitimate patterns of interpretation and behavior for dealing with the organization's problems. Secondly, it provides members of the organization with a hierarchical motivational structure that links their identity to relevant roles and values. Thirdly, it provides members of the organization with a symbolically integrated framework that regulates social interaction and goal attainment through the creation of meanings.

Table 2.4. Definitions of Organizational Culture

Sources	Definitions of Organizational Culture
Robbin (2001)	Organizational culture is “a set of values, beliefs and norms, meanings and practices” shared by personnel in an organization.
Mullins (2005)	Organizational culture is “the collection of traditions, values, policies, beliefs, and attitudes that constitute a pervasive context for everything we do and think in an organization”.
Schein (1992)	Culture is “a pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems”.
Goffee and Jones (1996)	Culture is community. It is an outcome of how people related to one another. The community is built on shared interest and mutual obligations.
Denison and Mishra (1995)	Culture is “the underlying values, beliefs, and principles that serve as a foundation for an organization’s management system as well as a set of management practices and behaviors that both exemplify and reinforce these basic principles”. These principles and practices endure because they have meaning for the members of an organization. They represent strategies for survival that have worked well in the past and that the members believe will work again in the future.

(c) Types of Organizational Culture

There are currently three organizational cultural models in the literature. On the one hand, using social system approach, the models developed by Cameron and Quinn (1999), and Fey and Denison (2000) are a helpful framework for assessing and profiling the dominant cultures of organizations because they help individuals identify the underlying cultural dynamics that exist in their organizations. On the other hand, the model developed by Goffee and Jones (1996) focuses on behavior of individuals in an organization. Detailed discussion of each cultural model is presented below.

The Competing Value Framework developed by Cameron and Quinn (1999).

The framework consists of two dimensions. The first one differentiates effectiveness criteria that emphasize flexibility, from criteria that emphasize stability, order and control. The second dimension differentiates effectiveness criteria that emphasize an internal orientation, integration, and unity, from criteria that emphasize an external orientation and integration (Cameron and Quinn, 1999).

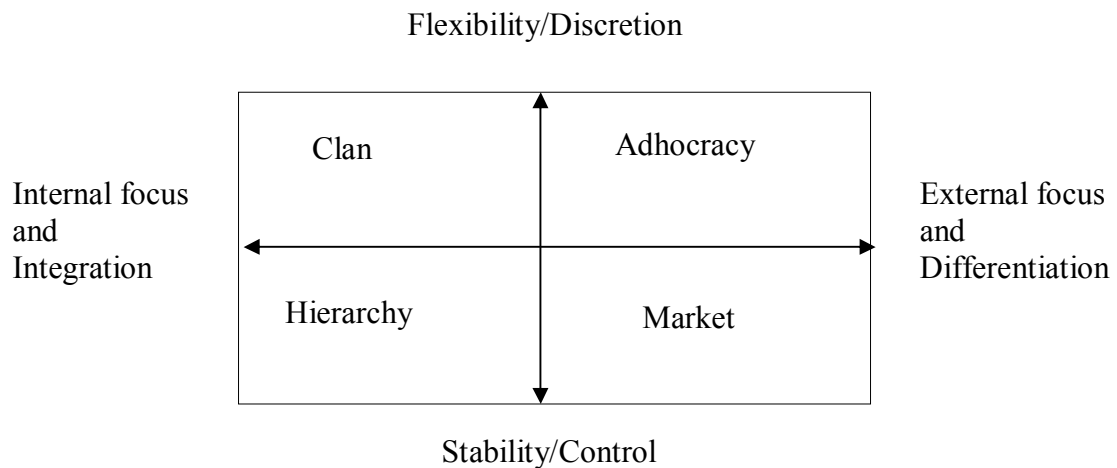


Figure 2.2. Type of Organizational Culture (Cameron and Quinn, 1999)

The Clan Culture: exists in an organization that focuses on internal maintenance with flexibility, concern for people, and sensitivity to customers. This type of organization has a sense of cohesion, with goals that are strongly shared. This culture is typified as a friendly place to work where people can share a lot of themselves. It is like an extended family with best friends at work.

The Adhocracy Culture: exists in an organization that focuses on external positioning with a high degree of flexibility and individuality. This organization emphasizes openness to change and innovation. People are willing to take risks. The readiness to change and new challenges are important.

The Hierarchy Culture: exists in an organization that focuses on internal maintenance with a need for stability, efficiency and control. This type of organization often relies on formal structures, policies and procedures to keep things running.

The Market Culture: exists in an organization that focuses on external positioning with a need for stability and control. This type of organization is concerned about productivity, consistency, results and the bottom line.

Based on the above cultural models, Fey and Denison (2000) go further by developing an explicit model of organizational culture and valid method to measure organizational culture. This model is based on four cultural traits of effective organizations.

Four Cultural Traits Model developed by Fey and Denison (2000)

This model focuses on the contradictions that occur as organizations try to achieve internal integration and external adaptation at the same time. For example, organizations that are market-focused and opportunistic often have problems with internal integration. On the other hand, organizations that are well integrated and over-controlled usually have a hard time adapting to their business environment. Organizations with a powerful top-down vision often find it difficult to focus on empowerment and “bottom-up” dynamics needed to implement that vision. Effective organizations are those that are able to resolve these contradictions without relying on simple trade-offs.

The four traits of organizational culture presented by Denison and Mishra (1995) have been expanded by Denison and Young (1999), and Fey and Denison (2000) to include three sub-dimensions for each trait, giving 12 dimensions.

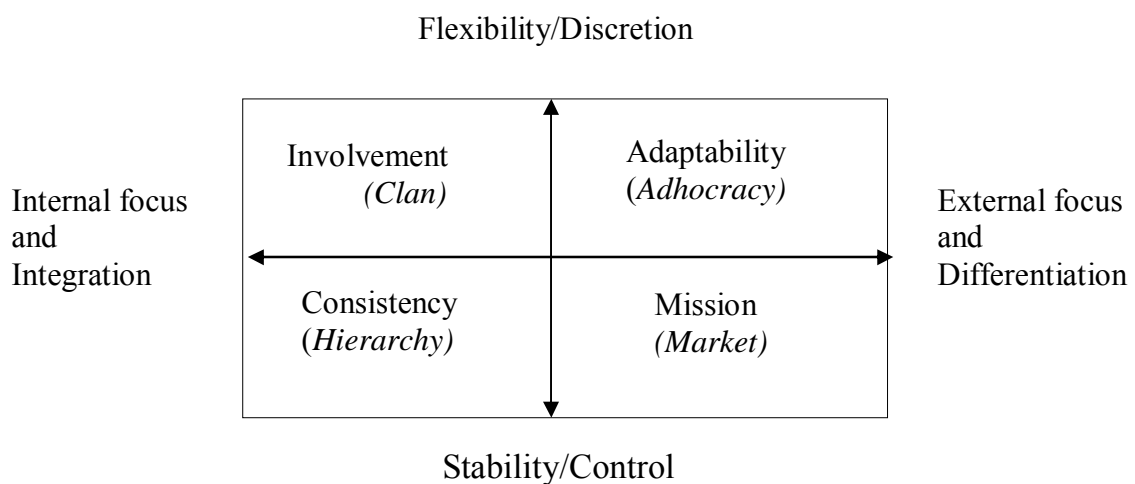


Figure 2.3. Integrated Organizational Culture Models

Following is brief description of four cultural traits of an effective organization:

Involvement: Effective organizations empower their people, build their organizations around teams, and develop human capability at all levels. All employees are committed to their work and feel that they own a piece of organization. People at all levels feel that they have at least some input into decisions that will affect their work, which is directly connected to the goals of the organization.

Consistency: Organizations also tend to be effective because they have “strong” cultures that are highly consistent, well coordinated, and well integrated. Behavior is rooted in a set of core values, and leaders and followers are skilled at reaching agreement even when there are diverse points of view. This type of consistency is a powerful source of stability and internal integration that results from a common mindset and a high degree of conformity.

Adaptability: Organizations that are well integrated are often the most difficult ones to change. Internal integration and external adaptation can often be at odds. Adaptable organizations are driven by their customers, take risks and learn from their mistakes, and have capability and experience at creating change. They are continuously changing the system, so that they are improving the organization’s collective abilities to provide value for their customers.

Mission: Successful organizations have a clear sense of purpose and discretion that defines organizational goals and strategic objectives and expresses a vision of how the organization will look in the future. When an organization’s mission changes, changes also occur in other aspects of the organization’s culture.

Culture Model developed by Goffee and Jones (1996)

According to Goffee and Jones (1996), all organizational cultures tend to vary along two dimensions: sociability and solidarity. Sociability is a measure of sincere friendliness among members while solidarity is a measure of community's ability to pursue shared objectives quickly and effectively regardless of personal ties.

Sociability creates an environment in which individuals are more likely to go beyond the formal requirements of their jobs. Sociability makes work more enjoyable, fosters teamwork, promotes information sharing, and creates openness to new ideas. Sociability is consistent with a high people orientation, high team orientation and focuses on process rather than outcome. High sociability means people do kind things for one another without expecting something in return and relate to each other in a friendly, caring way. However, it also means high prevalence of friendships that may lead to poor performance, and diminish debate.

By contrast, solidarity is mainly based on common tasks, mutual interests or shared goals that benefit all involved parties. Solidarity refers to the degree to which members of an organization share goals and tasks. It makes it easy for them to pursue shared objectives quickly and effectively, regardless of personal ties and generates a strategic focus, swift responses and a strong sense of trust. Solidarity creates the same standard for all employees, and then they often develop a strong sense of trust in the organization. This trust can translate into commitment and loyalty to the organization's goals. However, solidarity also has negative effects on organization. In such cases if the strategy of an organization is wrong, high solidarity is the equivalent of corporate suicide.

By combining these two dimensions, an organization's culture can be characterized as one of four types: communal, networked, fragmented and mercenary. Each type has its strengths and weaknesses, and no one is better than the other is. However, certain types of organizational culture tend to be more effective at promoting knowledge sharing than others.

Sociability	High	Networked	Communal
	Low	Fragmented	Mercenary
		Low	High
		Solidarity	

Figure 2.4. Organizational Culture Model (Goffee and Jones, 1996)

Each type of culture operates well in certain specific business conditions, and may have different impacts on the knowledge transfer process within an organization. In a networked culture (low solidarity and high sociability), individuals feel like family, often socialize, work well together, demonstrate strong loyalty, and complete works via informal network. In this type of culture, there is little commitment to shared business objectives and people tend to spend much of their time pursuing personal agendas. In a mercenary culture (low sociability and high solidarity), individuals do not interact socially but are united in supporting strategic business objectives. They are rushing to pursue specific targets, so they are often disinclined to cooperate, share information or exchange ideas. In a fragmented culture (low sociability and low solidarity), people rarely agree about organizational objectives. They often think that they are working for themselves and are rarely willing to share and interact with each other. A communal culture (high solidarity and high sociability) is characterized by informal communication, very high consciousness of organization identity, high focus on fairness and justice, and clear corporate goals and objectives. People of such an organization work very close together and likely socialize together. This type of culture functions well in an organization that requires extensive teamwork across departments for creating synergies and opportunities for learning and operates in a highly dynamic and complex business environment.

In this study, the author incorporates the three culture models given by Cameron and Quinn (1999), Denison and Young (1999), and Goffee and Jones (1996) to drive for several culture dimensions that capture all meanings of organizational culture. The integration enables identification of a specific type of culture and concrete cultural traits associated with knowledge transfer in an organization. A culture of an organization consists of different traits that can be categorized along two following behavioral dimensions: Sociability dimension including team orientation, collaboration, adaptability, and solidarity dimension including mission and consistency.

(d) Role of Organizational Culture on Knowledge Transfer

The importance of culture in the knowledge management domain is widely recognized (Gold, Malhotra and Segars, 2001; Al-Alawi et al., 2007; Lucas, 2006). Culture is particularly seen as a potential source of barriers for processes such as knowledge sharing and development (De Long and Fahey, 2000; McDemott and O'Dell, 2001; Gupta and Govindarajan, 2000; Mohamed et al., 2006; Riege, 2005).

The influencing relationship of culture and knowledge management gets most attention in the literature. Culture influences knowledge sharing since it shapes assumption about what knowledge is, determines the relationship between levels of knowledge, shapes the creation and adoption of new knowledge, and creates a context for social interaction (DeLong and Fahey, 2000). Culture influences the way knowledge flows throughout an organization via vertical, horizontal and lateral communications of individuals (Nonaka and Toyama, 2002).

In addition, culture strongly influences an employee's attitude, behavior, motivation and willingness to share knowledge and insights (Kwok and Gao, 2004). The more the person believes that information sharing is a social norm, that is, usual, correct, and a socially expected behavior, the more they will be willing to share. Therefore, the effectiveness of intra-organizational knowledge transfer is affected by the degree of organizational culture in influencing behavior and attitude of individuals towards knowledge sharing, developing trust and stimulating their interactions in an organization.

2.5.3 Organizational Structure

On the one side, organizational culture creates context for social interaction - informal communication among individuals in an organization - and thus may influence the process of knowledge transfer. On the other side, organizational structure - the basic lines of reporting and accountability that are typically drawn on an organizational chart - is clearly important for any organization in controlling communications and interactions as well as coordinating different parts and different areas of works in an organization (Mullins, 2005). Organizational structure

creates a framework and controls formal communication among individuals across management levels and/or across departments.

Organizational structure is defined as the way of organizing, grouping and coordinating work within an organization (Robbin, 2001). Structure is the pattern of relationships among positions in the organization and among members of the organization. Structure makes possible the application of process of management and creates a framework of order and command, through which the activities of the organization can be planned, organized, directed and controlled (Mullins, 2005). There are six dimensions that configure the structure of an organization, including work specialization, departmentalization, span of control, chain of command, centralization, and formalization (standardization) (Robbin, 2001). Two primary dimensions of organizational structure, centralization and formalization, have received more attention than any others (Tsai, 2002).

Centralization concerns the locus of the decision-making authority in an organization - the extent to which decision-making is concentrated in a single point or diffused throughout the organization (Tsai, 2002; Robbin, 2001; Brock, 2003). Centralization is measured by identifying the level at which decisions are made in organizations (Palmer and Dunford, 2002). A highly centralized organization is characterized by low level of employee participation in operational decision-making and high level of authority given to managers in strategic decision making (Tata and Prasad, 2004; Baum and Wally, 2003). Operational decisions involve day-to-day processes and procedures that influence one part of a company, whereas strategic decisions are more long-term and have a more global impact.

Formalization refers to the degree to which the work processes of an organization are explicitly represented and standardized under the form of written policies and rules (Robbin, 2001; Hosapple and Joshi, 2001). Formalized organizational structures are characterized by explicitly articulated and written firm policies, job descriptions, organization charts, strategic and operational plans, and objective-setting systems. (Baum and Wally, 2003). In highly formalized systems, little flexibility exists to determine who may decide or act or even how to decide or act.

High formalization level inhibits adaptability, open communication, and rapid competitive response. However, the formalization of routine tasks can enhance organizational memories that could have positive impact on firm performance. In formalized organizations, employees are expected to handle the same input in exactly the same way, resulting in a consistent and uniform output.

Low formalization level allows employees with high levels of self-management to exercise their full scope of authority and responsibility, and perform a range of tasks without constraining red tape and bureaucratic obstacles. In such situations, employees can have the flexibility to make decisions and the ability to response quickly to problems and opportunities without having to follow detailed rules and regulations (Robbin, 2001; Baum and Wally, 2003).

2.5.4 Incentive Systems

Incentive systems are sets of tools, which are employed to align the interests of individuals towards common organizational goals. Incentive systems define the process of how rewards are given for the performance of individuals.

Incentives are motivational instruments, which are applied by an organization. There are two types of incentives mentioned in the literature: monetary incentives and non-monetary incentives (Bau and Dowling, 2007). Monetary incentives are represented by salary, bonuses and performance-related pay, while non-monetary incentives are under the forms of recognition such as career advancement, and some special benefits (flexible work time, holiday). The two types of incentives influence individual's behavior differently. Monetary incentives can only satisfy individuals' basic needs, and are not well suited to satisfying desires for status and recognition. On the other hand, non-monetary incentives can reinforce specific behaviors of individuals, and satisfy higher level of needs.

Since sharing knowledge could lessen the value, weaken the power of the original owner of the knowledge (Nonaka and Toyama, 2002), it is possible that an individual will not cooperate or be willing to externalize his/her knowledge. Thus, sharing knowledge is often unnatural. People may be reluctant to share their knowledge if their efforts are not recognized and sufficiently rewarded in return.

Thus, the existence of incentives and appropriate incentive systems are important in fostering and maintaining the knowledge sharing behavior of knowledge of individuals.

Incentives and incentive systems can influence the knowledge sharing behavior of individuals in several ways. According to economic exchange theory, individuals will behave by rational self-interest. Thus, knowledge sharing will occur when its rewards exceed its cost (Constant et al., 1994). While economic exchange theory concerns extrinsic benefits, social exchange theory concerns intrinsic rewards. According to social exchange theory, individuals may share knowledge if they believe they could have intrinsic rewards (improvement of relationship with knowledge recipients, or recognition of organization's members) in return.

2.6 Conceptual Framework of the Study

2.6.1 Theoretical Foundation

The theoretical framework of this study is based on several theoretical streams: (i) knowledge-based perspective of the firm, (ii) communication theory, (iii) information and decision sciences, (iv) organizational learning theory; and (v) organizational behavior literature. The main idea of this study is to combine these perspectives to get a better understanding of the determinants of intra-organizational knowledge transfer in a setting of Vietnam's IT companies.

The knowledge-based theory of the firm pioneered by Winter (1987), developed by Kogut and Zander (1992) and strengthened by Nonaka and Takeuchi (1995) and Grant (1996), considers knowledge is the key productive resource of the firm and the ability to create, transfer and apply it efficiently within an organizational context, appears significantly important in building and sustaining competitive advantage. In supporting this view, Bierly and Chakrabarty (1996) conclude that organizational performance differences between firms are a result of their different knowledge bases and different capabilities in developing and deploying knowledge.

In an attempt to manage knowledge effectively, many researchers and practitioners try to find a relationship among factors influencing knowledge management

(enablers), knowledge management process and organizational performance. Knowledge management enablers (or influencing factors) are organizational mechanisms for fostering knowledge consistently (Ichijo et al., 1998). They can stimulate knowledge creation, and facilitate sharing of knowledge in an organization. Knowledge processes (knowledge management activities) are considered as a structured coordination for managing knowledge effectively (Gold et al., 2001). Typically, knowledge processes include activities such as creation, sharing, storage, and usage. Knowledge processes represent the basic operations of knowledge, and enablers provide the infrastructure necessary for the organization to increase the efficiency of knowledge processes. Organizational performance can be defined as the degree to which companies achieve their business objectives. It can also be defined as differences in operating characteristics over time or between organizations, e.g., a change in productivity, efficiency, service quality, profitability, growth and innovativeness (William, 2003). In a comprehensive way, organizational performance can be measured along four perspectives: financial perspective, internal process perspective, innovation perspective and customer perspective (Kaplan and Norton, 1996).

However, most prior studies have examined the relationship in isolation. For example, some researchers have investigated the relationship between enablers and knowledge management process (e.g., Goh, 2002; Bock and Kim, 2002; Claver-Cortés et al., 2007; Chen and Huang, 2007, Lee and Ahn, 2007; Tsai, 2001). Others focus on the relationship between enablers and organizational performance (e.g., Fey and Denison, 2000; Denison and Misha, 1995). The integrative model examining the relationship between enablers, knowledge management process and organizational performance has not received enough attention. There is a general recognition among academics that knowledge management is a cross-functional and multifaceted discipline. A variety of components makes up knowledge management and the understanding of the interactions are important in developing a useful holistic view. To this end, an integrative research model is necessary; that is, the relationships among knowledge enablers, knowledge transfer processes, and

organizational performance can be identified within the framework of systems thinking.

2.6.2 Previous Empirical Studies on Knowledge Transfer

Previous empirical studies have investigated the relationships among three groups of factors: (i) relationships between knowledge enablers (knowledge-related factors, context-related factors, sources and recipients-related factors) and knowledge transfer process, (ii) relationships between knowledge transfer processes and organizational performance; and (iii) relationships among knowledge enablers, transfer processes, and organizational performance.

The first category of empirical studies explores the relationships between knowledge enablers and knowledge transfer processes. Several empirical researchers investigated the relationship between knowledge characteristic (tacit vs. explicit) and knowledge transfer processes, finding that the higher the tacit level of the knowledge, the more difficult the knowledge transfer process is (Simonin, 1999). In relation to the characteristics of the knowledge source and recipient, absorptive and retentive capacity, and motivation either facilitate or hinder the knowledge transfer process. For example, Szulanski (1996), in a study of 122 transfers of organizational practices within eight firms, found out that the three greatest impediments to intra-organizational transfer were (i) causal ambiguity of knowledge, (ii) lack of absorptive capacity of the recipient; and (iii) an arduous relationship between the source and the recipient. These are all knowledge-related barriers. Levin and Cross (2004) employed the notion of complex knowledge to explain the role of weak ties in transferring knowledge in a multi-unit organization. Since the process of knowledge transfer within an organization is embedded in a social, organizational and relational context, investigating the effect of contextual factors on knowledge transfer process appears very important (Kostova, 1999). Several contextual factors including the organizational culture, organizational structure, incentive system and information technology are seen as factors that most influence the knowledge transfer process (Al-Alawi et al., 2007; Cabrera et al., 2006; Chen and Huang, 2007). Empirical studies on the relationship between organizational culture and knowledge transfer revealed that a

strong organizational culture, which values trust, openness and teamwork, has positive effect on knowledge transfer (Wensley, 2001; Ladd and Ward, 2002; Park et al., 2007; Molina and Llorens-Montes, 2006; Lai and Lee, 2007). Regarding the effect of organizational structure on knowledge transfer, Chen and Huang (2007), Lee and Choi (2003), Tsai (2001, 2002) and Gold et al. (2001) argued that formal hierarchical structures had a significant negative effect on knowledge sharing. Claver-Cortés et al. (2007) argued that flexible structure gives freedom to employees to communicate and take better advantages of their competencies. Lee and Ahn (2007), Sundaresan and Zhang (2004) suggested that reward is needed to facilitate knowledge sharing. However, when designing reward systems, managers need to be aware of potential problems relating to either individual-based reward or group-based reward. The role of information technologies in supporting knowledge transfer is also recognized (Wagner and Bolloju, 2005; Cabrera et al., 2006; Kwan and Cheung, 2006; Tsui, 2005; Robertson, 2004), yet their significant effect on knowledge transfer has not been confirmed.

The second category of empirical studies examines the relationships between knowledge enablers and organizational performance. The purpose of these studies is to sharpen the understanding of the effects of knowledge enablers (e.g., knowledge management strategy) on organizational performance (e.g., return on assets or return on sales). For example, Fey and Denison (2000) investigated the relationship between organizational culture and organizational effectiveness.

The emphasis of the third category of empirical studies is on relationships among knowledge enablers, knowledge transfer processes, and organizational performance. The primary objective of these studies is to identify and assess knowledge enablers (e.g., infrastructure capabilities) and processes (e.g., transfer) for improving organizational performance. Gold et al. (2001) analyzed two relationships: one between infrastructure capabilities and organizational effectiveness, and the other between process capabilities and organizational effectiveness. Lee and Choi (2003) examined (i) the relationship of knowledge creation processes with organizational culture, organizational structure and IT tools, (ii) the relationship of knowledge creation processes with organizational creativity; and (iii) the relationship of

organizational creativity with organizational performance. Song et al. (2001) examined the relationship of knowledge management activities with the application of information technologies and with the firm's innovation. Brachos et al. (2007) found that when units pursue knowledge transfer between their different actors, contextual factors such as trust, motivation to transfer knowledge, management support and learning orientation are crucial for fostering knowledge transfer and innovation. Yang (2007) argued that knowledge sharing would facilitate the transformation of collective individual knowledge to organizational knowledge without the existence of orphaned knowledge and knowledge depreciation. Furthermore, this would result in the advancement of organizational learning and eventually, the enrichment of organizational effectiveness. Darroch (2005) found that knowledge acquisition, knowledge dissemination and knowledge responsiveness have direct effect on company's innovation, but only responsiveness to knowledge directly contributes to financial performance. The study of Lee and Lai (2007) provided evidence showing that high technology firms having a clear description of KM strategy, and linking rewards to KM are more likely to pay attention to measurement performance for KM, especially, the performance measurements related to the customer and internal business process perspectives.

Table 2.5, presented in Appendix A, provides a brief description of previous studies on relationship among knowledge enablers, knowledge transfer process and organizational performance.

2.6.3 Synthesis of the Previous Empirical Studies on Knowledge Transfer

The synthesis of the above empirical researches on knowledge transfer reveals four weaknesses:

Firstly, an integrative model is still missing. Although some studies investigated the relationships among knowledge enablers, knowledge transfer processes, or organizational performance (Gold et al., 2001; Lee and Choi, 2003; Song et al., 2001, Darroch, 2005; Lee and Lai, 2007; Lee and Ahn, 2007; Molina and Llorens-Montes, 2006; Burgess, 2005), they failed to explore the relationships between enablers and processes simultaneously. The relationship between knowledge

enablers, knowledge transfer process and organizational performance is still understudied. If managers understand these relationships in an integrative fashion, they can stand a better chance of improving their company's performance.

Secondly, the role of knowledge transfer processes is not consistent. Some studies recognized both knowledge enablers and processes as antecedents of organizational performance (Gold et al., 2001). Other studies recognized knowledge enablers as preconditions of knowledge transfer processes (Szulanski, 2000, Al-Alawi et al., 2007, Voelpel and Han, 2007; Chen and Huang, 2007). Therefore, the challenge is to clarify the role of knowledge transfer processes.

Thirdly, measuring knowledge transfer performance is still difficult. Some studies captured the contribution by the use of knowledge transfer outcome measures such as the degree to which knowledge is re-created in the recipient and the extent of the recipient's learning (Joshi et al., 2004; Yang, 2007), or the changes in knowledge and/or performance of the recipient (Argote and Ingram 2000). It would appear that the former studies take the relationship between knowledge transfer outcome and organizational performance for granted. The results of the latter studies should be examined carefully because the direct relationship between knowledge transfer process and organizational performance has not been validated.

Fourthly, given the importance of knowledge transfer processes, most of the previous research attempted to examine the factors affecting the process of knowledge transfer across the organizational boundaries (between headquarter and subsidiaries or among partners in strategic alliances or joint ventures) (Lane et al., 2001; Simonin, 1999, Štrach and Everett, 2006; Casal and Fontela, 2007; Napier, 2005). Little attention has been given to studying knowledge transfer within an organization.

2.6.4 Conceptual Framework and Hypotheses

Knowledge transfer is a complex process that requires managers to balance and link both soft factors (organizational culture) and hard factors (IT, organizational structure, incentive systems) to create conditions for social interaction as precedence of knowledge transfer within an organization.

Reviewing previous literature indicates that most of the research either dealt with the transfer of knowledge from one organization to another or only reflected part of the problem. Intra-organizational knowledge transfer seems to remain understudied. Hence, the model represented in Figure 2.5 is developed by synthesizing the studies in existing literature and extending some factors and measurements that the author thinks could influence the process of intra-organizational knowledge transfer.

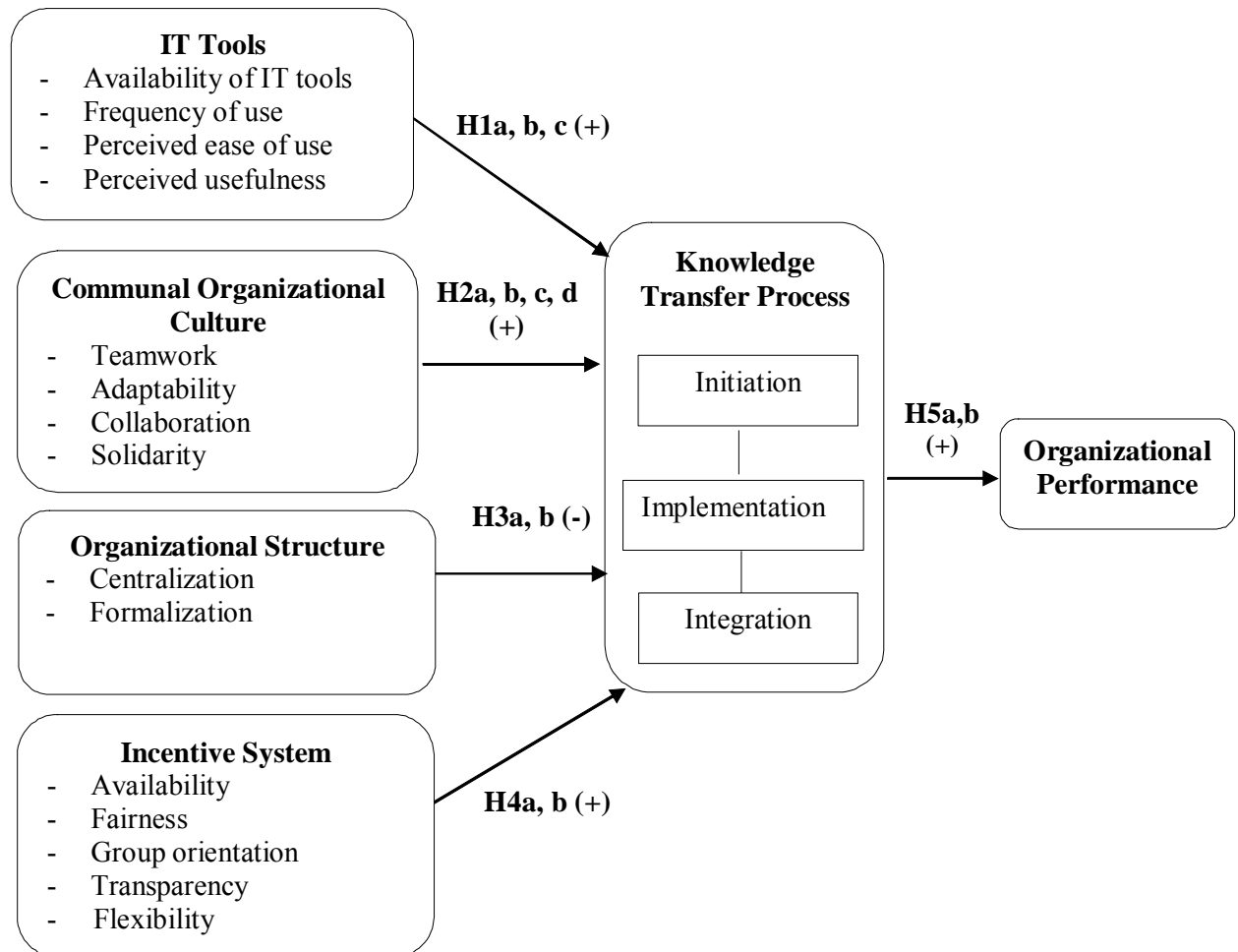


Figure 2.5. Conceptual Framework Developed for the Study

The following section examines each of the independent variables, the mediation variable and the dependent variable, and then proposes a number of hypotheses of relationships among variables.

(a) Information Technology and Knowledge Transfer

Traditionally, knowledge can be transferred within an organization via various means such as face-to-face interaction, mentoring, job rotation and staff development. However, as market and organizations become more global, these means may prove to be less effective and in need of supplementation by more efficient electronic methods (Alavi and Leidner, cited in Barnes, 2002). Nowadays, information technology is recognized as an important enabler for knowledge transfer (Tsui, 2005). IT plays an important role in breaking down infrastructure boundaries that inhibit the interaction between individuals within an organization. It offers organizations the ability to be flexible and respond more quickly to changing market conditions. Information technology can be a useful tool for transferring explicit knowledge between the people with the full sense and meaning rather than for transferring tacit knowledge (Hislop, 2002). The critical role of IT is its ability to support communication, collaboration and the search for knowledge, and to enable collaborative learning.

Considering the various modes of knowledge transfer, the two models of IT applications in this area have been identified as: (i) the network model, and (ii) the knowledge stock model (Alavi and Tiwana, 2001). The network model implicitly assumes that the most valuable knowledge cannot be codified and embedded in systems. Instead of attempting to store specialized knowledge in a software system, IT tools facilitate spontaneous connections between the individuals who possess the necessary knowledge. This model mainly relies on communication support systems to establish channels for efficient transfer of knowledge among individuals. The knowledge stock model focuses on the electronic transfer of codified knowledge to and from computerized knowledge repositories. The model is better suited to contexts in which valuable knowledge can be made explicit and codified in repositories. Consequently, the focus of this model is to facilitate the electronic transfer of knowledge to and from repositories.

Previous Empirical Researches on the Relationship between Information Technologies and Knowledge Transfer

Communication-aiding technologies are expected to foster knowledge transfer by efficiently alleviating factors leading to the difficulty of transfer knowledge. Firstly, this kind of technology flattens business structures, hence allowing faster communication across vertical boundaries. It helps to overcome barriers of time or space, lower temporal and spatial barriers between knowledge workers and improve access to information about knowledge (Marvick, 2001). Moreover, communication-aiding technologies promote positive relational communication and coordination between people, thus easing the “arduous relationship” that may prevent effective knowledge dissemination. It can increase knowledge transfer by extending the individual’s reach beyond formal communication lines. Computer networks, electronic bulletin boards, and discussion groups create a forum that facilitates contact between the person seeking knowledge and those who may have access to the knowledge (Karlsen and Gottschalk, 2004). Email, intranet and Internet were rated as the most currently used and the most effective tools supporting knowledge management in 16 organizations in UK (Edwards and Shaw, 2004), in 340 organizations in Australia (Zhou and Fink, 2003) and in 115 management consulting firms in USA (Kim and Trimi, 2007). Through email, the Internet, and intranet, groupware computer networks navigate professionals to owners of knowledge and connect people who need to share knowledge over distance. The databases and network capabilities of IT have eliminated management levels and structures that have inadvertently stifled information flow between employees in an organization. Moreover, this kind of technology can foster knowledge transfer by creating new relationships with organization members through “weak tie” (Levin and Cross, 2004).

Decision-aiding technologies usually require standard forms of input, procedures and standard reports that are readily understandable to users. In addition, the anonymity associated with general decision-aiding technologies allows users to participate freely in discussion without considering status and personality, thus alleviating common problems such as conformity of thought. The increased

diversity of opinion often leads to generation of new knowledge. Moreover, information technologies are found to support the knowledge transfer process via enhancing the interactions between individuals, groups and organizations as well as easing the decision making process in an organization (Alavi and Leidner, 2001).

The discussion above suggests that availability of information technology tools is necessary for facilitating a flow of knowledge within an organization since they can provide the technical infrastructure support for collaborative work systems (Disterer, 2003). Gold et al. (2001), through a survey of over 300 senior executives, suggested that a knowledge infrastructure consisting of technology, structure and culture along with a knowledge process architecture of acquisition, conversion, application, and protection, are essential organizational capabilities for effective knowledge management. Thus, it is expected that:

Hypothesis 1a (H1a): The availability of IT tools will positively relate to the frequency of using them for knowledge transfer.

However, the more important issue relating to information technology is how to make people aware of those technologies, to recognize their usefulness, and to have positive attitudes towards IT, and then actually use those technologies for knowledge transfer. Money and Turner (2005) surveyed a target group of 35 employees in two Northeastern US metropolitan areas and found that perceived usefulness and the ease of use of IT tools was significantly related to the behavioral intention to use IT tools. Kim and Trimi (2007) added that the most comfortable IT tools are usually used in transferring tacit knowledge in management consulting companies in USA since they are easy and inexpensive to acquire. Furthermore, the result of an empirical study in 73 law firms in Norway indicated that the greater the extent of IT use by people in an organization, the greater the extent of IT use in supporting knowledge management (Gottschalk, 2000). Similarly, Taylor (2004) in a survey of 212 software developers in one large IS organization, confirmed that there is a strong association between KMS usage levels and perceived usefulness and that email is the application that is most frequently used by respondents to acquire and share knowledge. In a similar vein, Staples and Jarvenpaa (2000)

empirically found that task interdependence, computer comfort and characteristics of computer-based information were significantly positively related to use of electronic media. This leads to their suggestion that managers could potentially stimulate the use of electronic media by increasing positive perceptions of computer based information, ensuring employees are comfortable using the technology available, and making technology available that fits the employees' task needs. Thus, we can hypothesize that:

Hypothesis 1b (H1b): The ease of use of IT tools and perceived usefulness of IT tools will positively relate to the frequency of using them for knowledge transfer

As well as the positive relationship between information technologies and effective knowledge transfer found in the literature, some researchers argue that information technologies cannot be effective tools for transfer tacit knowledge in an organization. Efforts to use advanced technologies to support tacit knowledge sharing, however, have been viewed as problematic (Flanagin, 2002). Although groupware technologies, videoconferencing, expert databases, and synchronous collaboration tools have been proposed in this regard, many contend that tacit knowledge can only be transferred successfully through demonstration, facilitated by face-to-face contact. Because the accumulation of tacit knowledge depends on shared experiences, a consistent claim has been that technologies are more suited to the transfer of highly codified and standardized knowledge, and less appropriate for the transfer of tacit knowledge. Robert (2000) gives evidence to demonstrate the importance of socialization and face-to-face contact in the process of knowledge transfer and the failure of information technologies to provide a perfect substitute for this interaction. He suggests that the issues of control and power need to be taken into account since they shape social interactions among individuals and therefore influence the process of knowledge transfer. Ras et al. (2005) further add that although information technology tools can facilitate collaborative work and enable the knowledge transfer process, they are usually applied for transferring explicit knowledge rather than transferring tacit knowledge. Similarly, Karlsen and Gottschalk (2004) found that there is no significant relationship between

information technology and effective knowledge sharing, although most of the firms have invested large sums of money in IT and databases for knowledge transfer.

In summary, information technologies play very important role in fostering knowledge transfer. The current development of information technologies is now about increasing opportunities as knowledge can be captured, codified and stored in repositories, where it can be easily shared, accessed and used by anyone in the organization. However, this does not guarantee that the investment in information technologies will lead to more effective knowledge transfer, and the real value of technology in supporting knowledge transfer has not yet fully understood. The effective support of information technologies on knowledge transfer depends on the technology itself (availability, ease of use) and the level of usefulness of those technologies perceived by users, as well as the frequency of use of those technologies for exchange of knowledge inside an organization.

Because of that, the supportive role of IT for knowledge transfer is still questionable and need to be more examined. Thus, we can hypothesize that:

Hypothesis 1c (H1c): The frequency of using IT tools will positively relate to the knowledge transfer process.

Technology by itself is insufficient, since people are central to creating and sharing knowledge. Information technologies just help to store and transfer knowledge and do not facilitate creation and transfer of knowledge if an organization does not have a culture favoring these activities (Davenport and Prusak, 1998).

While IT has exponential potential for facilitating knowledge transfer, it is important to bear in mind IT's limitations in any KM initiative. The IT for knowledge management systems has limitations in its ability to contextualize knowledge. This means that knowledge in a database may not be optimally exploited, as it may not be put into context with other relevant metadata. Technology is not yet capable of creating new knowledge that is contextually related to other knowledge. Knowledge creation remains an act of individuals, or groups (Davenport and Prusak, 2000).

Despite the above limitations, if a positive culture exists in the organization, then technology can expand knowledge access and deliver knowledge to the right person at the right time, and organizations need to build their knowledge management approach to fit their culture.

(b) Organizational Culture and Knowledge Transfer

Several studies have examined organizational culture and knowledge transfer and they lead to a better understanding of the relationship between the two constructs. Empirical results indicate that organizational culture is the most important factor for success in knowledge management in both industrial and services corporations (Finke and Vorbeck cited in Mertins et al., 2001). Surveys of the top 1000 German and the top 200 European firms confirm this. The benchmarking study of the American Productivity and Quality Center (1996) lists culture, rewards and support among the most important issues within management. The well-known survey by Ernst and Young (Ruggles, 1998) listed culture as by far the biggest impediment to knowledge sharing. Two German surveys show similar results and confirm that the most important key success factor of knowledge management is corporate culture. Cultivating trust among team members is the most important and most difficult task in building effective teams to share knowledge among members (Gupta and Govindarajan, 2000). McDermott and O'Dell (2001) studied 40 companies deemed to share knowledge effectively in order to determine the cultural characteristics that explain their success. They observed that these companies adapted their approach to knowledge management to fit their culture by (i) linking sharing of knowledge to solving practical problems, (ii) tying knowledge sharing to pre-existing core values, (iii) introducing knowledge management in a way that matches the organizations' style, (iv) building on existing networks that people use in their daily work; and (v) encouraging peers and supervisors to exert pressure to share. McDermott and O'Dell's study pointed to the importance of linking knowledge sharing to organizational actions, which are ultimately determined by the organization's culture. All of the above investigations show that culture is the leading impediment to knowledge management.

Although the relationship between organizational culture and knowledge transfer was tested in different contexts by using different methodologies, the researchers seem to agree that a culture characterized by mutual trust, openness, collaboration, a teamwork orientation and a learning orientation, has positive impacts on the process of knowledge sharing in an organization (Inkpen, 1996; Bollinger and Smith, 2001; Goh, 2002; Chow, Deng, Ho, 2000; Lee and Choi, 2003; Karlsen, Gottschalk, 2004, Al-Alawi et al., 2007). For example, Lee and Choi (2003) in a study of 63 companies in Korea, confirmed that an organizational culture that values collaboration, learning and trust is significantly positively associated with the knowledge conversion process and eventually leads to better organizational creativity and performance. Voelpel and Han (2005), in the case study of knowledge sharing in Siemens ShareNet in China, added that culture valuing respect, reputation and trust decisively supports knowledge sharing behavior. Thus, shaping cultural factors is crucial for knowledge management and managers need to consider culture in establishing knowledge management. Taylor and Wright (2004) who conducted a survey of 132 care managers in a healthcare service, add that an open and innovative culture is a strong predictor of effective knowledge sharing. Janz and Prasarnphanich (2003) surveyed 203 information systems professionals engaged in system development activities and found that the knowledge-centered culture characterized by risk, reward, warmth and support, coupled with a level of autonomy over people related, planning related and work related processes, has a significantly positive relationship with the degree of cooperative learning in teams. Ladd and Ward (2002) conducted a survey of 1,116 people in 23 organizations from the United States Air Force in order to test the correlation between organizational culture and the ability of an organization in efficiently and effectively transferring knowledge. They found that organizations with cultural traits exhibiting openness to change and innovation as well as a task-centered orientation, tended to be more conducive to knowledge transfer. Ribiere (2001) studied the relationship between the successful implementation of knowledge management initiatives and organizational culture, finding that organizational culture is an important predictor of such success.

Despite researchers' attempts to investigate the relationship between culture and knowledge management, in most cases, little attempt has been made to specify the type of culture and the influence of different culture traits on knowledge transfer in a concrete and comprehensive manner. Since organizational culture is often seen as the key inhibitor of effective knowledge sharing in an organization (McDermott and O'Dell, 2001; Guzman and Wilson 2005; Lam, 2005; Wensley, 2001), there is a need to re-examine the relationship between different culture traits and knowledge transfer. A culture, which best facilitates the process of knowledge transfer in the setting of IT companies, needs to be developed. Hence, it is expected that:

Hypothesis 2a (H2a): Teamwork will positively relate to knowledge transfer process.

Hypothesis 2b (H2b): Adaptability will positively relate to knowledge transfer process.

Hypothesis 2c (H2c): Collaboration will positively relate to knowledge transfer process.

Hypothesis 2d (H2d): Solidarity will positively relate to knowledge transfer process.

(c) Organizational Structure and Knowledge Transfer

Organizational structure defines the way in which communication of knowledge can take place. Organizational structure provides the infrastructure that facilitates and inhibits the effectiveness and efficiency of knowledge integration through creating knowledge flows, clusters and boundaries. The effects of organizational structure on the efficiency, scope and flexibility of a company's knowledge integration are influenced by the company's combinative capability - capability to access, synthesize and apply existing knowledge (Kenney and Gudergan, 2006).

Centralization and Knowledge Transfer

Within an organization where different units have different goals and strategic priorities, centralization is likely to have a negative impact on knowledge sharing. As Grant (1996) argued, "once organizations are viewed as institutions for integrating knowledge, a major part of which is tacit and can be exercised by those

who possess it, then hierarchical coordination fails”. In an empirical research, Tsai (2002) found that a formal hierarchical structure, in the form of centralization, has a significant negative effect on knowledge sharing among units that compete with each other for market share, but not among those that compete for internal resources. Claver-Cortés et al. (2007) claimed that the companies adopting flexible, increasingly flat organizational forms with fewer hierarchical levels not only allow but also encourage communication and teamwork among staff members. In addition, a structure emphasizing informal lateral relations, in the form of social interactions, has significant positive effect on knowledge sharing among units within an organization. High centralization prevents an individual from exercising greater discretion in dealing with the demands of his/her relevant task environment. Moreover, it is possible that centralization reduces the initiatives so that an individual in a highly centralized organization will not be interested in providing his/her knowledge to others working in different units unless a higher authority requires them to do so. Such an inactive role reduces possible beneficial knowledge flows to others in the same organization. Moreover, a centralized structure hinders interdepartmental communication and frequent sharing of ideas due to time-consuming communication channels (Bennett et al., 1999). It also causes distortion and discontinuousness of ideas (Stonehouse and Pemberton, 1999)

On the other hand, breaking down hierarchies in the organization enables knowledge transfer (Nonaka and Toyama, 2002). A flexible organizational structure (i.e., teamwork, decentralized structure) provides a good environment for discussion and interaction among employees about task-related issues (Chen and Huang, 2007). Multi-faceted dialogue, individual autonomy, and high care are factors of team working that favor knowledge transfer (Goh, 2002; Nonaka and Takeuchi, 1995). Moreover, the lateral relations and interactions among individuals are very important as they coordinate activities across different units and substantially improve the design of a formal organization. It blurs the boundaries among members of different units and between different management levels, and stimulates the formation of common interests, that in turn, support the building of new exchanges or cooperative relationships (Tsai, 2002). Low level of centralization

provides more channels for information exchange among members in an organization as well as making communication among individuals across organizational units and management levels easier. This may provide more space for knowledge exchange. However, if organizational structure is highly dynamic like virtual structure, it can inhibit the establishment of knowledge-oriented infrastructure that supports knowledge sharing (Kahler et al. cited in Barnes, 2002). Hence, there is a hypothesis that:

Hypothesis 3a (H3a): Centralization will negatively relate to knowledge transfer process.

Formalization and Knowledge Transfer

Knowledge transfer requires flexibility, frequent interaction and less stress on work rules (Lubit, 2001). The range of new ideas seems to be rarely created and shared when strict formal rules dominate an organization. There may not be much tacit knowledge shared when all work processes strictly follow the rules. Less formalized organizational structure enables social interaction, which is needed for transferring knowledge within an organization (Chen and Huang, 2007). The communication and interactions necessary for sharing knowledge may be hindered in an organization having high level of formalization. Hence, it is hypothesized that:

Hypothesis 3b (H3b): Formalization will negatively relate to knowledge transfer process.

(d) Type of Incentives and Knowledge Transfer

Real and perceived rewards as well as penalties for individuals that come from sharing and not sharing knowledge also influence the knowledge sharing process. The relationship between knowledge sharing and incentives was supported by Gupta & Govindarajan's (2000) study. The study suggested that significant changes had to be made in the incentive system to encourage people to share their knowledge, particularly through technology-based networks in organizations. Muller et al. (2005) conducted an empirical study in a large company in German, and confirmed that incentive systems positively influence knowledge sharing

behavior. They further noted that in a country having high level of individualism, voluntary knowledge sharing is harder to achieve, and other auxiliary activities like incentive systems are recommended. On the other hand, in societies with a higher power distance, knowledge sharing can be enhanced if knowledge sharing is made prominent and the reward for knowledge sharing is thus higher reputation and status. Similarly, Hall (2001) provided evidence to support the positive relationship of rewards with knowledge sharing within intranets. In addition, incentives are very important in the creation and sustenance of knowledge sharing networks (Dyer and Nobeoka, 2000).

Several empirical studies found that monetary incentives are necessary for fostering knowledge transfer. Bartol and Srivastava (2002) proposed a relationship of monetary reward systems with different types of knowledge sharing. They identified four mechanisms of knowledge sharing - individual contribution to databases, formal interactions within and between teams, knowledge sharing across work units, and knowledge sharing through informal interactions. They suggested that monetary rewards could be used to encourage knowledge sharing through the first three mechanisms. Meanwhile, informal knowledge sharing would be rewarded by intangible incentives such as enhancing the expertise and recognition of individuals. Disterer (2003) also recommended that knowledge sharing issues need to be incorporated into a compensation plan and promotion policies, such as, how many contributions are made to knowledge databases, how many people have been tutored and how many training courses have been designed. The survey of the German TOP 1000 and European TOP 200 companies conducted by Heisig and Vorbeck (2001) revealed that almost all companies have tried to improve staff motivation in conducting effective knowledge management activities by handing out financial rewards.

Although incentives and incentive systems are claimed to be indispensable to knowledge sharing, some researchers argue that non-monetary incentives may have stronger influence on knowledge transfer. The non-monetary incentives can have much greater and more sustainable effect on behavior of individuals (Heisig and Vorbeck, 2001). Supporting this argument, McDermott & O'Dell, (2001) suggested

that tangible rewards alone are not sufficient to motivate knowledge sharing among individuals. Professionals participate in knowledge sharing activities because of the intrinsic reward that comes from the work itself, and in some cases, formal rewards may be perceived as demeaning by professionals who are motivated by a sense of contribution and involvement. Non-monetary incentives are needed to stimulate intrinsic motivation of individuals. The intrinsic motivation is crucial for transferring tacit knowledge in and between teams (Osterloh and Frey, 2000). In addition, Bock and Kim (2002), in a field survey of 467 employees of four large public organizations in Korea showed that expected rewards, believed by many as the most important motivating factor for knowledge sharing, are not significantly related to the attitude toward knowledge sharing. Rather, they argue that if employees believe they could improve relationships with other employees or contribute to organization's performance by offering their knowledge; they would develop a more positive attitude toward knowledge sharing. They also provide evidence supporting the positive relationship of positive attitude toward knowledge sharing with the intention to share knowledge and, finally, with actual knowledge sharing behavior.

Although empirical studies on the relationship of different types of incentives with knowledge transfer show different results, especially the relationship of monetary incentives with knowledge transfer, incentive systems are proven important in fostering knowledge sharing. Many organizations incorporate issues of knowledge sharing into their compensation plans and promotion policies. For example, Texas Instruments created an annual award named "Not Invented Here, But I Did It Anyway Award" to reward usage of other employees' knowledge (Dixon, 2000). Forum, a consultancy company in Boston, holds a "World Cup Capture" to encourage its consultants to make explicit and sharable what they have learned from their latest engagements. Consulting and accounting firms commonly base their personal evaluations on how many contributions are made to knowledge databases, how many new people have been tutored and how many training courses have been designed.

Hypothesis 4a (H4a): Non-monetary incentives will have stronger influence on knowledge transfer process than monetary incentives.

(e) Incentive Systems and Knowledge Transfer

Sharing knowledge is often seen as an additional work, because of the time necessary for reflection, documentation and communication, etc. Time for reflection is scarce, especially if the performance of an organization is measured by hours only. Reflection of work and sharing experience is more investment for future work than an action in the present. Therefore, employees need incentives to find the time for knowledge sharing. Although the type of incentive is important in facilitating knowledge sharing, attributes of incentive systems are even more important. Locke (2004) argues that, it is critical to do a lot of thinking about which actions and outcomes are important before creating a goal and reward system. In more detail, Sundaresan and Zhang (2004) propose and analyze the Knowledge Sharing Reward Mechanism, which rewards knowledge sharing based on the amount of knowledge shared. This mechanism incorporates an incentive policy for rewarding knowledge sharing with a profit-sharing mechanism. They argue that with incentives for knowledge transfer, the high-knowledge worker may share even when the low-knowledge worker cannot completely absorb what has been shared. Moreover, the knowledge sharing reward mechanism induces knowledge workers to share knowledge and report their true knowledge levels.

Disterer (2003) adds that, in order to encourage people to share their knowledge, a clear incentive system has to be provided and there must be a balance of give and take between employees who participate in the process of knowledge transfer. Similarly, Hansen et al. (1999) argue that if there is an inappropriate and unclear incentive system for knowledge management, knowledge management policies and objectives will be inadequate. Voelpel and Han (2007) point out that the reliability of incentive system is needed to facilitate knowledge-sharing behavior. Through an empirical research in 118 potential respondents in IT planning, Sahraoui (2002) suggests that three attributes of a formal reward system, fairness, group reward, and openness, are positively related to the extent of harnessing collective knowledge of

knowledge workers. Locke (2004) adds that in order to have effective incentive systems, there is a need to set clear and challenging but doable goals for desired outcomes. In contrary, Lee and Ahn (2007) propose a system of individual-based reward that balances the benefit from knowledge sharing of each employee with the costs related with it, in order to facilitate knowledge sharing. They also argue that group-based reward was not only less efficient than individual-based reward, but it is also subject to a potential productivity problem, in which workers with more productive knowledge do not participate in knowledge sharing.

Given the important role of incentives and incentive systems in fostering knowledge transfer, the relationship between them has not yet thoroughly examined. The influence levels of monetary incentives, non-monetary incentives as well as attributes of incentive system on knowledge transfer are still questionable. Thus, we can hypothesize that:

Hypothesis 4b (H4b): An incentive system characterized by fairness, transparency, openness and group-orientation will positively relate to knowledge transfer process.

(f) Knowledge Transfer, its Influencing Factors and Organizational Performance

Knowledge transfer not only improves competence of the actors/ individuals that are involved in the process but it also benefits the organizations by speeding up the deployment of knowledge (Sveiby, 2001; Davenport and Prusak, 1998). Possible consequences of effective knowledge transfer include: improved financial performance (Teece, 1998; Wiig, 1997), innovation (Carneiro, 2000; Nonaka and Takeuchi, 1995; Darroch, 2005), enhanced organizational learning (Buckley and Carter, 2000; Yang, 2007), and organizational effectiveness (Yang, 2007). In the empirical study, Gold et al. (2001) suggest that knowledge management capabilities are positively related to organizational effectiveness. Supporting that, Lee and Choi (2003) also found the relationship of the knowledge creation process and subjective indicators of organizational performance, via the mediating effect of organizational creativity. However, the effect of knowledge creation processes on organizational creativity and organizational performance was relatively small. Darroch (2005), in the study of 433 companies in New Zealand, found that knowledge dissemination

positively predicts innovation, but the positive relationship of knowledge dissemination with organizational performance was not confirmed.

Given the importance of the knowledge transfer in improving organizational performance and competitiveness, its effect on organizational performance has not been widely confirmed by the empirical research. In addition, there are many factors influencing organizational performance including leadership effectiveness, human resource practices, business opportunities etc., so it is difficult to separate the impact of the knowledge transfer on the organizational performance. Despite knowledge transfer being an important facet of knowledge management, its relationship with organizational performance is questionable and needs to be reexamined. Transferring knowledge between the source and the recipient throughout the organization does not necessary mean that that knowledge can add value to the organization or provide benefits for the organization's performance as a whole. Therefore, there is a hypothesis that needs to be tested:

Hypothesis 5a (H5a): Knowledge transfer process will positively relate to organizational performance.

Hypothesis 5b (H5b): Knowledge transfer mediates the relationship between its influencing factors and organizational performance.

In order to examine the relationship between knowledge transfer and organizational performance, it is necessary to operationalize the concept of organizational performance. Today, in an economy dominated by intangible assets, the balanced scorecard proposed by Kaplan and Norton (1996) is used as a performance measurement system incorporating financial measures and non-financial measures of organizational performance that translates a company's strategy into operational terms.

CURRENT SITUATION OF VIETNAM'S IT INDUSTRY

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3.1 ICT Sector in the Context of Vietnam Economy

3.1.1 Operational Environment

(a) Role of IT Industry and Policy Framework

In the context of an increasingly global world, the emergence of a knowledge-based economy challenges developing countries to adjust. Comparative advantage of nations is now expressed as the ability to acquire, organize and disseminate information through digital technologies and communication networks. For developing countries, the challenge of a knowledge-based economy is not the scarcity of knowledge, but inadequacies in diffusing and using it. To remain competitive this requires an adaptable workforce that is receptive to innovation and change. Countries with widespread access to telecommunication networks, the existence of an educated workforce and the institutional capacity to promote knowledge creation and dissemination will thrive in the new economy. Against this background, Vietnam has a significant disadvantage.

In order to integrate into the global economy, development of the information technology sector has been given the highest priority by the Vietnamese

government over the next decade. ICT plays following important roles: as an enabler, as an economic sector and as part of the infrastructure of the national economy. Firstly, ICT is considered as one of the most important driving forces for economic development and social advancement. It is seen as one of the quickest ways to achieve national industrialization and modernization goals, and provide an important contribution to national security (The Directive 58/CT-TW). Secondly, as an economic sector, the development of ICT makes an important contribution to economic growth, helps other sectors develop, and enhances technology's capacity in industrialization and modernization nationally. Investment in ICT infrastructure is made at all levels and brings long-term benefits to the entire society. Furthermore, the ICT strategy states that "Based on ICT as a key element, Vietnam will quickly transform its socio-economic structure to become an advanced country in terms of a knowledge-based economy and information society, and greatly contribute to the success of country's industrialization and modernization process" (Decision 246/2005/QD-TTg).

Given the important role of IT sector in country development, the Vietnamese government has made significant efforts to support the sector. A strategy for IT development has been introduced since 2000. The Directive 58 has been promulgated by government to guide the establishment of an inter-ministerial IT Steering Committee in developing a National IT Master Plan for the whole country. Contents of the plan address the need to dramatically expand its national information infrastructure, strengthen the capacity of its human resources base, and liberalize the legal and regulatory environment to encourage foreign investment and growth of the IT sector. Series of government decisions have subsequently been enacted to guide the implementation of Directive 58. These include:

- Resolution 07/2000/NQ-CP, issued by the government on 5 June 2000, focuses on building and developing the software industry in the period 2000-2005.
- Decision 128/2000/QD-TTg, issued on 20 November 2000 by the Prime Minister, focuses on number of policies and measures to stimulate investment and development encouraging software industry.

Other legal documents include the Prime Ministerial Decision 246/2005/QĐ-TTg on 6 October 2005, approving the “Strategy for Development of Vietnam’s Information and Communication Technology toward 2010 and Orientations toward 2020”, and Decision 32/2006/QĐ-TTg on 7 February 2006, approving the “Master Plan of Internet and Telecommunication Development in Vietnam toward 2010”. These important decisions determine the future vision, objectives and direction of Vietnam’s ICT toward 2010 and major solutions for achieving the industry’s strategic objectives. In 2007, several important legal documents relating to the ICT plan and strategy were promulgated:

- Decision 51/2007/QĐ-TTg dated on 12 April 2007 approving the development program of the software industry until 2010.
- Decision 56/2007/QĐ-TTg dated on 3 May 2007 approving the development program of the Digital Content Industry until 2010.

(b) ICT's Objectives until 2010

The ICT strategy promotes the following objectives until 2010:

- To extensively apply ICT in all sectors of the economy.
- To establish, build and develop e-Vietnam with e-citizen, e-government, e-enterprise, e-transaction and e-commerce to reach a higher-than-average position in ASEAN.
- To become a key industry with an annual growth rate of 20-25% and total turnover of US\$ 6-7 billion by 2010.
- To fully implement a high capacity, high speed and quality and affordable ICT infrastructure over the country by 2010. In addition, it will be necessary to ensure that 100% of communes have access to public telephones, 70% of communes have access to public internet services and that 100% of districts and almost all the communes in the key economic regions will be connected to broadband Internet by 2010.
- In the public sector the requirement is that all ministries, industries, state administrative agencies, provincial and district authorities will be connected to

broadband Internet and will be linked to the Government's network. Training at the university's focal ICT faculties will reach an advanced level and quality in ASEAN.

(c) Major Directions/Solutions

To achieve the vision and objectives outlined above, the ICT Strategy identified nine major solutions:

- Improving awareness on the role and position of ICT in all economic sectors, security and defense and enhancing ICT usage capability via communications, popularization of basic ICT knowledge on the Internet and mass media. Launching an extensive in-depth revolutionary movement to move the whole country towards an information society and knowledge-based economy through encouraging an information-sharing culture and establishing a lifelong learning society.
- Enhancing the capability of ICT application and development by promulgating investment policy and incentive policies to encourage and support enterprises to increase investment in ICT application and production.
- Enhancing capability and effectiveness of state management on ICT at central and local levels.
- Mobilizing capital to implement the strategy by seeking ODA and attracting FDI.
- Developing human resources for ICT through compiling new curriculum on ICT training and increasing use of ICT fields of study.
- Developing the R&D system by enhancing R&D capacity of ICT institutions. Policies to hire ICT scientists and to provide special incentives to foreign companies to establish ICT research centers in Vietnam. Promoting research alliances between ICT enterprises, universities, and institutions, and encouraging enterprises to invest in research.
- Completing the legal environment to support development and application of ICT.

- Enhancing local and international cooperation and linkage.
- Developing the ICT market by creating favorable conditions for all economic sectors to participate in provision of telecom and Internet services.

Amongst the solutions, development of ICT human resources is crucial. Vietnam must ensure quality, synchronization, and adopt a mechanism to rapidly increase the qualified labor force, and enhancement of national ICT capability.

(d) Software Industry in Focus

In the IT sector, the software industry has had special attention from government. The government has set the goal of “developing the software industry as an economic sector with high growth rate to spearhead the contribution towards modernization and sustained socio-economic development and to enhance state management capacity and national security” (Decree 07/2000/NQ-CP). Many policies to stimulate industry development have been adopted. For instance, software businesses are exempted from corporate income tax for the first 4 years after generating income subject to taxation, corporate income tax levied on businesses operating under foreign investment law is 10% (the average rate among regional countries is 12%), software products and services are not subject to value-added tax, software products are exempted from export tariffs. Policies to stimulate the software industry development have led to the birth of a large number of new software companies.

3.1.2 Vietnam ICT Market

(a) Overall Market

Value of Vietnam ICT market ¹ has increased year by year. In 2006, it reached US\$ 1,015 million, (average of 22.6% over 6 years). This is three times the average growth rate of the world, in which growth rate of hardware is 15.8% and that of software is 43.9%.

¹ ICT market value means domestic IT spending (including import for consumption and manufacturing for consumption) and ICT industry value (including manufacturing for domestic market and manufacturing for export)

Table 3.1. Vietnam ICT Market 2000-2006

Year	Software (Million US\$)	Hardware (Million US\$)	Total Value (Million US\$)	Growth Rate (%)
2000	50	250	300	36.4
2001	60	280	340	13.3
2002	75	325	400	17.6
2003	105	410	515	28.8
2004	140	545	685	33.0
2005	198	630	828	20.9
2006	285	730	1015	22.6

Source: Vietnam ICT Outlook 2007, the HCMC Computer Association

In 2006, the total value of the IT industry was US\$ 1.74 billion, (21% increase compared to 2005). The growth rate of software was 32%, which is higher than that of hardware industry. This is partly because of a contribution from the digital content industry and software outsourcing.

Table 3.2. Vietnam ICT Industry Value 2002-2006 (Million US\$)

Year	Software			Hardware	Total
	For Domestic Market	Outsourcing/Export	Total		
2002	65	20	85	550	635
2003	90	30	120	700	820
2004	125	45	170	760	930
2005	180	70	250	1150	1400
2006	255	105	360	1380	1740

Source: Vietnam ICT Outlook 2007, the HCMC Computer Association

(b) Software Industry

The software industry in Vietnam did not begin to take shape until 1990's and followed the country's economic reform starting in 1987, which resulted in a relatively strong demand for IT and software products and services. Since then, the industry has grown continuously with the establishment and rapid increase in numbers of software enterprises. However, the overall value of this market is still relatively small compared with other regional countries and to the total Vietnam IT market. Sales of software products account for only 18% of the total sales of the IT

market. Few companies specialize in the manufacture of software products because of low demand and the inability to produce software packages of high commercial value.

The software industry was US\$ 360 million in 2006, of which US\$ 255 million was derived from the domestic market (71.1%) and US\$ 105 million from outsourcing (29.9%). This was a 44% increase from 2005, brought about by software outsourcing increasing 50%, domestic software increasing 41.6%. Assuming similar annual increase, it is expected that revenue of software industry will reach US\$ 500 million in 2007. Of the software industry revenue, ICT training accounted for US\$ 15 million and the Digital Content Industry US\$ 65 million.

In spite of the relatively small size of the industry, it has a very promising future. Average annual productivity varies from US\$ 7,500 to US\$ 10,000 per software labor unit for domestic software enterprises. Productivity, estimated at US\$ 11,000 to US\$ 15,000 is higher in enterprises that provide outsourcing for foreign companies. A number of software parks have been built and operated by municipal authorities and relevant government agencies and they offer tax holidays and other incentives to software and related service firms. This is a manifestation of the strong determination to promote software industry development. There are now around 10 software parks operating at full capacity in terms of equipment and facilities. The most successful one is the Quang Trung Software Park in HCMC, with 51 companies, of which 11 are foreign-owned companies and 15 others are joint ventures. There are more than 1500 software engineers working in this software park.

Table 3.3. List of Software Parks in Vietnam

Name of Software Parks	Location
1. Quang Trung Software Park	HCMC
2. Saigon Software Park	HCMC
3. Ree E-Town	HCMC
4. Unisoft	HCMC
5. Software zone in Hoa-Lac Hi-Tech Park	Hanoi
6. Danang Software Center	Da Nang
7. Hanoi Software Center	Hanoi

Table 3.3. List of Software Parks in Vietnam

8. Cantho Software Center	Can Tho
9. Hue Software Center	Hue
10. Haiphong Software Center	Hai Phong

Source: Vietnam ICT Outlook 2007, the HCMC Computer Association

In conclusion, the Vietnam software industry is relatively new but it plays a crucial role in the country's industrialization and modernization. Its development has brought not only direct economic effectiveness, but has also a general impact on the socio-economy because of its capacity to change productivity in all fields of any industry.

The Government of Vietnam prioritizes development of the industry. Many policies have been issued to enhance the growth. With the strong support from the government, the industry structure has rapidly developed. However, its size and the growth rate are still below expectations. The government is currently working on the draft of a national strategy with the aim of further enhancing the IT development and software industry in Vietnam. It is expected that by the year 2010, the software industry in Vietnam will be an important economic sector with significantly increased contribution to GDP.

(c) Hardware Industry

Year 2006 was the first time the hardware industry exceeds the threshold of US\$1.38 billion, with supplies for export with the turnover of US\$ 1.23 billion and a US\$ 147 million domestic market. ICT is now one of seven industries with an export turnover of over US\$ 1 billion per year (along with crude oil, textiles, seafood, footwear, wood products and rice). Much of this contribution is from 100% foreign-owned companies producing to export to other countries. Most of the Vietnamese-brand computer manufacturers have turnovers of less than US\$ 5 million. The two leading Vietnamese-brand computer manufacturers (FPT Elead and CMS) achieved a turnover of US\$ 10 million in 2006 with the growth rate of more than 40% year on year. 2006 is characterized by increasing investment of multinational ICT companies into Vietnam, among which are Intel's project in

HCMC (over US\$ 300 million), and Canon's project building the world's biggest printer factory in Bac Ninh with total investment capital of US\$ 110 million.

3.1.3 Human Resource Base

Currently the pool of IT university graduates is about 50,000 with about 2,500 graduating each year from Vietnam's IT university faculties. In 2007, the government target is 70,000 IT professionals. However, the skills of the current pool of IT university graduates are not being fully utilized as only about half of them are working directly in the IT industry.

In 2006, the government commenced implementation of the new law on education. Under this law, the education system will be reformed and the market mechanism will be applied in training ICT's human resources. The establishment of ICT training institutions is encouraged. The government will create favorable conditions for international universities to teach ICT in Vietnam, encouraging local and overseas organizations and individuals to deliver training and education for the ICT labor force.

Table 3.4. Number of ICT Training Institutions in Vietnam

Year	Numbers of Universities	Number of Colleges	Diploma
2002	55	69	35
2003	57	72	40
2004	62	74	45
2005	70	85	53
2006	80	103	60
2007	99	105	72

Source: ICT Outlook 2007, the HCMC Computer Association

In addition to the need to dramatically increase the number of technically qualified graduates, there is an urgent need to significantly improve the quality of IT education and information literacy skills at the university and college levels. Despite IT graduates being very capable, they lack adequate opportunity for hands-on experience and practical training in new ICT tools and techniques. In addition, an inadequate English language skill is an important constraint to competing on the global market since the IT sector is largely based on English language tools and

contents. IT enterprises must go perform an extensive search to recruit a limited number of qualified graduates, and/or invest in their own in-house education programs to develop the needed skills and capabilities.

3.1.4 Characteristics of Vietnam's IT Companies.

(a) Software Companies

The Vietnam software industry is a new economic sector but it has achieved rapid growth over recent years. Although there are a growing number of IT companies, most of them are small. The number of registered software businesses is currently around 2500, of which about 720 are considered real operating software companies. 82% of these companies have less than 50 employees and only 18% of companies have more than 100 employees. Most software companies are joint stock, limited or private companies (86%), while only 8% are foreign companies (Vietnam News, 2006). On average, software companies have 20 personnel (Table 3.6). It is estimated that more than 50,000 IT engineers are working in IT companies and other organizations, of which about 18,000 are working in software companies (Table 3.5).

Table 3.5. Software Companies and Number of Employees

Year	Number of Software Companies	Number of Employees Engaged in Software Sector
1996	95	1900
1997	115	2300
1998	140	2800
1999	170	3400
2000	230	4600
2001	300	6000
2002	400	8000
2003	570	12000
2004	600	12500
2005	1000	15000
2006	1200	18000

Source: ICT Outlook 2007, the HCMC Computer Association

Table 3.6. Structure of Software Companies by Number of Employees

Number of Employees in Software Companies	Percentage
< 20 employees	37%
20 - 49 employees	39%
50 - 99 employees	12%
100 - 149 employees	5%
150 - 199 employees	3%
> 200	4%

Source: VNPT Statistics, 2006

Among Vietnam's software companies, only one has won the highest quality rating of Capability Maturity Model (CMM) - Level 5, two others received the CMM - Level 4 certificates, and around 20 software companies are now striving to apply for CMM - Level 3 or CMM - Level 4. Approximately 15 companies have received ISO 9000 certificates.

(b) Hardware Companies

Currently, there are about 220 hardware and electronic companies operating in Vietnam. About 20 companies are assembling Vietnamese-brand computers, which account for about 25 - 30 percent of the market. Many Vietnamese-trademark computers such as CMC, SingPC, Mekong Green, VINACom, Robo, etc., have been assembled and widely distributed on the market. About two million computers have been installed in the country, and computer sales are growing by about 20 percent per annum. However, most Vietnamese computer assembly companies do not have an industrial assembly line and work mostly manually, leading to low productivity and quality. There are 200 companies operating in electronic equipment employing about 50,000 employees. However, the majority of them are manufacturing under license from world-leading electronic corporations. Some companies have started to produce goods with their own trademark, but they are all simple ones with little added value.

Domestic telecommunication equipment factories have step-by-step equipped themselves with state-of-the-art assembly lines to produce high-quality import-substitute products. Those factories, although small, have with modern technology,

been able to meet around 30% of domestic demand and export their products. The majority of products include small and medium-capacity electronic switchboards, end-use equipment, copper-fiber cables of different types, optic-fiber cables and supplementary parts.

3.2 Analysis of Vietnam's Information Technology Industry

3.2.1 Macro-environment of IT Industry: PEST Analysis

The renovation of Vietnam since the year 1986 has resulted in a simultaneous improvement in many areas and created a favorable environment for the development of all industries, especially the IT industry. The political environment in Vietnam is stable and secure. This creates confidence and trust among foreign investors and domestic companies operating in the industry. Legal framework is in favor of IT industry. A number of policies and legal documents favoring IT industry development have been produced. These include encouragement in areas such as human resource development, telecommunication infrastructure, IT investment and intellectual property rights protection. Tax-free policies for software companies have also been implemented. However, implementation of these policies through sub-legal documents remains problematic. At present, the policies are still slowly disseminated and do not align well with reality. They are non-synchronous and are inconsistent with each other, resulting in the restriction of the software industry development.

Table 3.7. PEST Analysis of Vietnam's IT Industry

Social	Technological
<ul style="list-style-type: none"> - Demographics: young population, eager to integrate with global economic community - Educational opportunity: Poor, institutions not keeping pace with levels of demand nor type of training demanded at tertiary levels - Entrepreneurial spirit: High, profitable sectors see many new entrants - Educational aptitude: High literacy 	<ul style="list-style-type: none"> - Recent technological developments: Limited installed technology base - Rate of technological diffusion: Poor mechanisms for diffusing technology as well as information

Political	Economic
<ul style="list-style-type: none"> - Political stability - highly stable - Legal framework for contract enforcement - under development - Intellectual property protection - weakest in the world - Taxation - tax incentives favorable for software companies - Wage legislation - minimum wage far below the threshold of sector standards - Political support of the industry - emerging as a favored sector 	<ul style="list-style-type: none"> - Economic system - pursuing integration with global system, improving - Government intervention in the free market - moving away from central planning, improving - Exchange rate stability - stable - Efficiency of financial markets - fledgling stock market - Infrastructure quality - poor and bandwidth expensive, but improving - Skill level of workforce - technically strong, managerially weak - Labor costs - low - Economic growth rate - high - Unemployment rate and underemployment rate - high

The recent entry into the WTO brings significant opportunities and big challenges for the development of the industry. IT companies have to operate in more competitive environment. The high GDP growth rate (8% per annum), low labor cost and technically strong labor force create many advantages for IT industry development.

3.2.2 SWOT Analysis of Vietnam's IT Companies

IT industry development plays a strategic role in accelerating Vietnam's transition to a knowledge society and integration into the global economy. Despite the rapid growth in recent years, Vietnam's IT industry is still quite young and inexperienced. Although IT companies have received special attention and support from the government, they have weaknesses related to technology, R&D capacity, human resources and management. Increasing competition in both local and international markets will require companies to raise their competitiveness by enhancing human

resource capacity, creating and utilizing new knowledge more efficiently and effectively. Building organizational capabilities to facilitate a process of knowledge transfer inside an organization will contribute to increased performance and competitiveness of firms. Table 3.8 points out strengths, weaknesses of the software companies and also opportunities and threats that they have to face.

Table 3.8. SWOT Analysis of Vietnam's IT Companies

Opportunities	Threats
<ul style="list-style-type: none"> - Potentially big market with the population of more than 80 million, particularly the ICT content and services markets which have yet to be developed. - The need for Vietnamese language in these markets presents domestic IT companies with a major advantage over foreign competitors. - Telecommunication is one of the fastest growing sectors in Vietnam and the South-East Asia region in the recent year. Telecommunications networks are also developing rapidly. - Big potential market for software companies due to an increase and a diversification in the use of IT in various areas, from socio-economic sectors, government administrations and businesses to the daily activities of many urban people. - The cost for Telecommunications and Internet Services has dropped in the last few years and it is now about the same as the average level in the region. - Government has a great support for the industry development. 	<ul style="list-style-type: none"> - Intellectual property rights protection and enforcement are weak. Vietnamese software enterprises have a great deal of difficulties in entering the international market. - The infrastructure remains weak, thus limiting the growth of information provision on the Internet. - Widespread infringements of software copyrights restrain the growth of software companies. - The general operating environment is not conducive to sector growth. Vietnam pays exceptionally high price for bandwidth services, averaging from 15-100 times prices found elsewhere, and suffers from a lack of private venture capital funding sources and market research into potential target opportunities. - The enforcement of legal policy remains weak.

Table 3.8. SWOT Analysis of Vietnam's IT Companies

Strengths	Weaknesses
<ul style="list-style-type: none"> - Software companies have dynamic and flexible operations. - Adequate and supportive infrastructures (software parks) and preferential regimes for software companies' operations. - Available pool of good workers at low cost for the hardware industry. 	<ul style="list-style-type: none"> - Software companies lack human resource, both in quantity and quality (insufficient management capacity, and experience). - Lack of capital investing in basic scientific and technological research, R& D capacity is limited. - Most of the software companies are mainly small sized and have limited resources. - Companies do not have a long-term strategy. - Software products are not so diversified. - Weak marketing capability and lack of information about markets and customers. - Lack of policies for the exploration and sharing of information intra- and inter-companies.

RESEARCH METHODOLOGY AND DESIGN

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4.1 Review of Methods used in Previous Literature

Empirical researchers in knowledge transfer in the past have demonstrated a variety of methodologies: from quantitative to qualitative, and a combination of both. However, the quantitative method seems to be the dominant one. Very few researches use the combined method.

In terms of sampling techniques, in nearly 30 studies on intra-organizational knowledge transfer reviewed below, most of them applied the non-probability method, and in particular, the most common technique was convenience sampling, in combination with judgment and quota sampling. The reason might be that for the populations of individuals inside different types of companies, there was difficulty in obtaining a sampling frame, which is a prerequisite for the probability sampling procedure. Time and cost constraints may be a reason for the probability sampling not being chosen by most researchers.

Table 4.1. Summary of Methods used in Previous Literature

Sources	Sampling Method	Data Analysis Method	Respondents	Sample Size	Response Rate
<i>Quantitative Approach</i>					
Yang (2007)	- Questionnaire survey - Convenience sampling	Multiple regression	- Top managers - Middle managers and staff	499 in 9 hotels	41.6%
Park, Wentling (2007)	- Online survey - Convenience sampling	Multiple regression	- Learners in 2 e-learning courses	88	48.9%
Minbaeva (2005)	- Web-based survey - Convenience sampling	Multiple regression	- Subsidiaries	92	30%
Darroch (2005)	- Mail survey - Random sampling	Structure Equation Modeling	- The most senior person of the company	433	27.8%
Al-Alawi et al. (2007)	- Questionnaire survey - Judgment sampling - In-depth interviews	One way ANOVA	- Operational staff - Middle managers - Senior managers	231	77%
Brachos et al. (2007)	- Questionnaire survey - Quota sampling	Multiple regression	- Senior, middle and line managers	295	57.7%
Ko et al. (2005)	- Questionnaire survey - Judgment sampling	Structural Equation Modeling	- Consultant and client matched pair	96	-
Lee, Choi (2003)	- Questionnaire survey - Quota sampling	Multiple regression	- Middle managers in 63 Korean firms	451	43%
Cumming (2004)	- Mail survey	Multiple regression	- Technology executives	69	-

Sources	Sampling Method	Data Analysis Method	Respondents	Sample Size	Response Rate
Lopez et al. (2004)	- Questionnaire survey	Structural Equation Modeling	- Spanish firms	195	-
Tsai (2002)	- Questionnaire survey - Judgment sampling	Quadratic Assignment Procedure, Multiple regression	- Director - Most senior deputy director of each business unit	24	-
Ladd, Ward (2002)	- Questionnaire survey - Convenience sampling	Multiple regression	- Individuals in 23 organizations from United States Air Force	1116	-
Gold et al. (2001)	- Questionnaire survey - Judgment sampling	Structural Equation Modeling	- Senior executives	323	32.3%
Simonin (1999)	- Questionnaire survey	Structural Equation Modeling	- Senior managers of multinationals	151	-
<i>Qualitative Approach</i>					
Riege (2005)	- Interview - Convenience sampling	Qualitative techniques	- Senior managers - Middle managers	20	
Tat, Hase (2007)	- Purposive sampling - Grounded theory	Qualitative techniques	- Managers in engineering, operations, business, administration, marketing and production	6	-
Nunes et al. (2006)	- Judgment sampling - Interview - Case study	Qualitative techniques	- CEO - Operational manager - Technical staff in 2 organizations	-	-
Voelpel, Han (2005)	- Case study	Qualitative techniques	- Siemens company in China	1	

Sources	Sampling Method	Data Analysis Method	Respondents	Sample Size	Response Rate
Desouza, Awazu (2006)	- Semi-structure interview - Quota sampling	Qualitative techniques	- Owners - Managers	25	-
Claver-Cortés et al. (2007)	- Quota sampling	Multiple case study method	- Spanish firms	6	-
Robertson, Hammersley (2000)	- Longitudinal case study - Semi-structured interviews.	Content analysis technique	- Expert Consulting in UK	1	-
<i>Combined Qualitative and Quantitative Approach</i>					
Taylor, Wright (2004)	- Questionnaire survey - Convenience sampling	Multiple regression	- Care managers in public service	132	-
	- In-depth interview		- Care managers	30	-
Bresman, Birkinshaw, Nobel (1999)	- Survey - Convenience sampling	OLS and negative binominal regression	- R&D organizations	42	-
	- Longitudinal case studies	Qualitative techniques	- International acquisitions	3	-

Regarding method of data analysis, multiple regression technique and Structural Equation Modeling were mainly employed. These techniques enable the researchers to simultaneously test complex relationships between several independent variables and dependent variables of the research model.

Sample size varied among the quantitative researches, ranging from 24 to more than 1000 usable responses. There were 7 out of 14 studies, which had sample sizes of less than 200 respondents. Besides time and cost issues, this might be due to the type and size of population used.

4.2 Quantitative Research

4.2.1 Survey Design

A survey design consists of techniques for (i) developing measurements, (ii) constructing a questionnaire, (iii) designing a sample plan, and (iv) anticipating analysis techniques. Following is a brief summary of what is contained in each stage of a quantitative research.

(a) Developing Measurements

This stage involves two processes: conceptualization and operationalization in measurement (Neuman, 2000). Conceptualization is the process of taking a construct and refining it by giving it a clear conceptual or theoretical definition. Operationalization is the process of linking a conceptual definition to a specific set of measurement techniques or procedures. In this process, a set of indicators measuring each construct in the research model is developed.

In developing measurements, two central issues should be carefully considered: reliability and validity of measurements. Reliability is used to indicate the extent to which the different items, measures, or assessments are consistent with one another and the extent to which each measure is free from measurement error. Cronbach's coefficient alpha is the most commonly used measure of internal consistency reliability (Leech et al., 2005). Validity is defined as the accuracy of the measurement, i.e. it is an assessment of the exactness of the measurement relative to what actually exists (Burns and Bush, 1998).

(b) Constructing Questionnaire

Good questionnaire design is essential to the high quality of a survey (Burns and Bush, 1998). Good survey questions give the researcher valid and reliable measures (Neuman, 2000). When designing a survey questionnaire, three following aspects should be paid special attention:

- Question types
- Question wording
- Question sequence

(c) Designing a Sample Plan

A sample plan involves several decisions, including specification of the target population, selection of a sampling frame, determination of a sampling technique, and sample size.

Defining the relevant population is the very first step to be considered in the sampling process. The target population is identified by the research objectives. To define the population, it is needed to specify the unit being sampled, the geographical location, and the temporal boundaries of populations (Neuman, 2000).

Once the relevant population has been defined, a sampling frame – a specific list that closely approximates all the elements in the population – is developed. Listing the elements in a population sounds simple, but in practice it is rather difficult to create a good list (Burns and Bush, 1998).

Sampling methods are classified as either probability or non-probability (Neuman, 2000). Probability sampling is based on chance selection procedures (Burns and Bush, 1998). With probability sampling, the method determines the chances of a sample unit being selected into the sample. The probability techniques include simple random, systematic sampling, stratified sampling, cluster sampling (Neuman, 2000). Non-probability sampling relies on the personal judgment of the researcher rather than on chance to select sample elements. There are several non-probability techniques: convenience, quota, snowball, and judgment.

Following the selection of the sampling technique, a sample size is determined. The sample size decision depends on the kind of data analysis, on how accurate the sample has to be for the researcher's purposes, and on population characteristics. It is generally accepted that, the larger the sample size, the greater the precision or reliability of the research. However, a large sample size alone does not guarantee a representative sample (Neuman, 2000; Burns and Bush, 1998). A large sample with poor sampling frame is less representative than a smaller one with an excellent sampling frame. There are two methods for determining sample size: statistical and rules of thumb (Neuman, 2000). Rules of thumb are based on past experience with samples that have met the requirements of the statistical method. This is a more

frequently used method since the researcher rarely have information required by the statistical method. For small populations (under 1000), a large sampling ratio (about 30%) is needed. For moderately large population (10,000), a sampling ratio of 10% is required.

(d) Anticipating Data Analysis Techniques

Data analysis process involves several stages. Firstly, it is a data coding. Coding is the process of assigning number to the values or levels of each variable. After the data are coded and entered, an exploratory data analysis is used for several reasons: (i) to see if there are problems in the data such as outliers, non-normal distribution, problems with coding, missing values, and data input errors (ii) to examine the extent to which the assumptions of the statistics that the researcher plans to use are met. Next, it is needed to examine the reliability and validity of measurements used for each constructs with item-to-total analysis and factor analysis. Then, descriptive analysis is performed to describe the variables. Following is correlation analysis. Finally, predictive analysis is conducted.

4.2.2 *Measurement of Constructs*

In this section, the measurements of all variables presented in the theoretical framework are developed. Since single item measures generally frame concepts narrowly, the measurement of complex variables is typically done through multiple-item measures. Multiple-item measures are generally used to enhance confidence that the constructs of interest are being accurately assessed and the measurement of the variable will be more consistent (Gold et al., 2001). Multiple-item measures were used for most variables to improve the reliability and validity of the measures. In addition, variables were measured with 5-point Likert scales that provide the advantage of standardizing and quantifying relative effects (Gold et al., 2001).

(a) Measures of Dependent Variables

Organizational performance is measured by either internally reflective performance indicators or competitive measures (Darroch, 2005).

Internally reflective performance measures include a set of indicators corresponding to four perspectives proposed by Kaplan and Norton (1996), Edvinsson and Malone (1997), Bell (2005) (Table 4.2) as follows:

- *Financial Perspective*: Financial performance measures indicate whether a company's strategy, implementation and execution are contributing to bottom-line improvement. The financial indicators are profitability, revenue growth, and sales growth.
- *Customer Perspective*: The core outcome measures include customer satisfaction, customer retention, and market share in targeted segments.
- *Internal Process Perspective*: This perspective measures the internal processes that will have the greatest impact on customer satisfaction and achieve organization's financial objectives. The indicators are quality improvement and response time, level of employee satisfaction and rate of employee turnover.
- *Innovativeness Perspective*: This perspective identifies and measures the infrastructure that the organization has to build to create long-term growth and improvement as well as innovativeness of an organization. The core measures are investment in research and development activities, number of new products.

Competitive performance measures are the differences in operating characteristics over time or among organizations (William, 2003; Lee and Choi, 2003).

Table 4.2: Measures of Organizational Performance

Constructs	Items	Sources
Financial Performance	<ul style="list-style-type: none"> - Average return on investment - Average return on sale - Annual sale growth - Annual revenue growth - Percentage of profit generated by new products 	Kaplan and Norton (1996) Lee and Choi (2003)
Customer Perspective	<ul style="list-style-type: none"> - Market share in primary market - Number of customer's complaints - Customer service 	Edvinsson and Malone (1997)
Internal Process Perspective	<ul style="list-style-type: none"> - Operational costs - Employee satisfaction - Rate of employee turnover 	Edvinsson and Malone (1997)

Table 4.2: Measures of Organizational Performance

Constructs	Items	Sources
Innovativeness Perspective	<ul style="list-style-type: none"> - Number of new products, number of patents - Investment in R&D - The rank of company in comparison with average industry in terms of new product introduction - New service introduction and new technology adoption 	Bell (2005) William (2003)

In this research, organizational performance was measured by changes in the company's performance over the last three years on different perspectives mentioned above. Respondents were asked about their level of agreement with the changes of their company's performance over 3 years (1: Strongly disagree, 2: Somewhat disagree, 3: Neutral, 4: Somewhat agree and 5: Strongly agree). The following statements represent the changes of a company's performance from the four perspectives in Table 4.2.

- Average return on sale has significantly increased
- Annual sale growth has significantly increased
- Annual revenue growth has significantly increased
- Percentage of profit generated by new products has significantly increased
- Market share in primary market has increased
- Number of customer's complaints has been decreased
- Customer service has been improved
- Operational cost has decreased
- Employee satisfaction has increased
- Rate of employee turnover has decreased
- Number of new products has increased
- Investment in R&D has increased
- The rank of company in comparison with average industry in terms of new product introduction has increased
- The overall performance of the company has increased.

The above qualitative judgments/measures of performance are chosen for several reasons. Firstly, most of IT companies do not publish information about their performances. When they do, the published quantitative measures of performance are subject to manipulation and often hardly comparable. Secondly, qualitative measures of performance are significantly correlated with actual performance. Finally, in Vietnam, it is almost impossible to get accurate data that represents financial performance (Lyles and Salk, 1996).

(b) Measures of Mediating Variables

Intra-organizational knowledge transfer process was hypothesized to mediate the relationship between independent and dependent variables. The development of the intra-organizational knowledge transfer measure was grounded in the work of Argote and Ingram (2000), Szulanski (1996, 2000) and Ko et al. (2005). It is a process involving 3 actions: (i) initiation - the extent to which people know how to access to knowledge they need, (ii) implementation - volume of knowledge movement via communication among individuals; (iii) integration - the extent to which a recipient applies the received knowledge that results in a change in recipient's behavior or/and job performance and the extent to which a recipient satisfies with received knowledge.

Operationalizing this variable, some measures from previous work were adapted. Meanwhile, some new items were created based on the literature related to intra-organizational knowledge transfer and knowledge sharing. Detailed items associated with each construct are described in Table 4.3.

Table 4.3. Measures of Intra-organizational Knowledge Transfer

Constructs	Items	Sources
Initiation	<ul style="list-style-type: none"> - People know knowledge source - People are able to access knowledge source - People are able to find needed information from knowledge source - Overall, people know very well how they can access to knowledge 	Self developed

Table 4.3. Measures of Intra-organizational Knowledge Transfer

Constructs	Items	Sources
Implementation	<ul style="list-style-type: none"> - The perceived volume of transferred knowledge (professional, market, management, external environment, technology, culture) is increased - Overall, the volume of knowledge is increased 	Adapted from Ko et al. (2005) and Self developed
Integration	<ul style="list-style-type: none"> - Transferred knowledge resulting in improved performance - Transferred knowledge resulting in new ways of doing things - Transferred knowledge resulting in new project or product ideas - Transferred knowledge resulting in wider thinking - Transferred knowledge resulting in increased ability to solve other problems - Overall, people satisfy with the quality and volume of knowledge gained 	Adapted from Argote and Ingram (2000) and Self developed

(c) Measures of Independent Variables

Four main independent variables were examined in the study: information technology support, organizational culture values, organizational structure dimensions, and incentive system attributes.

Measures of Information Technology Support

This variable consists of four constructs: perceived ease of use, perceived usefulness, availability of IT tools, and frequency of use. Perceived ease of use refers to the degree to which a member believes that using the information technology applications is free from their effort. Perceived usefulness refers to the degree to which members in a company believe they use the information technology applications to enhance their knowledge transfer process (Money and Turner, 2005). Table 4.4 outlines detailed measurements of each construct.

Table 4.4. Measures of Information Technology Support

Constructs	Items	Sources
Perceived Ease of Use	<ul style="list-style-type: none"> - There is a clear guideline of using IT tools - Interaction with available IT tools does not require a lot of mental effort - It is easy to manage the use of available IT tools - Overall, people find the use of available IT tools easy 	Adapted from Money and Turner (2005)
Perceived Usefulness	<ul style="list-style-type: none"> - Increase storage capacity of knowledge base - Increase knowledge transmission capacity - Increase speed of exchanging information - Increase accessibility to wide range and depth of information - Make the knowledge transfer process more convenient - Reduce location and time constraints - Overall, IT tools are useful for transferring information 	Self developed
Availability of IT tools	<ul style="list-style-type: none"> - List of communication-aiding IT tools and decision-aiding IT tools is provided 	Self developed
Frequency of Use	<ul style="list-style-type: none"> - Use IT tools to search for information within organization - Use IT tools to publish information - Use IT tool to store information in knowledge base - Use IT tools to search for information from sites outside an organization - Use IT tools to exchange information 	Adapted from Staples and Jarvenpaa (2000) Taylor (2004)

Measures of Organizational Culture

This variable was operationalized through four main constructs: teamwork, collaboration, adaptability, and solidarity. Teamwork refers to the degree to which people in an organization are encouraged to work in team. Collaboration is a degree of active support and help among individuals within an organization (Lee and Choi, 2003). Adaptability refers to the extent to which individuals expresses their attitude toward learning, takes risk and creates change (Fey and Denison, 2000). Solidarity refers to the degree to which members of an organization share goals and tasks (Goffee and Jones, 1996). Detailed measures of each construct are presented in Table 4.5.

Table 4.5. Measures of Organizational Culture

Constructs	Items	Sources
Teamwork	<ul style="list-style-type: none"> - People work like they are part of a team - Teamwork is used to get work done, rather than hierarchy - The work is divided up so that everyone has a part and everyone has to share - Interdisciplinary cross-functional teamwork is extremely important for making decisions and solving problems - Overall, teamwork is encouraged 	Adapted from Fey and Denison (2000) Goffee and Jones (1996)
Collaboration	<ul style="list-style-type: none"> - People coordinate with one another in doing tasks very well - Cooperation among employees across different parts of the company is actively encouraged - People are willing to help one another in doing tasks - Overall, collaboration level among people is high 	Adapted from Goffee and Jones (1996)
Adaptability	<ul style="list-style-type: none"> - People view failure as an opportunity for learning and improvement - Innovation and risk taking are encouraged and rewarded - Learning is an important objective in daily work - The way things are done is very flexible and easy to change - New and improved ways of doing work are continually adopted - Overall, the level of adaptability of employees in the company is high 	Adapted from Fey and Denison (2000)
Solidarity	<ul style="list-style-type: none"> - There is a long-term organizational goal and strategic direction - There is a clear mission that gives meaning and direction to people's work - People understand and share the same business objectives - People continuously track their progress against stated goals - People understand what needs to be done for a company to succeed - There is a clear and consistent set of values that governs the way people do business - When disagreement occurs, people work hard to achieve "win-win" solutions - It is easy to reach consensus, even on difficult issues. - There is good alignment of goals across levels of organizational hierarchy - Overall, the level of solidarity in the company is high 	Adapted from Goffee and Jones (1996) Fey and Denison (2000)

Measures of Organizational Structure

This variable comprises two main dimensions: centralization and formalization. Centralization is measured by identifying the level at which strategic and operational decisions are made in organizations (Palmer and Dunford, 2002). Formalization refers to the degree to which the work processes are explicitly represented and documented in the form of written policies and rules (Baum and Wally, 2003; Lee and Choi, 2003). Based on the studies of Lee and Choi (2003), Baum and Wally (2003), Tata and Prasad (2004), the items measuring the two constructs are defined in Table 4.6.

Table 4.6. Measures of Organizational Structure

Constructs	Items	Sources
Formalization	<ul style="list-style-type: none"> - The company has established a set of rules and procedures that must be followed during job execution - ISO is applied to manage company's operation - Company's standard operating procedures manuals help people to deal with routine problems - People must follow formal procedures for non routine processes - Overall, the formalization level of the company is high 	Adapted from Robin (2001) Baum and Wally (2003)
Centralization	<ul style="list-style-type: none"> - Employees are encouraged to participate in the strategic decision process - Company's top management team determines business strategic plan alone - Employees try to achieve consensus about major strategic changes - Company's top management is involved in optimizing day-to-day operations - Employees are free to make operational decisions about production, service, and customer-oriented problems - Employees are free to change things to get better task performance - Overall, the centralization level of the company is high 	Adapted from Tata and Prasad (2004) Baum and Wally (2003) Palmer and Dunford (2002) Lee and Choi (2003)

Measures of Incentive Systems

Availability of incentive systems for knowledge sharing behavior is measured by the availability of monetary incentives and non-monetary incentives for people who involve in knowledge transfer activities.

As discussed in the previous literature, transparency, flexibility, fairness and group orientation are four attributes measuring incentive systems that facilitate knowledge transfer in an organization. 16 items measuring the four constructs were generated based on the previous literature, especially on the work of Sahraoui (2002) and Locke (2004). The detailed items measuring each construct are presented in Table 4.7.

Table 4.7. Measures of Incentive Systems

Constructs	Items	Sources
Availability of Monetary Incentives	<ul style="list-style-type: none"> - Monetary incentives are provided for people who have improvement in knowledge and expertise as a result of knowledge sharing - Monetary incentives are provided for people who create new knowledge and/or extend existing knowledge in the company - Monetary incentives are provided for people who have effective problem-solving as a result of knowledge sharing 	Self developed
Availability of Non-monetary Incentives	<ul style="list-style-type: none"> - Non-monetary incentives are provided for people who have improvement in knowledge and expertise as a result of knowledge sharing - Non-monetary incentives are provided for people who create new knowledge and/or extend existing knowledge in the company - Non-monetary incentives are provided for people who have effective problem-solving as a result of knowledge sharing 	Self developed
Transparency	<ul style="list-style-type: none"> - People are able to anticipate and calculate the incentives they can received in return for their effort and performance - People understand the criteria used to administer rewards - People clearly understand what is required of them to get a desired reward - Overall, the incentive system is clear enough 	Adapted from Locke (2004)
Flexibility	<ul style="list-style-type: none"> - People are rewarded more for their skills than for their performance - Rewards are based more on general criteria of competency than on specific measures of performance - Rewards are specified only for formal activities - Overall, the incentive system of my company is an opened system 	Adapted from Sahraoui (2002)

Table 4.7. Measures of Incentive Systems

Constructs	Items	Sources
Fairness	<ul style="list-style-type: none"> - People's performances at work are rewarded in an equitable manner - The incentives people received truly reflect their job performance - People's involvements in their work group are appropriately rewarded - Overall, the incentive system is fair enough 	Self developed and adapted from Sahraoui (2002)
Group Orientation	<ul style="list-style-type: none"> - The reward system in the company encourages more group performance than individual performance - People participate in setting criteria for rewarding performance in work group - Rewards are based more on group work than on individual work - Overall, the incentive system is group-oriented 	Adapted from Sahraoui (2002)

(d) Measures of Control Variables

Control variables for intra-organizational knowledge transfer model included:

- *Company Size* was calculated as the number of full-time employees at the time of the study. Large companies tend to have more managerial and organizational resources to facilitate the knowledge transfer process (Tsai, 2002).
- *Company Age* was calculated as the number of years in operation up to the time the respondents were interviewed. Those companies having larger number of years in operation in the market may have more experience about the process of knowledge transfer. The impact of knowledge transfer on the organizational performance may be more easily recognized and evaluated.
- *Seniority* was calculated as the respondent's number of working years for the company. The respondents with higher seniority may have better understanding about organizational practices and higher involvement level in the company's operation process. Thus, they may have different attitudes and perceptions concerning the knowledge transfer process within the company.
- *Working Position* may influence the way by which the respondents access, transfer and apply knowledge in their works. The respondents in higher

positions may have greater opportunities to access to, and to use the organizational knowledge.

4.2.3 Constructing Questionnaire

(a) Type of Question

This research used closed questions with 5-point Likert scale in the main body of the survey questionnaire. Some multiple-choice questions were also designed at the end of the questionnaire to obtain some personal and company information. This type of question gives the respondent fixed responses from which to choose. Therefore, it is easier and quicker for them to answer. The response choices can clarify question meaning for respondents. The answers of different respondents are easier to compare. Moreover, using that scale, the answers are easier to code and to analyze statistically.

A 5-point Likert scale ranging from one (Strongly disagree) to five (Strongly agree) was employed for almost all questionnaire items measuring the main constructs of the research model. With the Likert scale, respondents indicate their attitudes by checking how strongly they agree or disagree with the statements which were designed for measuring each construct. This enables flexibility and the ability to get the value that indicates how each construct is measured from a set of individual items.

(b) Question Contents and Sequence

The questionnaire was developed using prior measurements corresponding to each variable presented in the section 4.2.2 and taking the context of the IT companies in Vietnam into account. Each variable was measured by multiple items in order to increase the reliability and validity of the measurements.

The questionnaire consisted of two main parts together with the cover letter. Part one, containing 20 questions, focused on collecting information associated with each construct belonging to the conceptual model of the study. Part 2 focused on collecting background information about respondents and their companies. Appendix C provides details of the questionnaire.

(e) Question Wording

Aiming at developing precise questions, five desirable qualities of question wording were considered by the researcher:

- The question should be focused on a single topic
- The question should be brief
- The question should be a grammatically simple
- The question should be worded in respondent's everyday vocabulary
- The question should be clear

In addition to the desirable qualities of question wording, several errors to avoid when developing questions were also taken into account:

- The question should not be beyond the respondent's ability or experience
- The question should not have ambiguous wording
- The question should not be "double-barreled"
- The question should not lead the respondent to a particular answer

(f) Question Pretest and Revision

The questionnaire was developed in English first, then translated into Vietnamese and finally back into English to ensure the consistency of the meanings.

The questionnaire pre-test was carried out with ten respondents. Among these ten, were five functional managers and five technical staffs of the Vietnam Data and Communication Company. All aspects of the questionnaire were tested, including question content, wording, relevance of measurements for each construct and time taken to complete the questionnaire.

Then, an interview of those respondents was held with the aim of getting their concrete comments on the questionnaire. The results of the pre-test were incorporated into the final draft of the questionnaire.

4.2.4 Sampling Plan

(a) Target Population and Sampling Frame

Target population refers to specific pool of cases - sampling elements - that the researcher wants to study (Neuman, 2000). Individuals who are currently working

in Vietnam's IT companies belonging to the Vietnam Software Association (VINASA) were the focus for this study. The respondents are mainly technical staff (IT engineers, professional programmers), middle managers, and senior managers. The target population was selected for several reasons:

- Firstly, companies belonging to VINASA are large enough in terms of operation, size and management, and provide a valid sample for study on intra-organizational knowledge transfer process. They employ about 50% of the total number of professional programmers and account for about 60% of software production in Vietnam.
- Secondly, respondents who are middle managers and technical staff can have a thorough understanding about their organizational culture, management systems, business strategy and goals, and have enough time to be involved in all company activities. They are knowledge workers of the companies. Thus, they can provide rich information in all areas of concern for studying the knowledge transfer process.

A sampling frame is a specific list that closely approximates all elements in the population. A sampling frame of this study was a list of employees working in all IT companies belonging to the VINASA. The list of the companies was obtained from the VINASA's website (Appendix B). However, it was unable to make a list of employees either because employees' data were not published on the companies' websites, or because the managers did not disclose this type of information. Without such a list, the author could not draw a probability-based sample and so will have to use non-probability sampling method.

(b) Sample and Procedure

The sample consisted of functional managers, technical staffs and senior managers of the Vietnamese IT companies in two cities, Hanoi and HCMC.

After obtaining the list of the companies from the website of VINASA, they were first contacted by phone to verify their status and to solicit their participation in the survey. At this stage, a challenge emerged. Initially, 43 companies agreed to

participate in the survey. However, as it was a busy season, despite repeated contacts it was unable to reach an agreement on the schedule for accessing the respondents of seven companies. As a result, 36 companies actually participated in the research.

Depending on the company size, five to fifteen employees were surveyed from each company. Middle managers and technical staffs were the main respondents of the survey. Middle managers play key roles in managing knowledge. They are posited at the intersection of the vertical and horizontal flows of knowledge. Technical staffs often use knowledge for accomplishment of their tasks and can provide useful comments on how the managers should do to facilitate the process of knowledge transfer within an organization.

(c) Sample Size and Data Collection

The sample size was determined by the judgment method because of time and budget constraints. The 400 questionnaires were sent to the respondents (technical staffs and middle managers) in 36 companies. The survey was carried out in one and a half month, from the middle of November to the end of December 2005, achieving 218 usable responses. The response rate was 54.5%.

4.2.5 Data Analysis Procedure

The data collected from the survey was processed using the Statistical Package for the Social Sciences 13.0. Following are steps involved in the data analysis procedure.

(a) Exploratory Data Analysis

Firstly, all the data was checked in order to detect outliers. Secondly, a violation of normality assumption was checked. All the variables met the assumption of normal distribution.

(b) Testing the Measurements' Reliability and Validity

A general strategy to test a construct's dimensionality and reliability is to conduct two analyses: item-to-total analysis and factor analysis. The item-to-total analysis shows Cronbach's coefficient alpha of each measurement, and suggests which item

to drop to increase the alphas. Factor analysis shows us how many factors were extracted from the item pool. Based on these two results, decisions were made regarding retaining or excluding items for each variable.

Reliability is defined as the accuracy or precision of the research instrument and is calculated as a proportion of the true variance to the total variance yielded by the measuring instrument. One aspect of reliability is internal consistency, which is an indicator of the homogeneity of a measuring scale. One criterion that has been consistently used to assess the reliability of a multi-item measurement scale is Cronbach's coefficient alpha. Kline (1998) suggests that the reliability coefficients around 0.9 can be considered “excellent”, values around 0.8 as “very good”, and values around 0.7 as “adequate”, those below 0.5 should be avoided.

A factor analysis tests the validity of each construct in the conceptual model. Factor analysis is used to identify underlying constructs in the collected data, and to reduce the number of variables to a more manageable set while attempting to retain as much of the information as possible (Hair et al, 1995). In this study, factor analysis with Varimax rotation was applied. The resulted factors with eigenvalues greater than 1 and factor loading greater than 0.5 were considered adequate for the factor structure and were used for analysis (Hair et al, 1995).

The results of reliability and validity testing on the data collected for this study are presented in Section 4.3.

(c) Creation of Aggregated Variables

After testing validity and reliability of all constructs, the following aggregated variables were created for later analysis. Since all constructs were measured with multi-item scales, the score of aggregated variables were mean computed across those items (Table 4.8). Three stages of knowledge transfer process will be dependent variables in the regression models used to test the hypotheses H1 to H4. They are also the mediating variables in the model testing the mediation effect of its antecedents on organizational performance.

Table 4.8. Aggregated Variables Created from the Data

Variable Name		Mean Computed Across Items
<i>Independent Variables</i>		
Frequency of using IT tools	X ₁	=Mean(Q5.3, Q5.4, Q5.6)
Perceived usefulness	X ₂	=Mean(Q7.1, Q7.3, Q7.4, Q7.5, Q7.7)
Perceived ease of use	X ₃	=Mean(Q8.1, Q8.2, Q8.3, Q8.4)
Teamwork	X ₄	=Mean(Q9.1, Q9.2, Q9.3, Q9.6)
Adaptability	X ₅	=Mean(Q10.1, Q10.4, Q10.5, Q10.6)
Collaboration	X ₆	=Mean(Q11.1, Q11.2, Q11.3, Q11.4, Q11.5)
Solidarity	X ₇	=Mean(Q12.1, Q12.2, Q12.3, Q12.4, Q12.6, Q12.7, Q12.10)
Centralization	X ₈	=Mean(Q13.5, Q13.7, Q14.7)
Formalization	X ₉	=Mean(Q14.1, Q14.2, Q14.3, Q14.4)
Monetary incentives	X ₁₀	=Mean(Q15.1, Q15.2, Q15.3)
Non-monetary incentives	X ₁₁	=Mean(Q15.4, Q15.5, Q15.6)
Fairness	X ₁₂	=Mean(Q16.1, Q16.2, Q16.3, Q16.4)
Transparency	X ₁₃	=Mean(Q16.5, Q16.6, Q16.7, Q16.8)
Flexibility	X ₁₄	=Mean(Q16.9, Q16.10, Q16.12)
Group orientation	X ₁₅	=Mean(Q16.13, Q16.14, Q16.15, Q16.16)
<i>Mediating and Dependent Variables</i>		
Initiation	Y _{1.1}	=Mean(Q17.1, Q17.2, Q17.3, Q17.4)
Implementation	Y _{1.2}	=Mean(Q18.1, Q18.2, Q18.3, Q18.4, Q18.5, Q18.6, Q18.7)
Integration	Y _{1.3}	=Mean (Q19.1, Q19.2, Q19.3, Q19.4, Q19.5, Q19.6, Q19.7)
Overall knowledge transfer	Y ₁	=Mean(Y _{1.1} , Y _{1.2} , Y _{1.3})
Financial performance	Y _{2.1}	=Mean(Q20.1, Q20.2, Q20.3, Q20.4, Q20.5)
Non-financial performance	Y _{2.2}	=Mean(Q20.6, Q20.8, Q20.9, Q20.10, Q20.11, Q20.12, Q20.13)
Overall performance	Y ₂	=Mean(Y _{2.1} , Y _{2.2} , Q20.14)

(c) Descriptive Statistics

Descriptive statistics are used to describe the basic features of the data in the study. They provide simple summaries about the sample and the measures. Summary measures such as mean, standard deviation, frequency distribution were calculated for all items.

(d) Correlation Analysis

Correlation analysis investigates whether and how two variables are related. It also is used to check the multicollinearity problem among variables in the model.

(e) Multiple Regression Analysis

A regression analysis is used to test all hypotheses of this research. Hypothesis testing included examination of different multiple regression models for predicting intra-organizational knowledge transfer and organizational performance. Since the study used multiple regression analysis, several multicollinearity tests were conducted to ensure independence of the independent variables. Two statistical tests were used to evaluate multicollinearity. Firstly, the pair-wise correlations between variables were evaluated to identify highly correlated pairs. Secondly, for each of the independent variables in the regression models, the variable inflation factor (VIF) was calculated. According to Chatterjee, Hadi and Price (2000), Hair et al. (1995), the value of VIF less than 10 is acceptable.

There are two reasons for using multiple regression analysis in this research.

- Multiple regression analysis can determine the effect of a set of independent variables on the dependent variables.
- All independent variables and dependent variables were measured by 5-point Likert scale and the frequency distribution was approximately normal. Thus, they could be considered as normal variables or scale variables. With scale dependent variables, multiple regression and/or MANOVA are appropriate statistical techniques for hypothesis testing (Leech et al., 2005).

(f) Testing a Mediation Effect

The mediating impact of intra-organizational knowledge transfer process was also tested using the procedure recommended by Baron and Kenny (1986). Mediation is a hypothesized causal chain in which one variable affects a second variable that in turn, affects a third variable. In this research, the intervening variable “intra-organizational knowledge transfer process” is the mediator. It “mediates” the relationship between its predictors (organizational culture values, organizational

structure, incentive systems, frequency of using IT tools), and organizational performance. Following Baron & Kenny (1986), four steps should be undertaken in order to test the mediation effect of knowledge transfer process, as depicted by panels A and B in Figure 4.1: (i) conduct a regression analysis with the independent variables predicting organizational performance (path c); (ii) conduct a regression analysis with the independent variables predicting intra-organizational knowledge transfer process (path a); (iii) conduct a regression analysis with intra-organizational knowledge transfer process predicting organizational performance (path b); (iv) conduct a regression analysis with the independent variables and knowledge transfer process predicting organizational performance (path c').

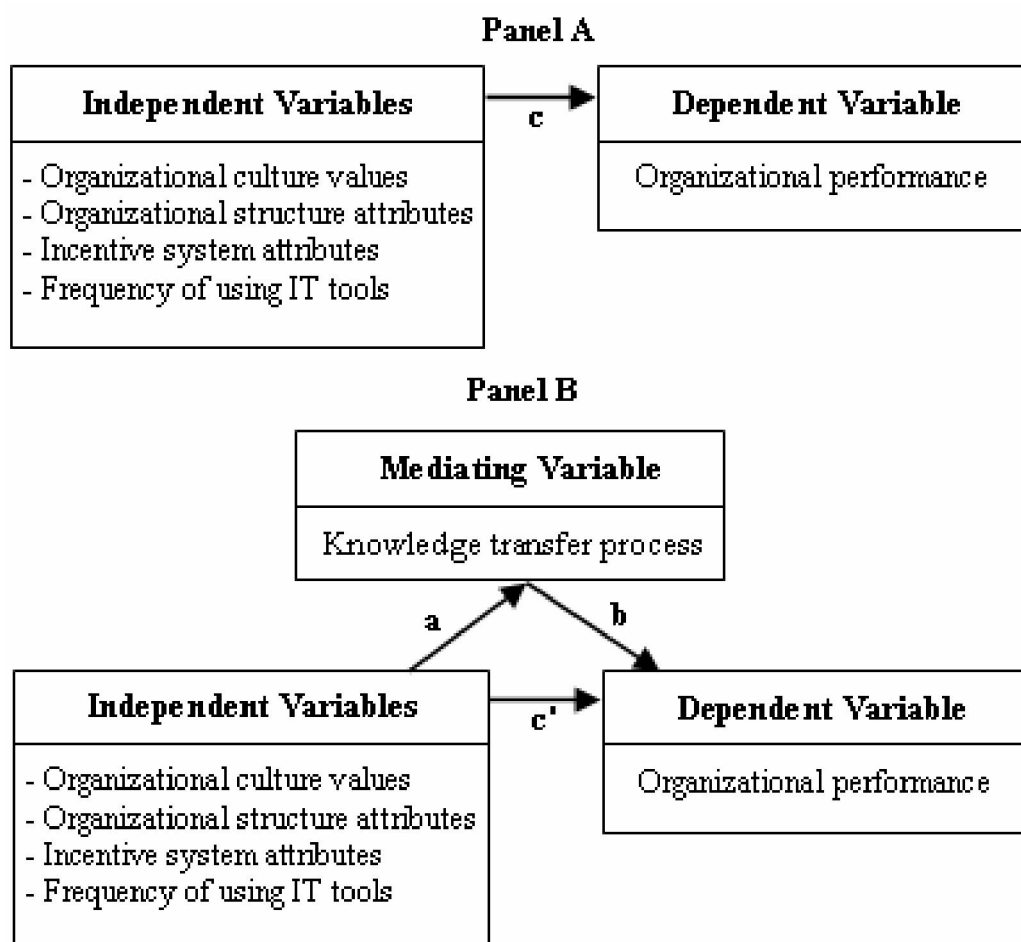


Figure 4.1. Mediation Effect of Knowledge Transfer Process

The last three steps examine the direct effect of independent variables on the dependent variable after controlling for mediating variable.

The mediation effect occurs if (i) there exists an effect to be mediated (i.e. c is

different from 0), and (ii) the indirect effect is statistically significant in the direction predicted by the mediation hypothesis (Preacher and Hayes, 2004). The null mediation hypothesis is that the indirect effect ($c - c'$) equals zero.

To test the mediation hypothesis, a Sobel test was conducted in SPSS 13.0 with the SPSS macro provided by Preacher and Hayes (2004), which is available in <http://www.comm.ohio-state.edu/ahayes/sobel.htm>.

4.3 Results of Measurement's Reliability and Validity Testing

As reported in Table 4.9, 4.10, 4.11, 4.12, 4.13, and 4.14, the results of testing validity and reliability of measurement of constructs indicated that all Cronbach's coefficient alpha of constructs were greater than 0.7. According to Kline (1998), a set of items with a coefficient alpha greater than or equal to 0.7 is considered internally consistent.

Following are the detailed results of factor analysis and reliability analysis for all constructs in the research model.

Results of Factor and Reliability Analyses of Organizational Culture

There were 27 items measuring four attributes of organizational culture. A factor analysis was conducted to see if four factors were extracted, and if the items loaded in similar pattern to theoretical categories. The factor analysis was slightly different from the theoretical categorization in three aspects.

Firstly, five factors were extracted instead of four. They accounted for 60.29% of the explained variance. Two items, an item supposedly measuring teamwork and the other supposedly measuring solidarity, loaded in one new factor. This factor accounted for only 7.5% of the explained variance, so it was decided to exclude the two items from the analysis.

Secondly, an item that was theoretically supposed to measure adaptability was loaded in teamwork factor.

Thirdly, an item, which belonged to the solidarity factor, had a loading less than 0.5, so it was decided to exclude this item from the analysis. After making some revisions, factor analysis was re-run. Four factors were extracted from the analysis.

These four factors accounted for 61.25% of explained variance. Then, based on the factor loadings, the total-to-item analysis was conducted.

Table 4.9. Results of Factor and Reliability Analyses of Organizational Culture

Factors	Items	Loading	Cronbach alpha
Teamwork	- Teamwork is used to get work done rather than hierarchy	0.815	0.764
	- The work is divided up so that everyone has a part and everyone has to share	0.713	
	- People from different departments frequently interact to discuss work-related issues	0.627	
	- Overall, teamwork is encouraged	0.777	
Adaptability	- People view failure as an opportunity for learning and improvement	0.551	0.764
	- The way things are done is very flexible and easy to change	0.653	
	- New and improved ways of doing works are continually adopted	0.789	
	- Overall, people demonstrate a high level of adaptability	0.733	
Collaboration	- People coordinate with one another in doing tasks well	0.510	0.831
	- Cooperation among employees across different units is actively encouraged	0.516	
	- It is easy to coordinate projects across different units of the company	0.658	
	- People from different departments frequently interact to discuss work-related issues	0.793	
	- Overall, the level of collaboration is high	0.832	
Solidarity	- There is a long-term goal and strategic direction of an organization	0.530	0.889
	- There is a clear mission that gives meaning and direction to people's works	0.610	
	- People understand and share the same business objectives	0.683	
	- People continuously track their progress against stated goals	0.605	
	- People understand what needs to be done for a company to succeed in the long run	0.553	

Table 4.9. Results of Factor and Reliability Analyses of Organizational Culture

Factors	Items	Loading	Cronbach alpha
Solidarity	- There is a clear and consistent set of values that governs the way people do business	0.800	
	- When disagreement occurs, people work hard to achieve "win-win" solutions	0.678	
	- Overall, the level of solidarity is high	0.599	

Results of Factor and Reliability Analyses of Organizational Structure

In a similar manner to organizational culture, the factor analysis was conducted, followed by an examination of the alphas for each factor.

As a result, two factors (centralization and formalization) were extracted from the two analyses (Table 4.10). The two factors accounted for 66.8% of explained variance.

Table 4.10. Results of Factor and Reliability Analyses of Organizational Structure

Factors	Items	Loading	Cronbach alpha
Centralization	- Employees are free to make operational decisions	0.800	0.710
	- Employees are free to change things for better task performance	0.860	
	- Employees are allowed to figure out the best way to complete non-routine tasks	0.660	
Formalization	- The company has established a set of rules and procedures that must be followed during job execution	0.690	0.819
	- ISO is applied to manage company's operation	0.860	
	- Company's a standard operating manuals help people to deal with routine problems	0.800	
	- People must follow formal procedures for non-routine processes	0.800	

Results of Factor and Reliability Analyses of Incentive Systems

Five factors accounted for 73.27% of explained variance. Table 4.11 presents the results of factor analysis and reliability analysis for incentive systems.

Table 4.11. Results of Factor and Reliability Analysis of Incentive System

Factors	Items	Loading	Cronbach alpha
Availability of Monetary Incentives	- Having monetary incentives for individual improvement	0.886	0.886
	- Having monetary incentives for individual contribution of new knowledge	0.900	
	- Having monetary incentives for effective problem-solving	0.923	
Availability of Non-monetary Incentives	- Having non-monetary incentives for individual improvement	0.850	0.801
	- Having non-monetary incentives for individual contribution of new knowledge	0.880	
	- Having non-monetary incentives for individuals who are willing to share knowledge	0.830	
Fairness	- People's performances at work are rewarded in an equitable manner	0.760	0.874
	- The incentives people received truly reflect their job performance	0.721	
	- Individual's involvement in teamwork is appropriately rewarded	0.739	
	- Overall, the incentive system is fair enough	0.747	
Group Orientation	- The reward system encourages more group performance than individual performance	0.672	0.843
	- People participate in setting criteria for rewarding performance in workgroup	0.763	
	- Rewards are based more on teamwork than on individual work	0.705	
	- Overall, the incentive system is group-oriented	0.786	
Transparency	- People are able to anticipate and calculate the incentives ...	0.715	0.886
	- People understand the criteria used to administer rewards	0.720	
	- People clearly understand what is required of them to get a desired reward	0.798	
	- Overall, the incentive system is clear enough	0.718	
Flexibility	- People are rewarded more for their skills than for their performances	0.903	0.781
	- Rewards are based more on general criteria of competency than on specific measures of performance	0.880	
	- Overall, the incentive system is flexible	0.640	

Results of Factor and Reliability Analyses of Information Technology Support

Two factors were extracted from factor analysis and accounted for 55.48% of the explained variance (Table 4.12).

Table 4.12. Results of Factor and Reliability Analyses of IT Tools Support

Factors	Items	Loading	Cronbach alpha
Frequency of Use	- Use IT tools to publish information	0.870	0.664
	- Use IT tools to store information in knowledge base	0.817	
	- Use IT tools to exchange information	0.613	
Perceived Ease of Use	- There is a clear guideline of using IT tools	0.685	0.706
	- Interaction with available IT tools does not require a lot of mental effort	0.652	
	- It is easy to manage the use of available IT tools	0.767	
	- Overall, people find the use of available IT tools easy	0.770	
Perceived Usefulness	- Increase storage capacity	0.670	0.790
	- Increase speed	0.781	
	- Increase accessibility	0.724	
	- Increase convenience	0.697	
	- Overall, IT tools are useful for exchanging information	0.746	

Results of Factor and Reliability Analyses of Intra-organizational Knowledge Transfer

Three factors (initiation, implementation, and integration) were extracted from the factor analysis (Table 4.13). These factors accounted for 64.4% of the explained variance.

Table 4.13. Results of Factor and Reliability Analyses of Intra-organizational Knowledge Transfer

Factors	Items	Loading	Cronbach alpha
Initiation	- People know knowledge sources	0.840	0.848
	- People are able to access the sources	0.771	
	- People are able to get knowledge from knowledge sources	0.692	
	- Overall, people know very well how they can access to knowledge	0.739	

Table 4.13. Results of Factor and Reliability Analyses of Intra-organizational Knowledge Transfer

Factors	Items	Loading	Cronbach alpha
Implementation	- Professional knowledge is significantly enriched	0.730	0.882
	- Knowledge of management is significantly increased	0.667	
	- Knowledge of external environment is significantly increased	0.692	
	- Knowledge of culture is significantly increased	0.822	
	- Knowledge of market is significantly increased	0.752	
	- Knowledge of technology is significantly increased	0.574	
	- Overall, the volume of knowledge is increased	0.855	
Integration	- People usually do a trial experimentation	0.597	0.884
	- The transferred knowledge resulting in improved performance	0.618	
	- The transferred knowledge resulting in new way of doing	0.840	
	- The transferred knowledge resulting in new project or product ideas	0.682	
	- The transferred knowledge resulting in wider thinking	0.791	
	- The transferred knowledge resulting in increased ability to solve other problems	0.694	
	- Overall, people satisfy with quantity and quality of knowledge	0.861	

Results of Factor and Reliability Analyses of Organizational Performance

Two factors (financial performance and non-financial performance) were extracted from the analysis (Table 4.14). These factors accounted for 50.5% of explained variance of the organizational performance construct.

Table 4.14. Results of Factor and Reliability Analyses of Organizational Performance

Factor	Items	Loading	Cronbach alpha
Financial Performance	- Increase average return on sale	0.80	0.859
	- Increase annual sale growth	0.82	
	- Increase annual revenue	0.75	
	- Increase percentage profit generated by new products	0.72	
	- Increase market share	0.63	

Table 4.14. Results of Factor and Reliability Analyses of Organizational Performance

Factor	Items	Loading	Cronbach alpha
Non-financial Performance	- Decrease customer complaints	0.62	0.864
	- Decrease operational cost	0.62	
	- Increase employees' job satisfaction	0.75	
	- Decrease employee turnover rate	0.66	
	- Increase number of new products/services	0.62	
	- Increase investment in R&D	0.63	
	- Increase company ranking	0.68	
	- Increase overall performance	0.75	

4.4 A Case Study

A single case study represents the critical case in testing a formulated theory. It confirms, challenges, or even extends the theory. In addition, in completing this case study, the author had a chance to make an in-depth analysis of the firm's phenomenon, problems and practices regarding the knowledge transfer process, enabling an attempt to provide make concrete and specific recommendations specific for the firm. In addition, in this case study, many important aspects of knowledge transfer process in an organization that cannot be captured by questionnaire survey, are investigated. This assists in developing new ideas and enables recognition of specific characteristics where the firm differs substantively from the population at large.

A Vietnamese IT company - FPT Corporation - was chosen for doing the case study.

The case study involves several units of analysis ranging from individual members to the organization as a whole. At each level of analysis, different data collection techniques were used.

4.4.1 Data Collection

Data were collected through a survey, interview with FSS managers, current employees, and a review of company documents and its website. Interview techniques and direct observations were mainly employed to obtain information

about the issues of the company and this assisted in designing and reporting on the case study. In order to examine the phenomenon from different perspectives, people from different levels in an organization (leaders, middle managers, and technical staffs), and from different departments were interviewed. The data collected from the different types of informants enabled the researcher to examine the knowledge transfer at individual, group and organizational levels.

Field notes were taken and transcribed regularly. Interviews and crucial conversations were transcribed in written form. These notes were translated from Vietnamese into English at the end of the fieldwork.

A survey of 90 employees of the company was undertaken to gather information related to each construct defined in the conceptual model in Chapter 2. Together with data collected from interviews and field notes, an overall picture on knowledge transfer process within FSS has been built up.

4.4.2 Data Analysis

To analyze information of the case study, two general strategies: relying on theoretical propositions and developing a case description, were combined. The dominant mode of analysis is a pattern matching of constructs in the model, and explanation-building (Yin, 2002).

Qualitative data was analyzed by using Microsoft Excel. First, data were stored in a spreadsheet. Next, they were categorized and sorted by major topics, i.e., company culture, use of IT tools, company strategy and policy, incentive system, knowledge transfer process, and company performance (Table 4.15)

For the analysis of surveyed data, a procedure similar to that applied in the empirical research presented in Chapter 5 was applied.

Table 4.15. Description of the Coding Categories

Label	Description
Organizational Culture	The data shows informant attitudes about the working atmosphere and behavior of their colleagues and managers. The data shows informants have shared values with others, and the level of their interaction.
Organizational Structure	The data shows informant attitudes on communication channels and the level of standardization of the operation process in the company.
Incentive System	The data shows informant attitudes about incentive types that currently apply in the company, their opinions on the level of fairness, transparency, flexibility and group orientation of the incentive system.
Use of IT Tools	The data shows informant perceptions and their behavior in using IT tools during their work and the level of support from these tools for exchanging knowledge.
Company Policy and Strategy	The data shows informant awareness about the company's strategy and goals.
Knowledge Transfer Process	The data shows the extent to which different types of knowledge have been transferred among individuals, across management levels and units within the company along with business process.
Company Performance	The data shows informant perceptions about company's performance in different aspects: financial performance, customer management, internal operation, learning and growth.

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5.1 Description of Sample

Participants in this study are individuals who are working at IT companies in Hanoi and HCMC. The total number of participants was 218 of which 143 were from Hanoi (65% of the sample), and 75 from HCMC. A total of 36 IT companies

actually participated in the survey, of which 22 were located in Hanoi and the remainder in HCMC.

5.1.1 Socio-demographic Profile of Respondents

Table 5.1 provides a demographic profile of the respondents. In terms of gender, 86% were male and 14% were female. Almost 57% of respondents had working experience of more than two years. Regarding work positions, technical staff constituted 58.7%, while 40.4% were middle managers (head and deputy head of departments), and only 1% senior managers.

Table 5.1. Demographic Profile of Respondents

Demographic Variables	Frequency	Percentage
<i>Gender</i>		
Male	188	86.2
Female	30	13.8
<i>Work seniority</i>		
Less than 6 months	26	11.9
6 months to 2 years	68	31.2
2 years - 5 years	96	44.0
More than 5 years	28	12.8
<i>Work positions</i>		
Technical staff	128	58.7
Middle managers	88	40.4
Senior managers	2	0.9

5.1.2 Characteristics of Surveyed Companies

Table 5.2 provides a profile of IT companies participating in the study. Of the companies sampled, almost 89% engaged in software production, 11% in hardware production and IT services. Most of the surveyed companies (83.3%) were non-state owned enterprises. They are either joint-stock companies or liability-limited ones. The company size varied from less than 50 to more than 250 employees. 86.1% were medium sized enterprises with number of full-time employees greater than 50. Most of the companies are profitably operating in the IT industry. 41.7% reported to have a profit-revenue ratio of less than 15%. 33% achieved profit-revenue ratios ranging from 15% to 20%. Nearly 17% achieved high profit-revenue ratio (greater than 25%).

Table 5.2. Profile of the Surveyed Companies

Company Characteristics	Frequency	Percentage
<i>Business Area</i>		
Software production	32	88.9
Hardware production and IT services	4	11.1
<i>Year of Operation</i>		
< = 7 years	18	50.0
> 7 years	18	50.0
<i>Company's Ownership</i>		
Joint-stock	17	47.2
Liability Ltd.	13	36.1
State-owned	6	16.7
<i>Company Size (Number of full-time employees)</i>		
< = 50	5	13.9
51 - 99	12	33.3
100 - 249	6	16.7
> = 250	13	36.1
<i>Profit-revenue Ratio (Year 2004)</i>		
5% - < 15%	15	41.7
15% - 20%	12	33.3
20% - 25%	3	8.3
> 25%	6	16.7

5.1.3 IT Tools in Surveyed Companies

Almost all surveyed companies have communication-support IT tools such as email, intranet, Internet, website, e-library, and electronic bulletin board. Nearly one fifth of surveyed companies have decision-aiding IT tools such as decision-support systems and expert systems (Table 5.3).

Table 5.3. IT Tools in Surveyed Companies

IT Tools	Frequency	Percentage
<i>Current information technology system used</i>		
- Computer-based	2	5.6
- Mix of computer and paper based	34	94.4
<i>Availability of information technology tools</i>		
- Email	36	100.0
- Intranet	36	100.0
- Electronic bulletin board	27	75.0

Table 5.3. IT Tools in Surveyed Companies

IT Tools	Frequency	Percentage
- Internet	36	100.0
- Company website	36	100.0
- Video-conference	8	22.2
- E-library	29	80.6
- Decision support system	6	16.7
- Expert system	18	50.0

5.1.4 Frequency of Using IT Tools

Table 5.4 provides the frequency of using different IT tools reported by the respondents to the survey.

Table 5.4. Frequency of Using IT Tools (n=218)

IT Tools	Frequency of Use					
	<i>Never</i>	<i>Occasionally</i>	<i>Often</i>	<i>Regularly</i>	<i>Everyday</i>	<i>N/A</i>
E-library	17.4	13.3	23.9	20.2	5.5	19.7
Intranet	6.0	8.7	15.6	28.9	40.8	-
Email	-	0.5	4.6	20.6	74.3	-
Company website	8.3	10.6	30.3	32.6	18.3	-
Video-conferencing	3.7	9.2	8.7	-	-	78.4
Internet	-	0.5	6.4	17.9	75.2	-
Internal electronic bulletin board	22.0	12.8	14.7	13.8	26.6	10.1
Decision support system	11.0	2.3	2.8	5.0	1.4	77.5
Expert system	21.1	12.8	8.7	5.0	1.4	50.9

Scale: 1=never, 2=occasionally (less than once a month), 3=often (between once a month and once a week), 4=regularly (several times a week), 5=all the time (everyday)

The results suggest that email and Internet were most frequently used by respondents (74.3% and 75.2% used it everyday, respectively). Intranet was the next most frequently used. Decision support systems were rarely used by respondents, because they were installed in only a few companies. Decision support systems were mainly used by managers and senior managers.

5.1.5 Perceived Support Level of IT Tools

Table 5.5 describes the support level of each IT tool perceived by the respondents. The results suggest that among the communication-aiding IT tools, Internet and

email were the two IT tools that provide most support to knowledge sharing (Mean=4.51, SD=0.33 and Mean=4.49, SD=0.33), while decision support systems, expert systems and video-conferencing provide much less support to knowledge sharing (Mean=2.24, SD=0.37 and Mean=1.99, SD=0.81). The reason for this is that people use decision-aiding IT tools less frequently, and only small numbers of people in the surveyed companies are able to use such tools due to their complexity. The more frequently people use IT tools for knowledge transfer, the higher the support level of those IT tools for knowledge transfer is perceived.

Table 5.5. Perceived Support Level of IT Tools for Knowledge Sharing

Scale Items	n	Mean	SD
Level of email support	36	4.49	0.33
Level of intranet support	36	3.84	0.66
Level of electronic bulletin board support	27	3.11	0.96
Level of Internet support	36	4.51	0.33
Level of company's website support	36	3.13	0.51
Level of video conference support	8	2.38	0.59
Level of e-library support	29	3.03	0.63
Level of decision support system support	6	2.24	0.37
Level of expert system support	18	1.99	0.81

Note: Scale values range from 1 (little) to 5 (very much)

5.2 Descriptive Analysis

5.2.1 Knowledge Transfer Process

Most of the respondents agreed that people in their companies know how to access the knowledge sources in order to get the knowledge they need (Mean=3.9, SD=0.7). The volume of knowledge being transferred increases because of the frequent interaction among individuals and between individuals and knowledge repositories of the company (Mean=4.0, SD=0.6). Especially, the professional knowledge and knowledge of technology have been significantly exchanged. With the volume of knowledge obtained through frequent interaction, people tend to apply it in their daily works. As a result, their behaviors at work and task performances have been improved. Specifically, their problem solving abilities and task performance results are significantly improved.

The results suggested that the intra-organizational knowledge transfer process has been facilitated within the companies (Table 5.6).

Table 5.6. Mean Results of Intra-organizational Knowledge Transfer Process (n=218)

Scale Items	Mean	SD
<i>Initiation Stage</i>		
- People know knowledge sources	3.9	0.8
- People are able to access the knowledge sources	4.0	0.7
- People are able to get knowledge	3.8	0.9
Overall, people know and are able to get knowledge if needed	3.9	0.7
<i>Implementation Stage</i>		
- Increase in transferred volume of professional knowledge	4.1	0.7
- Increase in transferred volume of management knowledge	3.8	0.8
- Increase in transferred volume of knowledge of external environment	3.6	0.8
- Increase in transferred volume of knowledge of culture	3.9	0.7
- Increase in transferred volume of knowledge of market	3.8	0.8
- Increase in transferred volume of knowledge of technology	4.2	0.6
- Overall, the volume of knowledge is increased	4.0	0.6
<i>Integration Stage</i>		
- People usually do a trial experimentation	3.6	0.7
- The transferred knowledge resulting in improved performance	3.9	0.6
- The transferred knowledge resulting in new way of doing	3.7	0.7
- The transferred knowledge resulting in new project or product ideas	3.7	0.7
- The transferred knowledge resulting in wider thinking	3.9	0.6
- The transferred knowledge resulting in increased ability to solve problems	4.1	0.6
- Overall, people satisfy with quantity and quality of knowledge	3.9	0.6

Note: Scale values range from 1 (strongly disagree) to 5 (strongly agree)

5.2.2 Organizational Performance

The mean scores for organizational performance are not so high, meaning that the organizational performances of the IT companies are not significantly improved over the past three years (Table 5.7). The companies' financial performance seems to exceed the non-financial performance. There are some reasons for moderate level of agreement on the improvement of non-financial performance. Firstly, in any company, financial performance has received more attention since it is the ultimate goal of the company's operation. Secondly, it is not easy to identify the changes in the non-financial performance since it is not always explicitly demonstrated or

measured.

Table 5.7. Mean Results of Organizational Performance (n = 36)

Scale Items	Mean	SD
<i>Financial Performance</i>	3.72	
- Increase of average profit/revenue rate	3.72	0.34
- Increase sale turnover	3.72	0.40
- Increase annual revenue growth rate	3.85	0.52
- Increase percentage of profit generated by new products	3.67	0.43
- Increase market share in primary market	3.62	0.36
<i>Non-financial Performance</i>	3.53	
- Decrease number of customer's complaints	3.45	0.39
- Improve customer service	3.61	0.30
- Decrease operational cost	3.32	0.37
- Increase employee satisfaction	3.47	0.44
- Decrease rate of employee turnover	3.50	0.49
- Increase number of new product	3.47	0.45
- Increase investment in R&D	3.54	0.39
- Improve the rank of company in comparison with average industry in terms of new product introduction	3.65	0.40
<i>Overall Performance</i>	3.75	0.33

Note: Scale values range from 1 (Strongly disagree) to 5 (Strongly agree)

5.2.3 Perceived Usefulness of IT Tools

Most of respondents agree that IT tools are very useful (Mean=4.37, SD=0.59). As shown in the Table 5.8, “increasing speed of information exchange”, “convenience” and “overcoming location and time constraints” were useful traits of IT tools that were mostly recognized by respondents.

Table 5.8. Perceived Usefulness of IT Tools (n=218)

Scale Items	Mean	SD
- Increase storage capacity	4.34	0.66
- Increase transmission capacity	4.39	0.63
- Increase speed of exchanging information	4.48	0.54
- Increase accessibility	4.22	0.72
- Process of exchanging information is more convenience	4.45	0.61
- Overcome location and time constraints in communication	4.45	0.58
- Overall, IT tools are very useful for exchanging information	4.37	0.59

Note: Scale values range from 1 (strongly disagree) to 5 (strongly agree)

5.2.4 Perceived Ease of Use of IT Tools

Table 5.9 shows that most of the respondents somewhat agree that it is easy to use IT tools for exchanging knowledge (Mean=3.94, SD=0.65).

Table 5.9. Perceived Ease of Use of IT Tools (n=218)

Scale Items	Mean	SD
- There is a clear guideline of using IT tools	3.86	0.79
- Interaction with the available IT tools does not require a lot of mental effort	3.85	0.85
- It is easy to manage the use of available IT tools	3.75	0.78
- Overall, the use of the available IT tools is easy	3.94	0.65

Note: Scale values range from 1 (strongly disagree) to 5 (strongly agree)

Only 20% of respondents agree that using IT tools required little mental effort and use of available tools went smoothly. Nearly 60% of respondents somewhat agree with those statements. Only 5% of respondents disagree on the ease of using IT tools. The rest neither agreed nor disagreed with the perceived ease of using IT tools.

5.2.5 Organizational Culture

(a) Teamwork

The result suggests that, in surveyed companies, teamwork was highly encouraged (Mean=4.19, SD=0.74). Most respondents (84%) agree that teamwork is usually used to get work done. 90% of respondents said that each individual was a member of the team and the work was divided up. Working in team is usually applied in IT companies since the work is mainly organized on a project basis. The number of projects depends on the number of contracts signed between companies and their customers. Table 5.10 presents the level of agreement of respondents on each item measuring teamwork in the surveyed companies.

Table 5.10. Teamwork Perceived by Respondents (n=218)

Scale Items	Mean	SD
- Teamwork is used to get work done, rather than hierarchy	4.18	0.72
- The work is divided up so that everyone has a part and everyone has to share	4.28	0.64
- People from different departments frequently interact to discuss work-related issues	4.16	0.67
- When working in a team, the assignment or project can not be completed unless everyone contributes	3.98	0.76
- Interdisciplinary cross-functional teamwork is extremely important for making decision and solving problem	3.80	0.72
- Overall, teamwork is encouraged in an organization	4.19	0.74

Note: Scale values range from 1 (strongly disagree) to 5 (strongly agree)

(b) Adaptability

The statistical result suggests that the level of adaptability is not so high (Mean=3.81, SD=0.61). Learning and flexibility in doing work are most encouraged by the companies. 90% of respondents agree that learning is an important objective in their daily work and 60% of them view failure as an opportunity for learning and improvement. Table 5.11 presents the level of agreement of respondents on different items measuring adaptability in the surveyed companies.

Table 5.11. Adaptability Perceived by Respondents (n=218)

Scale Items	Mean	SD
- People view failure as an opportunity for learning and improvement	3.77	0.80
- Innovation and risk taking are encouraged and rewarded	3.59	0.70
- Learning is an important objective in daily work	4.28	0.68
- The way things are done is very flexible and easy to change	3.64	0.79
- New and improved ways of doing works are continually adopted	3.62	0.68
- People in the company demonstrate a high level of adaptability	3.81	0.61

Note: Scale values range from 1 (strongly disagree) to 5 (strongly agree)

(d) Solidarity

Most of respondents somewhat agree that the level of solidarity in surveyed companies is moderate (Mean=3.65, SD=0.77). In the surveyed companies, clear mission and long-term strategic direction have been set out to guide people's work.

However, respondents provided no clear opinion about the alignment of goals across management levels in an organization (Mean=3.47, SD=0.82). Table 5.12 presents the agreement level of respondents on the different items measuring solidarity in surveyed companies.

Table 5.12. Solidarity Perceived by Respondents (n=218)

Scale Items	Mean	SD
- There is a long-term organizational goal and strategic direction	3.78	0.91
- There is a clear mission that gives meaning and direction to people's work	3.80	0.83
- People understand and share business objectives	3.75	0.78
- People continuously track their progress against stated goals	3.73	0.75
- People understand what needs to be done for a company to succeed	3.77	0.72
- There is a clear and consistent set of values that governs the way people do business	3.70	0.83
- When disagreement occurs, people work hard to achieve “win-win” solutions	3.75	0.78
- It is easy to reach consensus, even on difficult issues	3.46	0.85
- There is good alignment of goals across levels	3.47	0.82
- Overall, the level of solidarity in the company is high	3.65	0.77

Note: Scale values range from 1 (strongly disagree) to 5 (strongly agree)

(c) Collaboration

The statistical result suggests that, in general, the level of collaboration among individuals in the surveyed companies is moderate (Mean=3.65, SD=0.79). Only 12% of respondents strongly agree and 48% of respondents somewhat agree that there is high collaboration among individuals. 33% of respondents were neutral. However, most of respondents agree that the cooperation among employees across different units is actively encouraged in surveyed companies (Mean=3.96, SD=0.71). Table 5.13 presents the agreement level on different items measuring collaboration in surveyed companies.

Table 5.13. Collaboration Perceived by Respondents (n=218)

Scale Items	Mean	SD
- People coordinate with one another in doing tasks very well	3.71	0.71
- Cooperation among employees across different units is actively encouraged	3.96	0.71
- It is easy to coordinate projects across different units of the company	3.60	0.83
- People from different departments frequently interact to discuss work-related issues	3.62	0.78
- Overall, the collaboration level among individuals is high	3.65	0.79

Note: Scale values range from 1 (strongly disagree) to 5 (strongly agree)

Overall, the culture of surveyed companies is communal culture, which is characterized by high level of teamwork orientation, high level of adaptability and a moderate level of collaboration and solidarity.

5.2.6 Organizational Structure

(a) Centralization

The statistical result suggests that the centralization of strategic decision making in the surveyed companies is high (Mean=3.8, SD=0.7). Top management teams determine the strategy and set goals for company's development. However, most of respondents agree that employees are allowed to take their own initiatives to improve task performance (Mean=3.82, SD=0.8).

(b) Formalization

In the surveyed companies, most of respondents somewhat agree that there is a high level of formalization (Mean= 3.62, SD=0.9). 67% of respondents said the company has some rules and regulations regarding working time, labor safety, information release, security and working conditions that all employees must follow. About 63% of respondents said that ISO is applied to manage their companies' operations.

5.2.7 Incentive Systems

The statistical result suggests that most of respondents somewhat agree that monetary and non-monetary incentives are available to elicit for knowledge transfer behavior. The incentive system was characterized by moderate level of fairness,

transparency, flexibility and group-orientation (Mean=3.56, 3.59, 3.43, 3.57 and SD=0.71, 0.88, 0.8, 0.83, respectively). Table 5.14 presents the agreement level of respondents on different items measuring each attribute of incentive systems of the surveyed companies.

Table 5.14. Incentive Systems of the Surveyed Companies (n=218)

Scale Items	Mean	SD
<i>Availability of Monetary Incentives</i>		
- Having monetary incentives for individual improvement	3.69	0.97
- Having monetary incentives for contribution of new knowledge	3.62	0.88
- Having monetary incentives for effective problem-solving individuals	3.76	0.94
<i>Availability of Non- monetary Incentives</i>		
- Having non-monetary incentives for individual improvement	3.70	0.77
- Having non-monetary incentives for contribution of new knowledge	3.70	0.80
- Having non-monetary incentives for effective problem-solving individuals	3.49	1.02
<i>Fairness of Incentive System</i>		
- Equitable rewarded among individuals	3.52	1.02
- Incentives reflect individual performance	3.48	0.70
- Individual's involvement in teamwork is appropriately rewarded	3.50	0.79
- Overall, the incentive system is fair	3.56	0.71
<i>Transparency of Incentive System</i>		
- People are able to calculate and anticipate incentives	3.44	0.70
- People know and understand criteria used to administer incentives	3.35	0.85
- People understand requirement to get desired rewards	3.47	0.71
- Overall, the incentive system is clear enough	3.59	0.88
<i>Flexibility of Incentive System</i>		
- People are rewarded for skill more than for performance	3.04	0.87
- Rewards are based on criteria of competence	2.97	0.90
- Rewards are specified only for formal activities	3.53	0.92
- Overall, the incentive system of the company is flexible	3.43	0.80
<i>Group Orientation of Incentive System</i>		
- The reward system encourages group performance more than individual performance	3.40	0.77
- People participate in setting criteria for rewarding performance in workgroup	3.31	0.82
- Rewards are based more on teamwork than on individual work	3.63	0.84
- Overall, the incentive system is group-oriented	3.57	0.83

Note: Scale values range from 1 (strongly disagree) to 5 (strongly agree)

5.3 Correlation Analysis

A Pearson correlation analysis was performed on the independent and dependent variables. Table 5.15 presents the correlation matrix addressing bi-variate relationships among the variables in the study. None of these correlations was considered high (above 0.7) and some were moderately correlated (between 0.4 and 0.7).

As expected, the four attributes of organizational culture (adaptability, teamwork, collaboration and solidarity) positively correlated with the three stages of the transfer process: initiation, implementation and integration. Perceived ease of use and perceived usefulness of IT tools correlated with the frequency of using IT tools. Then, in turn, they correlated with all three stages at low level.

Some independent variables were correlated in a way opposite to that hypothesized. Centralization and formalization positively correlated with all three stages. When people must follow certain administrative rules and standard procedures, they will clearly know how to access the knowledge they need inside the organization. They are also requested to share knowledge with others in order to get the work done.

The control variable - company size - correlated with implementation and integration stages at low correlation coefficients. Larger companies may provide better conditions and opportunities for individuals in sharing and applying knowledge in their works.

Table 5.15. Correlations among Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Company Age	***																						
2. Company Size	.29**																						
3. Seniority	.08	.08																					
4. Working Position	-.14*	.13*	.21**																				
5. Perceived Ease of Use	-.05	.00	.00	.08																			
6. Perceived Usefulness	-.08	-.05	-.12*	.01	.38**																		
7. Frequency of Use	-.07	.12*	.00	.19**	.34**	.32**																	
8. Teamwork	-.14*	-.10	.07	.07	.37**	.45**	.31**																
9. Adaptability	.11*	.11	.10	.00	.36**	.15*	.29**	.43**															
10. Collaboration	.09	.13*	.22**	-.02	.32**	.13*	.29**	.34**	.55**														
11. Solidarity	-.01	.18**	.11	.00	.36**	.16**	.41**	.35**	.57**	.71**													
12. Centralization	.01	.00	-.10	.06	.35**	.18**	.35**	.31**	.32**	.42**	.56**												
13. Formalization	.22**	.08	.05	-.07	.27**	-.01	.11*	.19**	.46**	.60**	.57**	.36**											
14. Fairness	.23**	.12*	.02	.01	.18**	-.01	.24**	.26**	.50**	.52**	.65**	.52**	.57**										
15. Transparency	.07	.08	.02	-.02	.34**	.06	.29**	.30**	.45**	.47**	.69**	.62**	.52**	.67**									
16. Flexibility	.08	.14*	.05	-.08	.27**	.04	.13*	.15*	.41**	.33**	.40**	.27**	.31**	.37**	.43**								
17. Group Orientation	.06	.07	.06	-.01	.30**	.08	.16**	.24**	.39**	.55**	.59**	.45**	.50**	.55**	.60**	.37**							
18. Monetary Incentives	.13*	.23**	.06	-.05	.17**	.01	.22**	.31**	.39**	.55**	.64**	.49**	.55**	.58**	.55**	.37**	.61**						
19. Non-monetary Incentives	.11	.22**	.01	.00	.13*	-.08	.13*	.15*	.25**	.45**	.59**	.38**	.48**	.54**	.53**	.35**	.50**	.68**					
20. Initiation	-.20**	.07	.10	.05	.49**	.22**	.17**	.38**	.54**	.28**	.45**	.11	.22**	.23**	.35**	.26**	.33**	.24**	.15*				
21. Implementation	-.01	.14*	.10	-.05	.31**	.17**	.14*	.12*	.40**	.32**	.51**	.03	.26**	.27**	.19**	.36**	.27**	.26**	.32**	.57**			
22. Integration	-.01	.12*	.10	.11	.23**	.22**	.29**	.37**	.44**	.39**	.56**	.30**	.16*	.37**	.50**	.30**	.38**	.44**	.38**	.53**	.55**		
23. Overall Knowledge Transfer	-.10	.07	.12*	.04	.42**	.24**	.24**	.35**	.56**	.39**	.60**	.16**	.26**	.34**	.41**	.36**	.39**	.36**	.33**	.86**	.84**	.80**	
24. Overall Performance	-.04	.21**	.04	.06	.24**	.06	.31**	.21**	.45**	.48**	.64**	.43**	.34**	.46**	.54**	.52**	.52**	.51**	.55**	.31**	.40**	.49**	.47**

** .Correlation is significant at the 0.01 level (1-tailed).

* .Correlation is significant at the 0.05 level (1-tailed).

5.4 Hypotheses Testing

This section presents the statistical tests of the research model and for the research hypotheses examined in the study. The emphasis of the study is on assessing the statistical significance and relative influence of the independent variables on the three stages of knowledge transfer process and on company performance.

Firstly, a test for the multicollinearity among independent variables is implemented to ensure not to violate the assumption of multiple regression statistics. To this end, the tolerance statistic was examined to identify any variables with a tolerance close to zero. The Variance Inflation Factor (VIF), which is the inverse of the tolerance value, was calculated. VIF of independent variables in all regression models ranged from 1.052 to 5.148. According to Chatterjee, Hadi and Price (2000), Hair et al. (1995), the value of VIF less than 10 is acceptable. Thus, the data is not subject to multicollinearity problems.

Secondly, since all dependent variables correlated with one another at moderate level, the MANOVA technique was used to simultaneously test the relationship between all independent variables and three dependent variables corresponding to the three stages of knowledge transfer. Since, the MANOVA was significant (Wilks' Lambda <0.001), all hypotheses were tested by running several multiple regression models. Hypothesis testing included examination of different multiple regression models for predicting knowledge transfer and company's performance.

Table 5.16a, 5.16b and 5.16c present the regression results for knowledge transfer process. The model 1 tested H1c by regressing knowledge transfer process on frequency of using IT tools. Model 2 tested H2a, H2b, H2c, and H2d by regressing knowledge transfer process on organizational culture constructs. Model 3 examined the impact of organizational structure's attributes on the knowledge transfer process (H3a, H3b). Model 4 examined the impact of availability of incentive systems on the knowledge transfer process (H4a). Model 5 tested H4b by regressing knowledge transfer process on different attributes of incentive systems. Model 6 examined the joint impact of organizational culture attributes, organizational structure characteristics, incentive systems and frequency of using IT tools on knowledge

transfer processes. Model 7 examined the impact of intra-organizational knowledge transfer process on organizational performance.

5.4.1 IT Tools and Knowledge Transfer Process

The statistical results suggest that there was a significant relationship between perceived ease of use and perceived usefulness of IT tools with the frequency of using IT tools for knowledge transfer (Adj. $R^2=0.149$, $p<0.001$). Thus, hypothesis H1b was supported.

Model 1 examining the predictability of the frequency of using IT tools was significant (Adj. $R^2=0.052$, $F=3.35$, $p<0.001$). The frequency of using IT tools contributes to 5.2% of the variance in knowledge transfer. This effect remains weak. None of the control variables is significant in this model. The statistical result in Table 5.16a indicates support for the hypothesis H1c. The use of IT tools positively facilitates all three stages of knowledge transfer ($\beta=0.15$, $p<0.001$). The impact of the frequency of use IT tools on integration stage remains the biggest ($\beta=0.18$, $p<0.001$). The higher the frequency of using IT tools, the higher the possibility that knowledge will be integrated into daily work and individuals' performance in the company. This finding suggests that information technology has a potential for facilitating knowledge transfer. However, the IT tools by themselves are not sufficient. There needs to be a mechanism and an enabling environment to encourage people to use the tools for exchanging knowledge.

5.4.2 Organizational Culture and Knowledge Transfer Process

Model 2 examining the predictability of organizational culture attributes was significant (Adj. $R^2=0.44$, $p<0.001$). The adjusted R^2 value of all regression models reveals that organizational culture has large effect on different stages of knowledge transfer. The statistical results of the regression analysis in Table 5.16a indicate support ($p<0.001$) for the hypotheses H2a, H2b and H2d (Adj. $R^2=0.38$, 0.28 , 0.35 , $p<0.001$).

Table 5.16a. Regression Results of Knowledge Transfer

Variables	Model 1				Model 2			
	(1)	(2)	(3)	Overall	(1)	(2)	(3)	Overall
	Beta	Beta	Beta	Beta	Beta	Beta	Beta	Beta
<u>Control Variables</u>								
Company Age	-0.12	-0.02	0.01	-0.04	-0.17*	-0.08	0	-0.08
Company Size	-0.11	0.14	0.08	0.04	-0.17*	0.05	0.03	-0.03
Seniority	0.09	0.07	0.05	0.07	0.05	0.05	0.01	0.04
Working Position	-0.03	-0.13	0.03	-0.04	0	-0.09	0.08	0
<u>Independent Variables</u>								
<u>Frequency of Using IT Tools</u>								
	0.15**	0.11*	0.18***	0.15***				
<u>Organizational Culture</u>								
Teamwork					0.13+	-0.11	0.16*	0.06
Adaptability					0.52***	0.23**	0.13*	0.29***
Collaboration					-0.22*	-0.13	-0.09	-0.15
Solidarity					0.34***	0.46***	0.40***	0.40***
<u>Organizational Structure Dimensions</u>								
Centralization								
Formalization								
<u>Availability of Incentive Systems</u>								
Monetary Incentives								
Non-monetary Incentives								
<u>Incentive Systems' Attributes</u>								
Fairness								
Transparency								
Flexibility								
Group Orientation								
Adjusted R²	0.03	0.03	0.07	0.052	0.38	0.28	0.35	0.44
F Statistic	2.6**	2.5*	4.6***	3.35*	17.5***	14.0***	15.7***	22.7***

Note: + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

(1) Initiation stage, (2) Implementation stage, (3) Integration stage

The beta weights, presented in Table 5.16a, suggest that high adaptability and high solidarity contribute most to predicting the knowledge transfer process ($\beta=0.29$ and 0.4 respectively, $p < 0.001$). Solidarity, adaptability and teamwork are three culture values that were significantly associated with the three stages of intra-organizational knowledge transfer process, while collaboration was not. Teamwork orientation has more impact on the integration stage ($\beta=0.16$, $p < 0.001$). In contrast to that hypothesized (H2c), collaboration was negatively related to the initiation stage ($\beta=$

-0.22, $p < 0.001$). Two control variables - company age and company size - were negatively correlated with the initiation stage ($\beta = 0.17$, $p < 0.05$).

5.4.3 Organizational Structure and Knowledge Transfer Process

Model 3 examining the predictability of organizational structure attributes was significant (Adj. $R^2 = 0.07$, $p < 0.001$). However, the effect of organizational structure on knowledge transfer process is much lower than that of organizational culture. Formalization contributes most to facilitating knowledge transfer. None of the control variables is significant in this model.

The results, presented in the Table 5.16b, suggest that formalization was positively associated with the initiation stage ($\beta = 0.22$, $p < 0.01$) and the implementation stage ($\beta = 0.204$, $p < 0.001$). The hypothesis H3b was supported in the opposite direction to that hypothesized. Applying ISO standards to managing company operations and providing regulations and instructions in the organization may help people keeping track of their work and knowing exactly what they need to do. High formalization can also reduce chaos and control employees' behavior in a way that facilitates knowledge transfer.

Centralization was negatively associated with the integration stage ($\beta = -0.22$, $p < 0.001$). High centralization prevents individual creativity and flexibility in dealing with changes in the work environment. It also hinders communication and frequency of sharing ideas due to time-consuming communication channels. There is no statistically significant relationship between centralization and the initiation and implementation stages.

5.4.4 Incentive System and Knowledge Transfer Process

The statistical results presented in the model 4 (Table 5.16b), suggest that both monetary and non-monetary incentives are needed to facilitate the knowledge transfer process (Adj. $R^2 = 0.142$, $p < 0.001$). The effect of incentive availability on the implementation stage is the biggest. However, in contrast to that hypothesized (H4a), monetary incentives had stronger impact on the knowledge transfer process in comparison with non-monetary incentives. The hypothesis H4a was supported in

the opposite direction. The monetary incentive systems was positively associated with initiation and integration stages ($\beta=0.213$, $p<0.01$ and $\beta=0.198$, $p<0.001$, respectively), while the non-monetary incentive system was significantly associated with the implementation stage ($\beta=0.202$, $p<0.01$).

Table 5.16b. Regression Results of Knowledge Transfer

Variables	Model 3				Model 4			
	(1)	(2)	(3)	Overall	(1)	(2)	(3)	Overall
	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>
<u>Control Variables</u>								
Company Age	-0.22	-0.11	-0.04	-0.12	-0.17+	-0.06	-0.06	-0.09
Company Size	-0.11	0.14	0.1	0.05	-0.17+	0.08	0	-0.03
Seniority	0.07	0.06	0.06	0.06	0.07	0.07	0.03	0.06
Working Position	0.02	-0.09	0.05	-0.01	0.03	-0.1	0.09	0.01
<u>Independent Variables</u>								
<i>Frequency of Using IT Tools</i>								
<i>Organizational Culture</i>								
Teamwork								
Adaptability								
Collaboration								
Solidarity								
<i>Organizational Structure Dimensions</i>								
Centralization	0.02	-0.05	-0.22***	-0.07				
Formalization	0.22***	0.204***	0.03	0.153***				
<i>Availability of Incentive Systems</i>								
Monetary Incentives					0.213**	0.03	0.198***	0.148**
Non-monetary Incentives					0	0.202**	0.109+	0.103+
<i>Incentive Systems' Attributes</i>								
Fairness								
Transparency								
Flexibility								
Group Orientation								
Adjusted R²	0.070	0.070	0.096	0.070	0.070	0.100	0.202	0.142
F Statistic	3.7**	4.0**	4.83***	3.96***	3.9***	5.11***	10.17***	6.98***

Note: + $p<0.1$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

(1) Initiation stage, (2) Implementation stage, (3) Integration stage

Model 5 examined the relationship between the incentive system's attributes and the knowledge transfer process. The statistical results, presented in Table 5.16c, indicate support for the hypothesis H4b (Adj. $R^2=0.23$, $p<0.001$). For facilitating the initiation stage, group orientation and transparency are more important than fairness

and flexibility. The volume of knowledge transfer increases if the incentive system is flexible and fair. To facilitate the integration stage, there is a need to have a clear incentive system ($\beta=0.28$, $p<0.001$). Overall, an incentive system, which is flexible, transparent and group-oriented, can have a significantly positive effect on the knowledge transfer process.

Table 5.16c. Regression Results of Knowledge Transfer

Variables	Model 5				Model 6			
	(1)	(2)	(3)	Overall	(1)	(2)	(3)	Overall
	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta</i>
<u>Control Variables</u>								
Company Age	-0.19	-0.09	-0.07	-0.12	-0.13	-0.03	0.04	-0.04
Company Size	-0.14	0.1	0.06	0.01	-0.18*	0	-0.02	-0.07
Seniority	0.07	0.06	0.04	0.05	0	0.01	-0.01	0
Working Position	0.03	-0.09	0.08	0.01	0.08	-0.04	0.11*	0.05
<u>Independent Variables</u>								
<i>Frequency of Using IT Tools</i>					-0.05	-0.01	-0.01	-0.02
<u>Organizational Culture</u>								
Teamwork					0.17*	-0.02	0.12*	0.09+
Adaptability					0.49***	0.19*	0.17**	0.28***
Collaboration					0.19*	-0.14	0.03	-0.1
Solidarity					0.47***	0.69***	0.31***	0.49***
<u>Organizational Structure Dimensions</u>								
Centralization					-0.30***	-0.23***	-0.14*	-0.22**
Formalization					-0.04	0	-0.26***	-0.10*
<u>Availability of Incentive Systems</u>								
Monetary Incentives					0.02	-0.08	0.11*	0.02
Non-monetary Incentives					-0.07	0.11+	0.05	0.03
<u>Incentive Systems' Attributes</u>								
Fairness	-0.02	0.15*	0.02	0.05	-0.15	0.004	-0.06	-0.07
Transparency	0.21*	0.11	0.28***	0.128*	0.16*	0.24***	0.23***	0.05
Flexibility	0.12+	0.22***	0.07	0.133*	0.03	0.16***	0.02	0.07+
Group Orientation	0.17*	0.11+	0.07	0.117*	0.15*	0.06	0.01	0.07
Adjusted R²	0.17	0.155	0.267	0.23	0.43	0.409	0.452	0.509
F Statistic	6.55***	5.95***	10.86***	9.1***	10.9***	9.8***	11.53***	14.22***

Note: + $p<0.1$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

(1) Initiation stage, (2) Implementation stage, (3) Integration stage

5.4.5 Independent Variables and Knowledge Transfer Process

Model 6 tested the joint impact of all proposed independent variables on the knowledge transfer process. As observed, there is a significant improvement in the predictive power of this model in comparison with previous models with the

explained percentages of total variance being 43% for the initiation stage, 40.9% for the implementation stage and 45.2% for the integration stage. Company size is negatively correlated with the initiation stage ($\beta=-0.18$, $p<0.05$), while working position is positively correlated with the integration stage ($\beta=0.11$, $p<0.05$). The results suggest that individuals with high position in the company's hierarchy tend to have more opportunities to apply the acquired knowledge in their work that results in their better performance. In addition, the larger the company is, the weaker the individuals' interaction for exchanging knowledge. In order to facilitate the interaction among individuals, meetings need to be frequently organized, communication via IT tools needs to be encouraged, and a more important point is to build a culture of adaptability and solidarity in the company.

The statistical results in Table 5.16c suggest that solidarity and adaptability are two culture values that strongly influence all three stages of the knowledge transfer process. Solidarity has large effect and the strongest association with the implementation stage ($\beta=0.69$, $p<0.001$), and the integration stage ($\beta=0.31$, $p<0.001$). It is also significantly related to the initiation stage ($\beta=0.47$, $p<0.001$). Adaptability has the strongest association with the initiation stage ($\beta=0.49$, $p<0.001$), and is significantly associated with the implementation stage ($\beta=0.19$, $p<0.05$) and the integration stage ($\beta=0.17$, $p<0.01$). Teamwork is significantly associated with the initiation stage ($\beta=0.17$, $p<0.05$) and the integration stage ($\beta=0.12$, $p<0.05$). Collaboration is only significantly associated with the integration stage ($\beta=0.19$, $p<0.01$). Overall, all four culture values were significantly associated with the integration stage. Adaptability, teamwork orientation and solidarity are important for the facilitating the initiation stage. Solidarity and adaptability appear important for facilitating the implementation stage.

After examining the effect of organizational culture, the two dimensions of organizational structure are now analyzed. The statistical results suggest that the higher the level of formalization and centralization is, the more the transfer process is hindered. Centralization is negatively associated with all three stages. Formalization negatively influences the integration stage ($\beta=-0.26$, $p<0.001$).

Overall, the effect of centralization on the knowledge transfer process is larger than that of formalization.

A flexible and transparent incentive system is also important for facilitating the knowledge transfer process. The more flexible the incentive system is, the more knowledge is exchanged and utilized among individuals ($\beta=0.16$, $p<0.001$). Transparent incentive systems encourage people to utilize knowledge and make behavioral change ($\beta=0.23$, $p<0.01$).

Unexpectedly, in this model, frequency of IT tools use was not significantly related to knowledge transfer process ($p>0.5$). Since people did not frequently use IT tools for knowledge transfer (the average frequency is "sometimes", e.g. once per month to once per week), the support of IT tools in the knowledge transfer process could not be adequately revealed. The low frequency of individual use of IT tools in surveyed companies results from a low level of IT usefulness perceived by people in those companies. Another explanation is that IT tools may not directly support the three stages of the transfer process. Although email, intranet, and company website can help collaboration, this communication-aided technology cannot replace face-to-face contact to foster tacit-to-tacit knowledge transfer.

In summary, the impact of independent variables on the knowledge transfer process was varied. Among independent variables, the results suggest that organizational culture has the strongest impact on the knowledge transfer process. The next most important was the impact of organizational structure dimensions followed by the impact of incentive systems. The frequency of using IT tools was not significantly associated with the three stages of knowledge transfer process.

To facilitate each stage of the process, some independent variables appear to be more important than others. Facilitation is enhanced in the initiation stage by building a culture of adaptability, teamwork, collaboration and solidarity, by using group-oriented and transparent incentive systems, and by avoiding centralization. Building a culture of high adaptability and high solidarity, as well as flexible and clear incentive systems coupled with a high involvement of individuals in decision-making process may facilitate the implementation stage. Knowledge integration is

improved by a transparent incentive system, low formalization and centralization and a culture of high adaptability, teamwork and solidarity.

5.4.6 Intra-organizational Knowledge Transfer and Organizational Performance

The statistical result, presented in Table 5.17, suggests that the knowledge transfer process were positively related to overall organizational performance (Adj. $R^2=0.272$, $p<0.001$). The hypothesis H5a was supported. Among the three stages of knowledge transfer, integration contributes most to predicting organizational performance ($\beta=0.338$, $p<0.001$). It has the biggest effect on both financial and non-financial performances.

Together with knowledge integration, company size also positively influences organizational performance ($\beta=0.139$, $p<0.05$).

Table 5.17. Multiple Regression Results for Organizational Performance

Variables	Financial Performance	Non-financial Performance	Overall Performance
	Beta	Beta	Beta
<u>Control Variables</u>			
Company Age	-0.080	0.022	-0.021
Company Size	0.205**	0.140*	0.139*
<u>Knowledge Transfer Process</u>			
Initiation	0.083	0.034	0.023
Implementation	-0.040	0.115	0.133*
Integration	0.475***	0.305***	0.338***
Adjusted R^2	0.274	0.205	0.272
F Statistic	17.390***	12.173***	17.170***

Note: + $p<0.1$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

5.4.7 Mediating Effect of Knowledge Transfer Process

In order to test the mediation effect of the knowledge transfer process on the relationship between its predictors and organizational performance, the steps recommended by Baron and Kenny (1986) were followed. In order to provide all the outputs required to assess mediation using the Baron and Kenny (1986) criteria, the Sobel test was performed (Preacher and Hayes, 2004). The result of the Sobel test is presented in Table 5.18.

Table 5.18: Results of Mediation Testing

Run MATRIX procedure:						
DIRECT AND TOTAL EFFECTS						
	Coeff	s.e.	t	Sig(two)		
b(YX)	.1924	.0396	4.8653	.0000		
b(MX)	.2203	.0464	4.7429	.0000		
b(YM.X)	.1042	.0577	1.8072	.0721		
b(YX.M)	.1695	.0413	4.0993	.0001		
INDIRECT EFFECT AND SIGNIFICANCE USING NORMAL DISTRIBUTION						
	Value	s.e.	LL 95 CI	UL 95 CI	Z	Sig(two)
Sobel	.0229	.0138	-.0042	.0501	1.6569	.0975
BOOTSTRAP RESULTS FOR INDIRECT EFFECT						
	Mean	s.e.	LL 95 CI	UL 95 CI	LL 99 CI	UL 99 CI
Effect	.0220	.0139	-.0037	.0511	-.0123	.0645
NUMBER OF BOOTSTRAP RESAMPLES						
5000						
----- END MATRIX -----						

The statistical results indicated that the indirect effect of all independent variables on organizational performance via knowledge transfer process is not significantly different from zero ($z=1.65$, $p>0.05$). Thus, knowledge transfer process failed to mediate the relationship between its antecedents and organizational performance.

The results of hypothesis testing are summarized in Table 5.19.

Table 5.19: Summary of Hypotheses Testing

Hypotheses	Relationships	Effect	Results
H1a	Availability of IT tools à Frequency of using IT tools	Positive	Supported
H1b	Perceived ease of use and perceived usefulness of IT tools à Frequency of using IT tools	Positive	Supported
H1c	Frequency of using IT tools à Knowledge transfer	Positive	Supported
H2a	Teamwork orientation à Knowledge transfer	Positive	Not supported
H2b	Adaptability à Knowledge transfer	Positive	Supported
H2c	Collaboration à Knowledge transfer	Positive	Not supported
H2d	Solidarity à Knowledge transfer	Positive	Supported

Table 5.19: Summary of Hypotheses Testing

Hypotheses	Relationships	Effect	Results
H3a	Centralization à Knowledge transfer	Negative	Supported
H3b	Formalization à Knowledge transfer	Negative	Supported
H4a	Non-monetary incentives will have stronger influence on knowledge transfer than monetary incentives.		Supported in opposite direction
H4b	Fair, clear, flexible and group-oriented incentive systemsà Knowledge transfer	Positive	Supported
H5a	Knowledge transfer process à Organizational performance	Positive	Supported
H5b	Organizational culture, Organizational structure, Incentive systems, Frequency of using IT tools à Knowledge transfer à Organizational performance.	Mediating	Not supported

5.5 Discussion of the Main Results

This study proposed and tested a model linking organizational culture, incentive system attributes, organizational structure dimensions, frequency of using IT tools with knowledge transfer and organizational performance in the setting of Vietnam's IT companies. It was found that the most important factor influencing the knowledge transfer process was the organizational culture values. The next factors in importance were incentive system attributes and organizational structure dimensions. Frequency of using IT tools was a minor factor influencing the knowledge transfer process. The relationship between the knowledge transfer process and organizational performance was also examined. It was found that the three stages of the knowledge transfer process were significantly associated with organizational performance.

The results of the study confirm the important role of organizational culture in intra-organizational learning, stated by Finke and Vorbeck (cited in Mertins et al., 2001), McDermott and O'Dell (2001). In contrast to previous research undertaken in developed countries (Lee and Choi, 2003; Karlsen, Gottschalk, 2004; Molina and Llorens-Montes, 2006), this study found that in the context of a transition economy, high solidarity and adaptability attributes are more important than collaboration and

teamwork orientation. This finding is in line with the findings of Taylor and Wright (2004). To facilitate knowledge transfer within an organization, managers need to develop a clear strategy; objectives and business plan, and extensively communicate those objectives to their employees. The company's goals and mission act as a platform to guide all employees' activities. A high degree of sharing goals and tasks makes people pursue objectives quickly and develop a strong sense of trust. Moreover, encouraging employees to take risks and to be open to learn creates room for people to develop new ideas and do a trial experimentation of the new knowledge. Establishing performance appraisal criteria associated with knowledge sharing behavior motivates people to exchange knowledge and to create new knowledge for the company.

The link between the incentive system and the knowledge transfer process is confirmed by the study. Further to the conclusion drawn by McDermott and O'Dell (2001), Bartol and Srivastava (2002), Burgess (2005), Al-Alawi et al. (2007), neither monetary incentives nor non-monetary incentives alone are enough to facilitate the process of intra-organizational knowledge transfer. In Vietnam's IT companies, despite the importance of non-monetary incentives for increasing volume of knowledge, monetary incentives seem to play a more important role encouraging people to utilize knowledge. The reasons why employees in IT companies favor monetary incentives over non-monetary incentives are twofold: (i) high level of centralization brings high promotion possibilities for employees, so there is no stickiness in career paths and organizational job structure for them, (ii) employees desire higher bonus and incentives since their salaries remain low. This result is in contrast with the theoretical hypothesis and the findings of Gammelgaard (2007) that intrinsically motivated incentives, such as colleagues' acknowledgement and respect, improved reputation, and the possibility of professional or personal development are more important than extrinsic incentives (salary increase) in motivating knowledge sharing.

The finding of this study further supports the study of Lucas (2006) that, in order to make people engage in the process of knowledge transfer, incentives must be

offered through all three stages. If incentives only exist at a particular stage, then people may refuse to participate in subsequent knowledge transfer effort.

Besides, all four attributes, including transparency, fairness, flexibility and group orientation, must be taken into account when designing an incentive system since each attribute appears more important for a certain transfer stage than the others. Group-oriented incentives, on the one hand, would be an effective instrument in creating a feeling of cooperation, ownership and commitment among employees. On the other hand, the group-oriented incentives can enhance knowledge sharing within teams and across work units. Fair incentive system is an important factor in the development of trust, which facilitates knowledge sharing through informal interactions. Flexible and transparent incentive system motivates employees to improve their job performance, and their competencies. As a result, a company can benefit from the wide pool of employee's knowledge and their subsequent improved performance. The result of the study is in line with the findings of Bartol and Srivastava (2002), Hansen et al. (1999), Disterer (2003) and Locke (2004), but it goes further by concluding that (i) a transparent incentive system has to be in place in order to encourage people to apply new knowledge in their work, and (ii) a transparent incentive system allows individuals to anticipate rewards - knowing how it functions, they then try to meet the company requirements to achieve rewards.

The impact of organizational structure dimensions (centralization and formalization) on the knowledge transfer process is also revealed in the study. Similar to the findings of Tsai (2002), Goh (2002), Lee and Choi (2003), Lucas (2006), Chen and Huang (2007), Al-Alawi et al. (2007), centralization was found to negatively influence the flow of knowledge among individuals. High centralization prevents interaction and frequency of communication among individuals in different units. It also hinders the creativity and the need for sharing ideas between individuals since they are not required to do so by higher authorities. The more control the managers exercised on their subordinates, the less the subordinates were willing to share knowledge with others. Therefore, participation and active involvement in the decision making process are essential for successful knowledge

transfer. When employees are involved in the decision-making process, they develop a sense of ownership. This sense of ownership leads employees to look beyond the scope of their stated responsibilities and do what is necessary to ensure that knowledge transfer is successful. The sense of ownership that employees develop stimulates them to engage in repeated signaling as a means of encouraging specific actions by employees and discouraging those actions that do not reinforce the cultural values important to success.

Centralization can become an ineffective way to coordinate individuals in the company since centralization may impose certain costs on an organization. These costs include: (i) a tendency for managers to intervene inappropriately in individuals' task performance, (ii) increased time and effort devoted to influencing activities with a corresponding reduction in individual and organizational productivity; and (iii) poor decision-making resulting from the distortion of information associated with activities to influence.

In contrast to the findings of Lee and Choi (2003), Lubit (2001), formalization was found to have positive relationship with the knowledge transfer process in this study. There are several possible explanations for this difference. The first is that the learning requirement in the Vietnamese company's setting may not be as dynamic as originally assumed. Therefore, the need for more flexible learning structures may not be as great as originally hypothesized. The second is that formalization may enhance the communication flow through an extensive monitoring and reporting requirement. This, in turn, can facilitate the conversion of tacit knowledge into explicit knowledge within the company. Another important, possible explanation for the failure to confirm the hypothesis related to formalization is that, as McDermott and O'Dell (2001) suggested, culture plays a significant moderating role in the knowledge transfer process. Formal studies of Vietnamese culture do not appear to have been conducted, but if uncertainty avoidance is a silent cultural trait in Vietnam as with many other Asian cultures, then it is possible that Vietnamese people may learn more efficiently when formal mechanisms are used to transfer knowledge.

The knowledge transfer process was found to predict organizational performance. The fact that the knowledge transfer process accounted for 27% of the total variance in financial performance and 20.5% of the total variance in non-financial performance clearly suggests that intra-organizational knowledge transfer process should be considered as one of the factors contributing to company performance. The explaining power of knowledge transfer to the variance of organizational performance was at a slightly moderate level. These results also support for Brachos et al. (2007), who found that knowledge sharing connected with organizational learning ultimately predicts organizational effectiveness. The effective organizational learning and knowledge sharing enable an organization to improve organizational behaviors by the creation of advanced knowledge and the development of better understandings, and hence to become innovative and competitive. Furthermore, the overall contribution to bottom-line profits would be attained. Eventually, this results enhance overall organizational effectiveness. Several studies considered intra-organizational knowledge transfer as an indicator of organizational capability and used it to predict various performance outcomes. For example, Tsai and Ghoshal (1998) showed that intra-organizational knowledge sharing affected business unit product innovation. Darroch (2005) showed that a company with a knowledge management capability uses resources more efficiently and so is more innovative and performs better.

The study also found that a strong culture of solidarity, collaboration and adaptability and a flexible incentive system were critical factors in predicting organizational performance. When all employees share unwritten rules and the company's goals, they know what they should do in unforeseen situations. In such a case, monitoring and supervising costs would be reduced.

The statistically non-significant findings in this study also have some implications. Firstly, in the multiple regressions (model 6) presented in Table 5.16c, the frequency of using IT tools was no longer significantly related to the knowledge transfer process when other independents variables were added to the analysis. The statistically non-significant relationship suggests that either IT tools have no direct impact on the knowledge transfer process or their effects remain weak. IT tools will

have more impact if people use them more frequently in their work. Thus, IT companies should invest more in training to improve the IT skills of their employees in order to encourage them to use such tools. Secondly, the failure to confirm the mediation effect of an intra-organizational knowledge transfer process between its antecedents and company's performance means that intra-organizational knowledge transfer had not yet carried out the impact of organizational culture, incentive system's attributes, frequency of using IT tools and organizational structure dimensions on organizational performance. Rather, the knowledge transfer process was considered as an independent factor that significantly influenced organizational performance.

Overall, managers in IT companies can improve company's performance by facilitating knowledge transfer processes. In order to facilitate the knowledge transfer process, building a communal culture, decentralizing organizational structure and developing flexible and transparent incentive systems are the main concern.

A CASE STUDY

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6.1 The Context and Relevance of this Case Study

The case study was conducted in 2006. The case study aimed at exploring how the process of knowledge transfer occurred in an IT company in Vietnam. Then, the impact of knowledge transfer process on company performance was examined. The Vietnamese software company studied was FPT Software Solutions, a subsidiary company of FPT Corporation.

The case study contributed to this research in two different ways. First, it serves as an illustration of the theoretical framework of intra-organizational knowledge transfer. Secondly, it provides the basis for modifying the theoretical framework that was developed and tested in Chapters 2 and 5.

6.2 Limitation of the Case Study

Some limitations of this case study need to be taken into account when interpreting the results: (i) there was little opportunity to crosscheck the coding of collected data with the company's managers. However, there is a high degree of confidence that the coding is acceptable since the researcher has visited the company for a month, and has participated in some important meetings; (ii) although access to the company's documents was permitted, only few types of documents were available. The data was collected mainly through observations and interviews, therefore implying some subjectivity when expressing personal viewpoints.

Despite these limitations, this case study provides important insights about the knowledge transfer process inside an IT company in a transition economy. In the next section, the background information of the company is provided and the results are examined to investigate how well the theoretical model fits in that particular context.

6.3 Background Information of the Company

6.3.1 FPT at a Glance

FPT, one of the biggest information technology holding companies in Vietnam, was established in 1988 by 13 Vietnamese intellectuals. It is a joint stock company with the state at 51% being the biggest shareholder. In 2006, FPT turnover reached US\$ 730 million, an increase of 41% compared with 2005. Software and service sales alone accounted for US\$ 440 million, an increase of 87% compared with 2004. In 2005, FPT Corporation contributed US\$ 51.3 million to the state budget of Vietnam. By June 2007, FPT had 7,739 employees and it is estimated that by the year 2008, the number of staff will reach 13,000. FPT staff have a high education standard, amongst which 67% are university graduates. FPT is regarded as one of the corporations that have young average age of employees in Vietnam (26.4 years of age). FPT is a leader in every important field of the national information and communication technology industry, such as software outsourcing, system integration, informatics distribution, software engineer training, internet service, electronic news, mobiles and personal computers made in Vietnam. In each of these

fields, FPT has three times the level of performance of the second strongest rival company in turnover and in profit. Table 6.1 provides some background information of the company.

Table 6.1. Background Information of the FPT Corporation

<ul style="list-style-type: none">• Company Name: FPT (Corporation for Financing and Promoting Technology)• Company Type: Joint stock• Founded: 13 September 1988• Managing Director: Truong Gia Binh• Head Office: HITC Building, Xuan Thuy, Cau Giay, Hanoi, Vietnam• Number of Staff: 7739 (as of June 2007)• Revenue: US\$ 730 million (2006)• FPT vision: <i>"FPT aims to be a company guided by technology innovations, committed to the highest level of customer and shareholder satisfaction, contributing at best to the society, and having the most favorable working environment for all employees that enables them to explore their maximum potential in professional career as well as cultural life". The company aims to become the number one information technology company in Southeast Asia with turnover expected to reach US\$ 1 billion in 2008"</i>
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At present, FPT is a holding company including 15 affiliates, one university representative and branches in Ho Chi Minh City, Hanoi, Da Nang. Figure 6.1 shows the company organization chart.

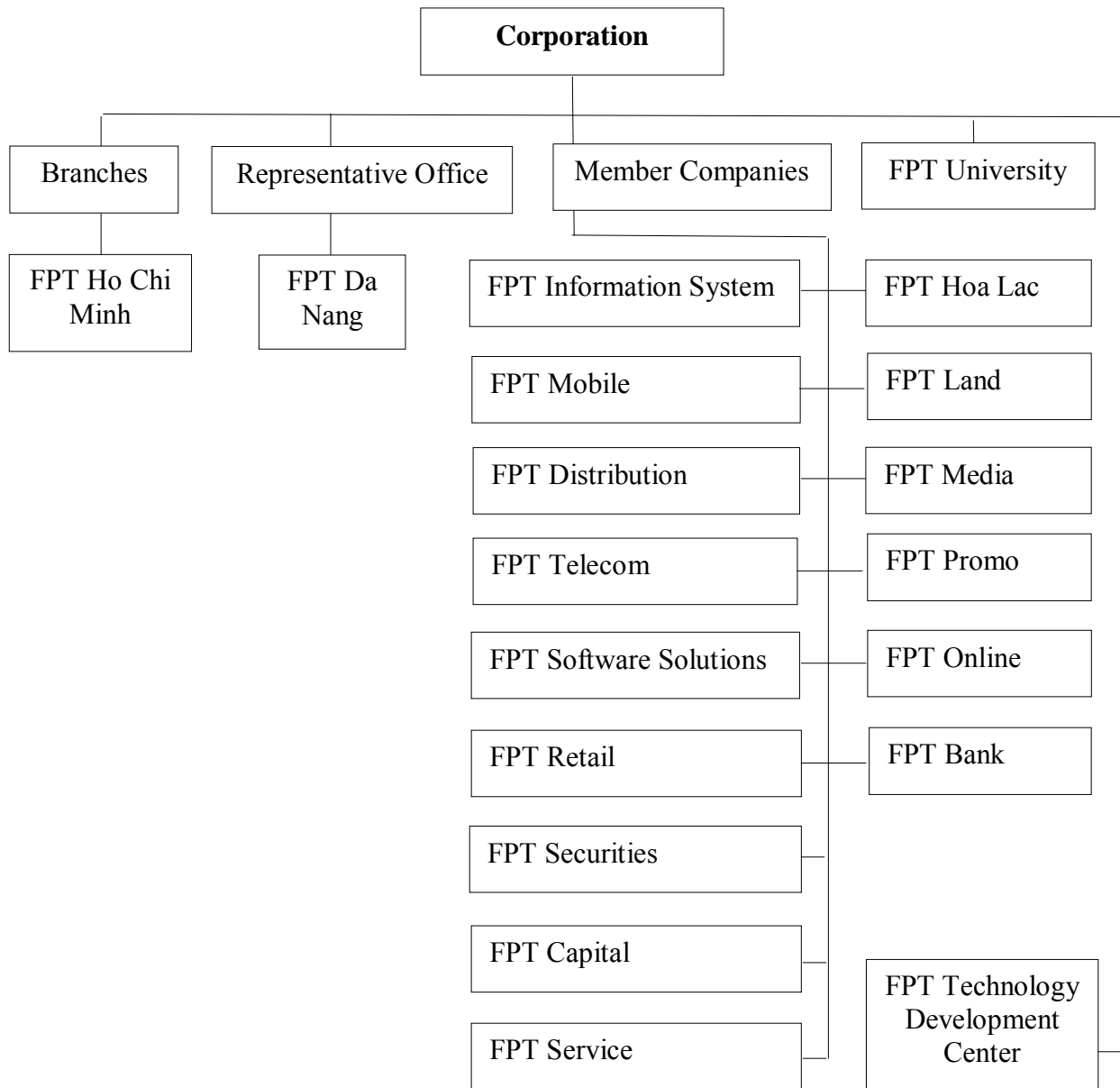


Figure 6.1. Organization Chart of FPT

6.3.2 Overview of FSS

To investigate inside a specific case of knowledge transfer, FPT Software Solutions was chosen. This choice was made because the company management board expressed support for this field research. Both the company management and employees were willing to provide information to assist in the case analysis.

FPT Software Solutions (FSS) is a subsidiary company of FPT Corporation. It is the leading provider of software and software services in Vietnam. It was established in

December 2003 from the former FPT Center of Software Solutions, and has offices in Hanoi, Da Nang and HoChiMinh City. Over its 15-year development, FSS has grown from 30 staff members to a large team with more than 500 software specialists. FSS continuously endeavors to lead the domestic software market and penetrate the regional market. In 2004, FPT Software Solutions received a number of prestigious awards at the Computer World Expo in HCMC including: Top 5 software services providers, the Gold Medal for the software company with the highest turnover, the Award for software with the highest sales (Smart Bank), and Vietnam Informatics Association's IT and Communication Silver Cup for the software Smart Bank. Table 6.2 and Figure 6.2 show the background information and organization chart of the company.

Table 6.2. Background Information of FPT Software Solutions Company (FSS)

- Company Name: FPT Software Solutions Company
- Director: Duong Dung Trieu
- Personnel: 650 people (as of December, 2007)
- Revenue: US\$ 11 million (2007)
- Headquarters: 51 Le Dai Hanh, Hai Ba Trung, Ha Noi
- Main Services: Software and software services supply for the domestic market and countries in ASEAN
- Company Vision: <i>"FSS aspires to be the biggest software enterprise and to provide the best conditions to its staff by satisfying its customers locally and within the region with software solutions/services of high quality based on a deep understanding of customer's requirements"</i>

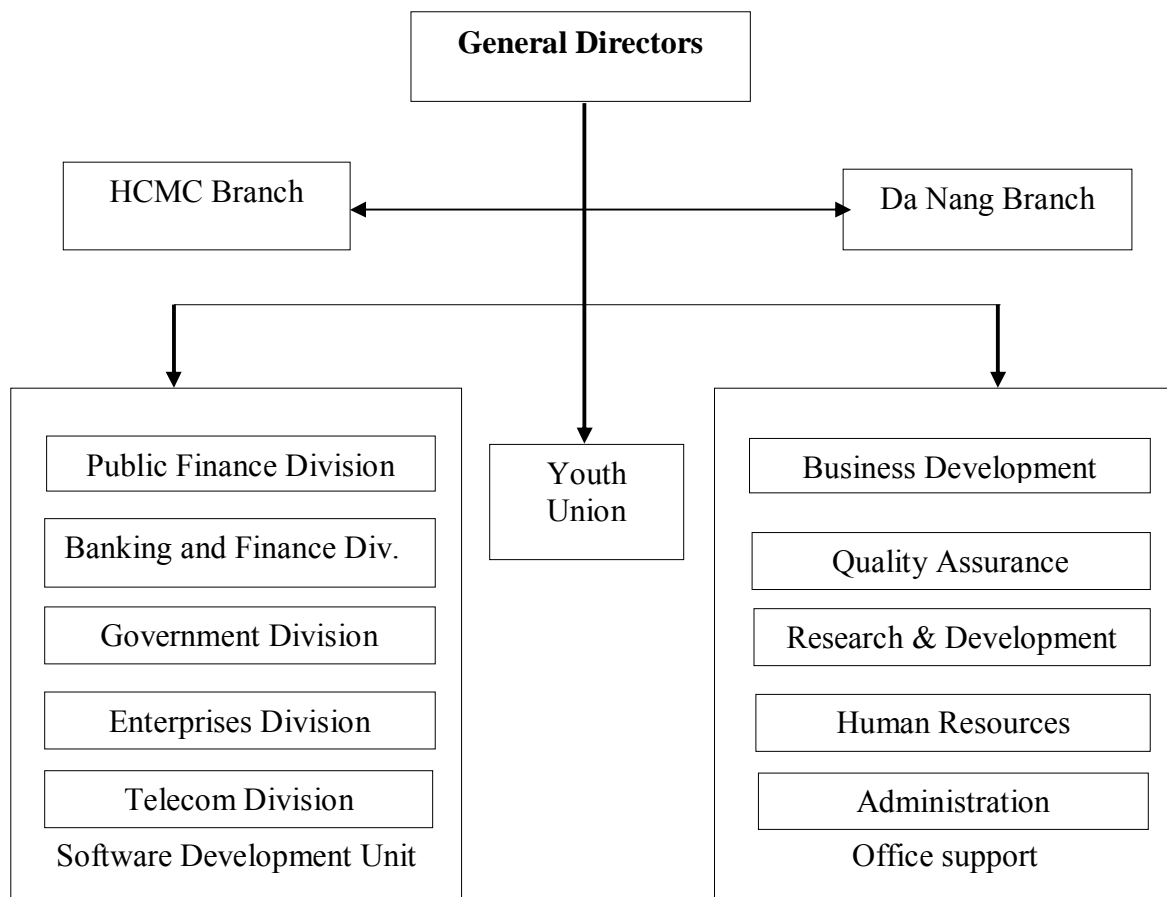


Figure 6.2. Organization Chart of FSS

(a) FSS's Business Focus

FSS's business is diversified. The company provides a wide range of software solutions and services for private and government sectors in many fields such as banking, finance, telecommunications, health insurance and petroleum. The diversification includes providing services from packaged software to tailoring software or providing services of software consultants and this conveys an exclusive competitive advantage for the company in the market.

FSS commits to be a trustworthy and efficient business partner. It focuses on maintaining stable and long-term relationships with local customers by providing them with the best solutions, efficient support and consultancy on future plans. FSS is a CMM - Level 4 certified company and possesses ISO 9001:2000 Quality Management certification. With a motto "*Quality makes the difference*", FSS is highly competitive, leads the domestic software market and penetrates into regional markets. Moreover, FSS makes continuous efforts to expand its business

relationships with foreign software companies through activities such as outsourcing services and software implementation for Vietnamese customers based on a principle of sharing mutual benefits.

(b) FSS's Products and Services Focus

Along with upgrading existing products, FSS has continuously developed new solutions and products in as diverse fields as telecommunication, finance, insurance and ERP systems, etc. FSS strives to become the preferred professional services provider for foreign customers based in Vietnam as well as regional and worldwide customers.

(c) FSS's Human Resources

FSS is proud of more than 600 young, enthusiastic and dynamic members and regards its people as the most valuable assets of the company. With experience in implementing large projects in diversified fields, FSS's staff members have gained customer satisfaction through delivery of high quality products. With the motto "We put humans first", FSS creates most favorable conditions for its staff members to train overseas and in prestigious universities in Vietnam. FSS also highly values its staff and provides the best opportunities for them to develop their career, as well as favorable conditions to take care of their families and contribute to the company and society. Figure 6.3 provides an overview of human resources at FSS from 2001-2007.

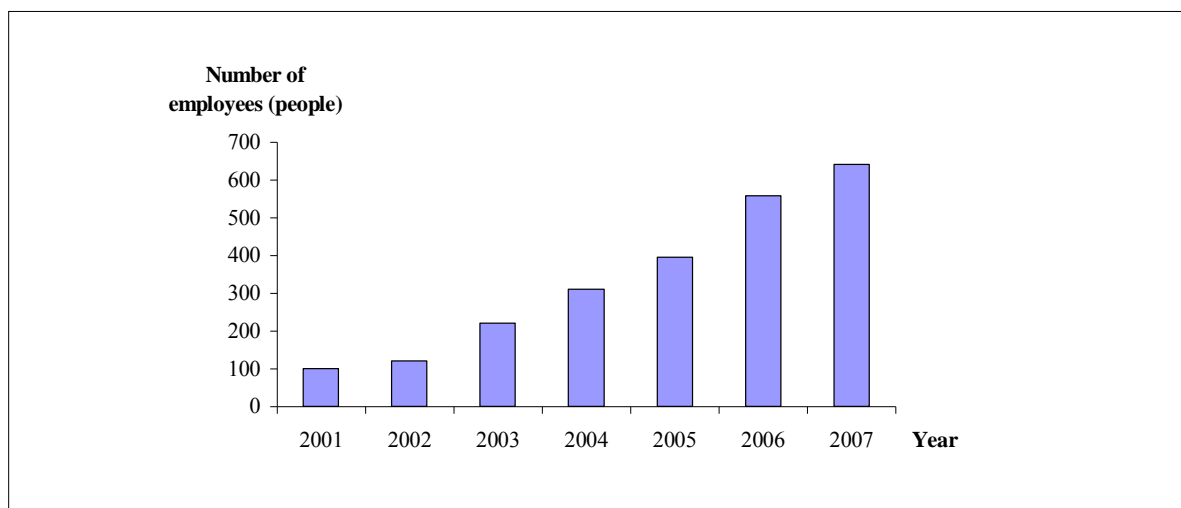
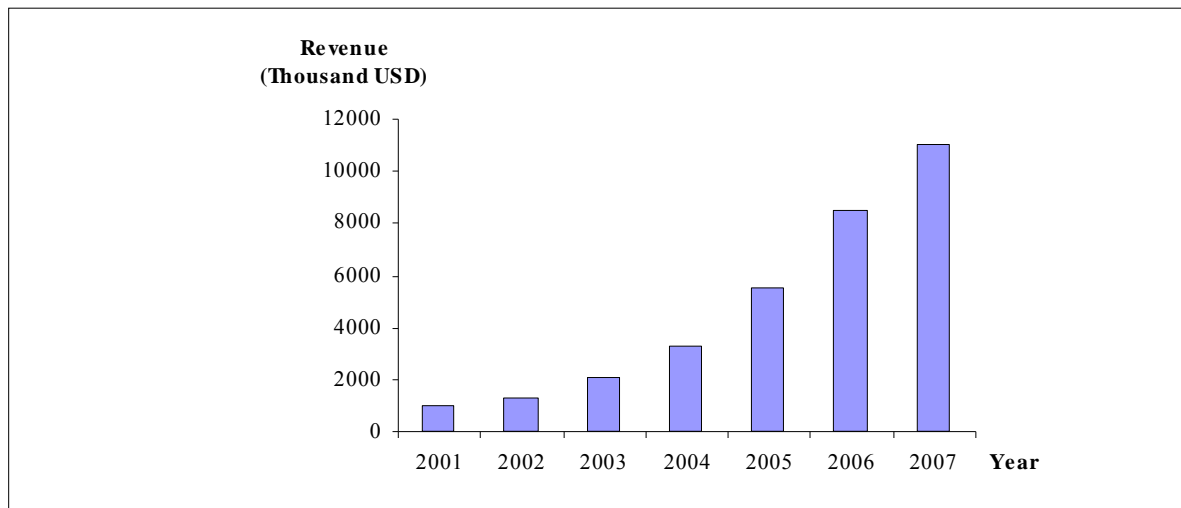


Figure 6.3. FSS's Human Resources (2001-2007)

(d) FSS's Business Performance

**Figure 6.4. Performance of FSS (2001-2007)**

FSS's turnover has continued to grow year on year. The company's average revenue growth rate is about 30%. In 2007, the company revenue was US\$ 11 million, an increase of 29% compared with 2006. Its target is to reach US\$ 15 million, US\$ 20 million and US\$ 25 million in 2008, 2009 and 2010 respectively.

Table 6.3. Performance and Human Resources of FSS (2001-2010)

Performance Indicators	Year									
	2001	2002	2003	2004	2005	2006	2007	2008 Est.'	2009 Est.'	2010 Est.'
Revenue (1000 US\$)	1000	1300	2100	3300	5500	8500	11000	15000	20000	25000
Revenue Growth (%)	-	30%	62%	57%	67%	55%	29%	36%	33%	25%
HR (people)	100	120	220	310	395	558	640	830	950	1050
HR Growth (%)	-	20%	83%	41%	27%	41%	15%	30%	14%	11%

(e) FSS's Business Process

The overall business process of the company consists of four main subprocesses: sales process, development process, implementation process, and maintenance and support process. These subprocesses are supported by the management and customer care processes.

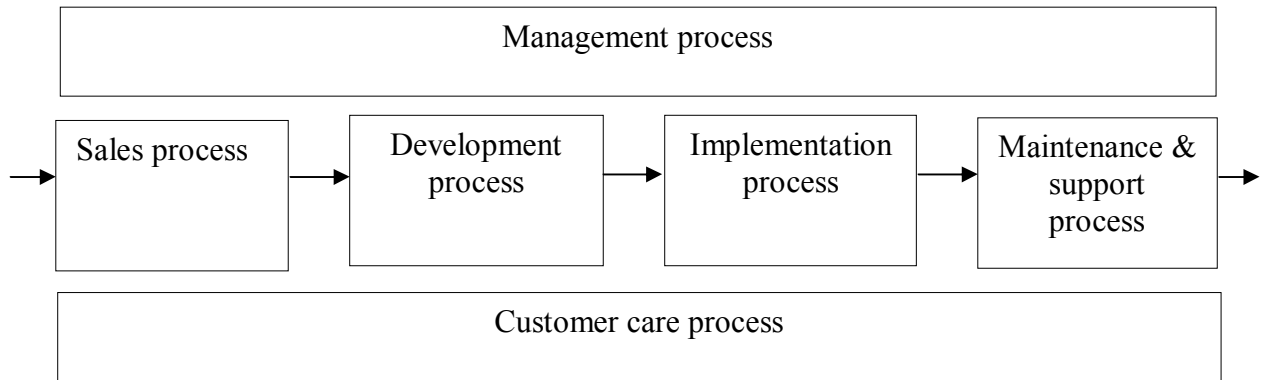


Figure 6.5. Business Process of FSS

The Sales process involves the marketing activities, preparation of proposals, finalization and execution of contracts, management of contracts and payments. Marketing activities include market scanning, meeting customers, collecting customer information, and exploring opportunities and potential markets. Then, based on collected information, the salesperson suggests appropriate products with pricing quotations. The technical and commercial proposals are prepared afterwards. The draft contract is developed and approved by the management before being sent to customers. Managing the contract and payment is the final step of the sales process.

The Development process includes four steps. The first is to survey customer requirements in detail. The intention is to collect information and to understand customer requirements as much as possible. The second is to analyze customer requirements in order to determine the best solution to satisfy the customer. The third is to design and build the customized solution. The last step is to test the solution.

The Implementation process consists of three stages including pilot, packaging, and rollout implementation. Firstly, the software modules are launched in FSS. If the pilot implementation succeeds, the modules will be packed to become software. Then, the software is installed into the whole IT system of the customer organization. Finally, the software and IT solutions are spreading out all over the IT systems of the customer organizations.

The Maintenance and support process is considered as an after-sales service. The maintenance and support services will be provided to customers to ensure no error of the product in operation. In this process, the need for upgrading the product installed into the customer's IT system is also taken into account.

The Management process includes quality assurance management, financial management, and resource management.

The Customer care process aims to regularly obtain feedback from customers, analyze customer requirements, and periodically survey the customer satisfaction levels. Both customer needs and FSS's internal operation process are usually examined in order to improve the overall performance of the company.

6.4 Results

The data from this case study revealed that most of the theoretical constructs are relevant to the study of intra-organizational knowledge transfer in Vietnam.

6.4.1 Organizational Culture

The respondents claimed FSS had an open information-sharing culture where people could easily ask about anything they do not know. One informant argued that it was important that new employees picked up these values and got used to making their own decisions. Other respondents agreed that sharing information and knowledge was a vital part of the company's culture. They argued that it was their responsibility to take this opportunity to market their individual abilities and thereby receive recognition among their peers. One respondent said:

“I do want to be thought of as being capable and helpful if I can solve a problem that someone has been struggling with, and in itself this is a kind of reward.”

FSS has been recognized by the society as a company that has a unique culture. The corporate culture originates from STC's culture. STC stands for “Sang Tac Company” (literally translated to “Composition Company”), which is an intangible value that exists in the soul of each FSS member. Observation of the STC culture reveals many songs, poems, plays and other examples containing creativeness and humor. The STC culture also reveals behavior between FSS's people, which value

sincerity, faithfulness and a sense of closeness similar to families. Within the STC culture, FSS people understand each other better and are close to each other.

The following norms and behaviors are often observed at FSS.

- *All for Common Goals*: From managers to employees, every decision and action is always based on delivering benefits to customers, employees and stockholders. The common interests of the company have priority over the interests of individuals.

“Yes, FSS is genuinely a learning organization with the philosophy that the company’s development is derived from each employee’s development.”

(Director of FSS)

- *Respect for the Individual*: Managers pay special attention to both the spirit and material capital of FSS’s members. Many out-of-work activities are arranged. Employees have been gradually trained in order to improve their capabilities. The FSS Board of Directors actively encourages creative work and extra curricular activities. At FSS, employees can join and participate in a variety of clubs including football, bowling, movies or swimming. There is also a football champion’s league and special events that are held on particular occasions, such as Women’s Days (8 March and 20 October), FSS Men’s Day (27 July), the Corporation Anniversary. Employees are encouraged to be innovative, risk taking and active in their own professional development.

“FPT Software is not the kind of IT company, where you come to work and work with the computer, and see it as your best colleague. I see FSS as my second family. We receive a great amount of guidance and support from the management since the very first days at work. Here, people are not only willing to listen to your ideas; they are willing to try them.”

(Head of R&D unit)

“The company’s objective is to bring to each of its staff the best conditions to develop their talents, to earn sufficiently for their physical life and abundantly for their spiritual life. The tradition of respect for human beings and personal talent has created a democratic and creative working environment, sharing the same

objectives and ideals. “Unchanged objective, adaptive actions” is considered the working principle of FPT staff. Every idea is warmly welcomed.”

(Director of FSS)

“All I have talked about seems solely about work. At FSS, there are sports clubs, an English club, and other cultural activities that we can take part in and enjoy.”

(An employee in the Business Development unit)

“I am the kind of person who wants to learn something new every day, and I am happy that I have made the right choice of working at FSS. I have always been able to hone my skills, learn new technical information and see projects through to completion.”

(Deputy Head of Business Development unit)

- *Teamwork and Collaboration:* At FSS, there is no place for the dictator. Managers believe that an employee can make his own decisions but should ask for advice and suggestions from co-workers. Teamwork is the best way to work and to achieve targets. The following are excerpts from interviews to show that openness and team spirit in problem solving process enable FSS’s employees to share and use new knowledge.

“I do not hesitate to go for a help from my colleagues whenever I have difficulty in doing my work.”

(An employee in Telecom division)

“I work with a very high caliber group of programmers, developers, etc. Working in a team is both challenging and exciting. I have got to see that a team is so much more powerful than an individual, and I can learn a lot by working in a team. We are always working together to make a difference in the output of client’s engagements.”

(Deputy Head of R&D unit)

“FSS is my second home.”

(An employee in R&D unit)

“There is no decision made privately in FPT. There is no place for a dictator. You have to make the decision required as quickly as possible, but you have to absorb wisely your colleagues’ consultancy.”

(Head of Human Resource Unit)

- *Emphasizing the Importance of Satisfying Customers*: FSS is a customer-oriented company. In its establishment phase, the goal of satisfying customers was the early vision and this became the target of both FSS leaders and employees. This is the core value of all FSS activities and each business process is measured by the degree of customers’ satisfaction. All FSS employees try their best to meet customers’ needs by (i) understanding both introvert and extrovert demand, (ii) supplying the best solutions through innovative technology, and (iii) continuously improving capacity to serve customers by enhancing technology and management knowledge.

“At FSS, we are trained to deal with customers, and the degree of customer’s satisfaction determines our success.”

(An employee in Quality Assurance Department)

The true meaning of FSS’s culture is observed in the attitude of FSS people at work. Wherever they are working and whatever they are doing, FSS members always look towards the company with intense sentiment. People at FSS are known as hard working, creative, humorous and full of brilliant ideas. FSS is primarily considered as the home to young talents and first-class programmers in Vietnam. At work, people are focused and willing to rise to challenges. That culture and those people have enabled FSS to become a first-ranked IT company and these factors have played a decisive role in the company’s globalization.

There is little doubt that culture plays a vital role in the success of the company. FSS’s spirit and culture values encourage each individual to work with enthusiasm. The highest proof of FSS’s spirit is its hard-working manner and creative dynamics that lead to its success in all fields. The company’s challenges and its success or failure in the market depend not only on good opportunities or good or bad lucky or the corporation’s business skills, but also on the preservation and development of its spirit, cultures and principles.

In summary, FSS culture is characterized by enthusiasm, adaptiveness, innovation, collaboration, teamwork and humor. Its emphasis on satisfying customers, stakeholders and employees means that all company members are trying to adapt to the internal and external demands of the customers. All employees behave in a way that quickly and positively responds to the need of their customers and the changes in the business environment to deliver more value to their customers.

6.4.2 FSS's Strategy and Policies

All people at FSS share a common vision of FSS becoming a leading software company in Asia, and a reliable partner of leading IT companies worldwide.

“FSS staff are young, enthusiastic, creative and driven. That makes FSS an invigorating, motivating and, of course, fun place to work. Here, we share a common goal of FSS - that is becoming a global software development company, and there is a common belief that we cannot succeed until our clients succeed. That's why we always strive to not only meet but also exceed clients' expectations on their offshore software development projects.”

(Head of Business Development)

Understanding, sharing, and accomplishing the company's mission and goals are the most important factors that facilitate the knowledge transfer process.

“The most important thing is that we all know that we have same goal in mind, and we are trying to accomplish the company mission.”

(Director of FSS)

In order to embed the vision and basic values into the company, leaders of FSS have established the following strategies and policies.

- *Customer-oriented Policies:* FSS is one of the first companies to apply ISO management systems in all process with the aim of satisfying customers. The leaders have standardized work process; the customer satisfaction management and a complaints handling policy have been implemented. In order to best satisfy customers, FSS focuses on target market segments that are large and profitable with customers who require high technology and quality services.

- *Employee-centered Policies*: FSS has a large pool of qualified employees. It is the result of long-term and consistent human resource management policies. Leaders of FSS commit to provide them with attractive working conditions such as:

- § Interesting and challenging job
- § Attractive salary package
- § Opportunities to develop career
- § Good working environment
- § Respect for the individual

In addition, FSS applies a performance management system that motivates employee's performance, encourages employees' creativity and risk taking. Many rewarding policies are implemented to encourage well-performing employees.

- *Emphasizing the Role of Leaders*: FSS management is based on the art of strategy used in Vietnam War. The strategy is “*to make use of mobilized creativeness and efforts of all employees for the sake of common goals with the emphasis on leadership and management*”, the CEO said. With the competition getting fiercer, the technology rapidly changing and the customers more demanding than ever, the need for leadership is increasing. FSS places a high emphasis on leadership development at all levels of the hierarchy through improving the capabilities of directing, aligning and developing people, motivating employees, thinking strategically, being result-oriented and encouraging flexibility.

- *Technology-driven Strategy*: In order to best satisfy customers' needs, and improve benefits for employees and stakeholders, FSS has a strategy of being the leader in technology. It cooperates with leading international partners such as IBM, HP, Microsoft, Cisco, etc., to get access to the most up-to-date technologies.

6.4.3 Communication and Organizational Structure

FSS has a functional organizational structure and a high degree of autonomy and empowerment amongst the employees. Management often involves employees at different management levels in the decision making process. Decision making power is highly delegated throughout the company and employees at the lowest level are encouraged to take responsibility for their own decisions.

Leadership development is practiced by top managers and at every level of the company hierarchy. Moreover, all leaders spend time listening to employees' ideas, motivating employees to follow the common vision and in applying the basic values of FSS. Employees are encouraged to be innovative, to discuss problems with their managers and to implement their own ideas. Through maintaining a continuous awareness about the company vision, strategies and values, employees gradually come to share the common culture with top managers. At FSS, it seems that there is no hierarchical distance between top managers and employees.

"I am not afraid of talking and presenting my viewpoint on any specific topic in any company's meeting. We are encouraged to talk, and contribute our ideas."

(An employee in Business Development unit)

"Management by objectives is often applied to manage my subordinates' performance. With this technique, they (employees) are free to do things and find the best ways to do them."

(Deputy Director of FSS)

"Working at FSS, we are allowed to take actions and be free to do things to get better results within a framework."

(An employee at Business Development unit)

The results of survey show a low level of centralization and a moderate level of formalization in the company. FSS is applying ISO standards to manage its operational processes, especially the development and implementation processes. People are strictly required to follow the regulations in the production process but can be very flexible in the sales and management processes.

6.4.4 Information Technology System

The information technology system currently used in FSS is depicted in Figure 6.6.

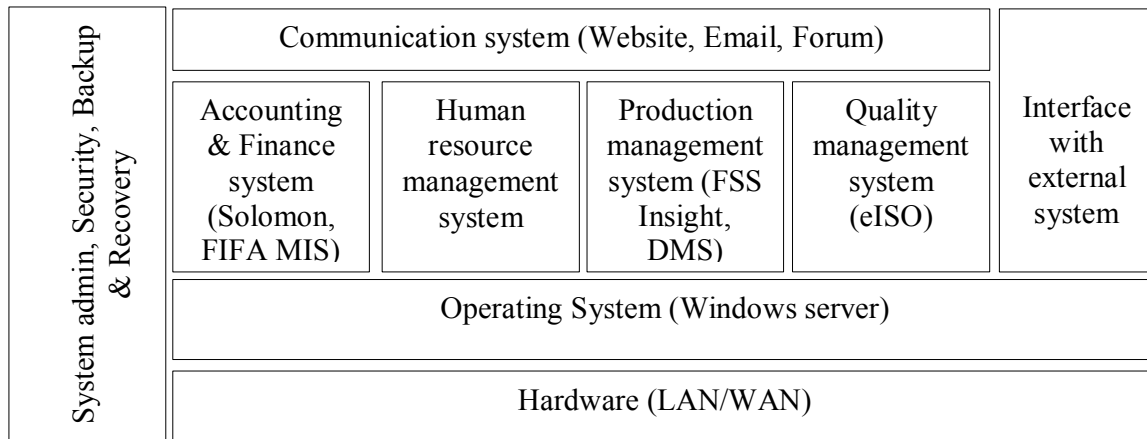


Figure 6.6. Information System Architecture of FSS

The Intranet system at FSS includes several modules, as shown in Figure 6.7.

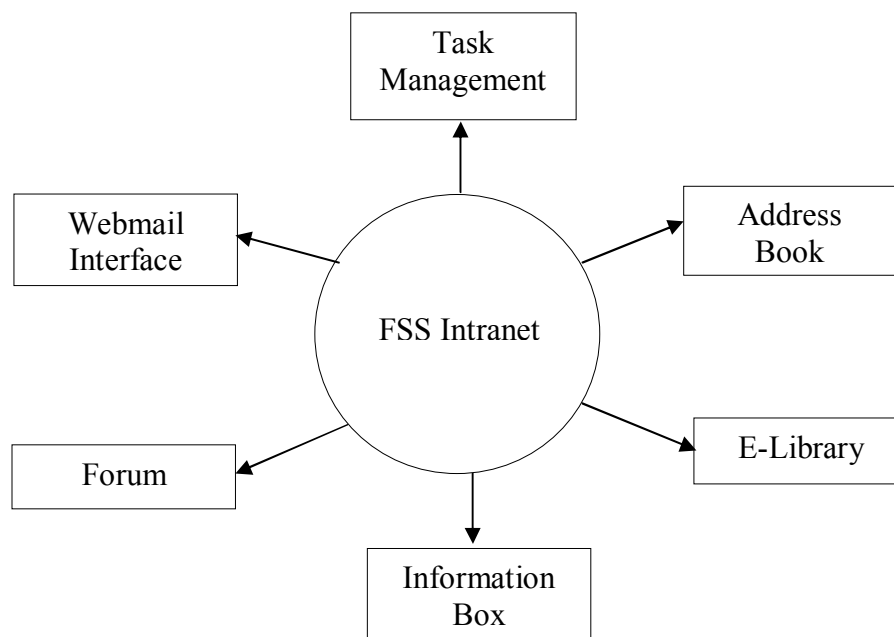


Figure 6.7. Intranet System of FSS

- *Webmail Interface.* The module provides web interface to individuals to access email at any node/location of the network. For ensuring the confidentiality, mail client programs such as Outlook or Netscape Mail using protocol POP3 or IMAP can only access to email system from local IP addresses.
- *Task Management.* The module allows the management of incoming and outgoing documents, the tracking of task implementation progress, and the publication of internal notices and announcements to employees.

- *Address book*. This is where addresses and other attributes of all individuals in the company are stored.
- *E-library*. Information is categorized and stored online. Employees access the e-library in order to find the information they need and to share information with others.
- *Forum*. The module contains boxes and topics to serve the need for information exchange, work discussion and entertainment.
- *Information box*. Through information box the company can publish information about external or internal business operations.

By using its intranet system, the company aims to centralize the professional tasks related to everyday business operations of each member in the company. Intranet saves time by enabling the company to distribute regular information to employees such as company news releases, meeting, training and work schedules, corporate events, and salary information. Employee handbooks, policy manuals, standard operating procedures and benefits information can also be economically posted on the Intranet. The use of electronic bulletins, the functionalities of the Task Management module (document management, online tracking of tasks, etc.) can help to reduce telephone costs, and paperwork in comparison with the traditional ways of sharing knowledge. Moreover, information is continuously updated and the time to disseminate information to each individual is significantly shortened. Application of the centralized management model based on the intranet is appropriate for individuals to acquire and process information that will help to increase the effectiveness of their work performance. In addition, by using the intranet system, information is quickly stored and evaluated to enable better management and forecasting of the company's business operation.

The most important factor that motivates employees to use the intranet system for sharing knowledge is its well-recognized usefulness and user friendliness. In addition, using the intranet system for sharing information and knowledge becomes a work habit of each employee, and to some extent, it is compulsory to individuals who want to achieve their tasks effectively.

Intranet offers several features that favor knowledge sharing:

- *Easy-to-access and use.* Web browsers are low cost and user-friendly interface to access to information and use applications.
- *Universal access to information.* Information can be stored on any “server” on the network, and accessed from anywhere within the intranet.
- *Person-to-person interaction.* An intranet simplifies interaction between people in different locations through electronic mail.
- *Informal networks.* Publishing information and making contact are quick and informal on intranet.
- *Access to external information and knowledge.* An intranet usually has gateways to the external Internet, allowing access to a rapidly growing global information resource.

An important point to note is that an intranet can convey information in many forms, not just Web pages but also documents, tables, spreadsheets and images. It can host applications and databases. Above all, it provides connectivity that allows knowledgeable employees to collaborate, wherever they are located.

The survey of the company’s employees revealed that the communication system for information and knowledge sharing inside the company was mainly email, the company website and forum. 90% of surveyed employees said that they use email everyday for exchanging information with other employees and managers inside the company. Nearly 30% of surveyed employees said they often use company website to contact customers, business partners and company managers and staff. FSS provides a unique forum for internal users. All related information about FSS can be posted in the company forum, either formal information like company’s regulations, policies, informal information like ideas, funny stories, poems, etc.

Most of the surveyed employees agreed that email and the company’s website are useful tools for exchanging information among company members and with outsiders (Mean=4.5, SD=0.6). Some respondents said, “*Without email system, we really feel uncomfortable in doing work.*”

Beside its communication system, FSS has other IT systems that support functional processes such as the accounting and finance systems, human resource management systems, quality management systems and sales information management systems. People from different functional divisions are trained to use the relevant IT system for fulfilling their tasks. The sales information management system stores all customer data in a database including customer profile, contract information, sales transaction (customers' call, appointment and bidding), financial conditions and payment. This system particularly benefits the sales and marketing employees. Salespersons can accurately keep track and take care of customers, and share information with their colleagues, so that they do not need to repeat the same actions. The sales force can access customer and business information whenever they wish to explore business opportunities. In addition, this system allows managers to evaluate performance of salespersons and save administration costs.

However, some respondents claimed several problems in using the company intranet. Firstly, they said that when employees are located in the same office, they often solve immediate problems through direct communication. The solutions they arrive at can often be used elsewhere in the organization, so it is important to make them known to employees who were not present, the respondents argued. The second problem mentioned by many respondents was the lack of time. Information sharing requires typing things up and the respondents conceived this as rather time consuming. A third problem identified by the interviewees was the difficulty of knowing what information is important and what is not.

FSS has an intranet but this was used for "official" information, according to the respondents. Prior to the introduction of the intranet, the only option when wanting to share information was to store the document on a file server, which, according to one respondent, was meaningless since no one knew that the file existed or where it had been stored. The implementation of the intranet had not improved the situation much, according to this user, since it was difficult to publish and difficult to know what had been published.

The primary objective when introducing the corporate intranet was - and still is - to make information available to the employees. The information consists of general corporate information useful for all employees, such as corporate history, various policy documents, address and telephone directories, vacation lists, and meeting protocols. This information is perceived to be static, long-term, and fact-based, and thus not in need of recurring updates. A few key users led by an info master had been appointed to manage the contents and all information was supposed to flow through them. The employees were not entirely happy with this arrangement, as it created a bottleneck whenever they had important things to share.

The respondents believed that a shared and distributed responsibility for content provision would help keep the intranet more up to date. If the information is not updated and useful, they argued, the consequence is that the users will not return but seek the information elsewhere. One user stated:

“Perhaps we don’t have the time to spend on updates, but if no one updates the information, you won’t log in and check since you know nothing has happened.”

Although the usefulness of intranet systems was recognized by most of respondents, it seems that the system would not be fully utilized unless a knowledge-sharing culture exists.

6.4.5 FSS’s Incentive System

FSS provides an attractive salary and incentive package to employees. People are rewarded, based on their actual performance and competence. Whenever employees have superior performance, they are immediately recognized and rewarded by company's leaders. Recognition exists in several forms, for example, by displaying the names of best-performing employees on a gold plate at the main entrance of the company and by praising them in the company meetings. Along with non-monetary incentives, the company also rewards individuals or teams having good performance or those who are creative in their work by increasing salary or offering bonuses. However, only a few performance appraisal criteria relating to knowledge sharing and use were integrated in the company’s incentive system.

“Working in FSS, we are rewarded satisfactorily when having superior performance.”

(An employee in Quality Assurance Unit)

The statistical results indicate that 57% of surveyed employees agreed that there were non-monetary incentives for individuals who are willing to share knowledge. 61% said there were monetary incentives for individuals who are creative in solving problems. 62% said the company provided both monetary and non-monetary incentives for individuals' knowledge improvement.

The results of survey also suggest that transparency and group rewards are two important attributes of the incentive system that have a significant influence on the initiation and integration stages of the knowledge transfer process among individuals inside the company.

6.4.6 Knowledge Transfer Process

The survey of 90 employees in FSS indicated that knowledge of technology, knowledge of management and knowledge of culture are considered as three most important knowledge types in the company. Possessing a rich knowledge in technology can enable people to become experts in the field. Good knowledge of management is pre-requisite for working and managing in an effective way. Understanding the company culture makes people more motivated and committed to the company. Knowledge and understanding of culture are very important for the development of the company. In some business processes, a specific type of knowledge seems to be more important than some others. In the sales process, knowledge of external environment and knowledge of the market appear very important. In the development and implementation processes, knowledge of technology and knowledge of management are crucial. Knowledge of culture and management is required to manage all processes of the company.

Different types of knowledge are shared among employees through different mechanisms. Knowledge about culture is shared and developed among FSS members in several ways. First, it is shared through “Doan Thanh Nien” (literally translated to “Young Union”). The Young Union is a voluntary association inside

the company, whose main function is to organize spiritual activities and events for all employees. All FSS employees from different hierarchical levels are encouraged and eligible to become a member of the Young Union. FSS culture is propagated among employees through series of meetings and contests where they have opportunities to talk and learn about FSS culture values. It is unquestionable that the Young Union is an effective tool that helps managers to communicate and explain the FSS culture to employees at every level of the hierarchy within the company.

Secondly, the Internal Bulletin “Chung toi” (literally translated to “We”), edited by FSS members, provides another effective channel to communicate the culture values to employees. The bulletin is updated weekly on the company website with FSS news, comments on events, expression of feelings and many articles on the company activities. The vision and culture values of FSS are conveyed by free-style stories, internal interviews, and poems that are easy to learn by heart.

Thirdly, direct communication between company managers and employees is another channel for sharing culture values. FSS leaders and managers spend time listening to employees’ wisdom and motivate them to follow common goals and to apply the basic values of the company culture.

Knowledge of management is transferred at different stages of the company's business process. Knowledge of management is shared among individuals through hands-on experience, on-the-job training, and teamwork. Through role rotation, team members have a chance to acquire and practice new skills. The interaction among individuals and between employees and the company database facilitates the information flow and knowledge creation inside the company.

Knowledge of the external environment (customers, markets, and competitors) is mainly transferred through the sales process. Figure 6.8 illustrates the flow of information and the participation of each division in the sales process.

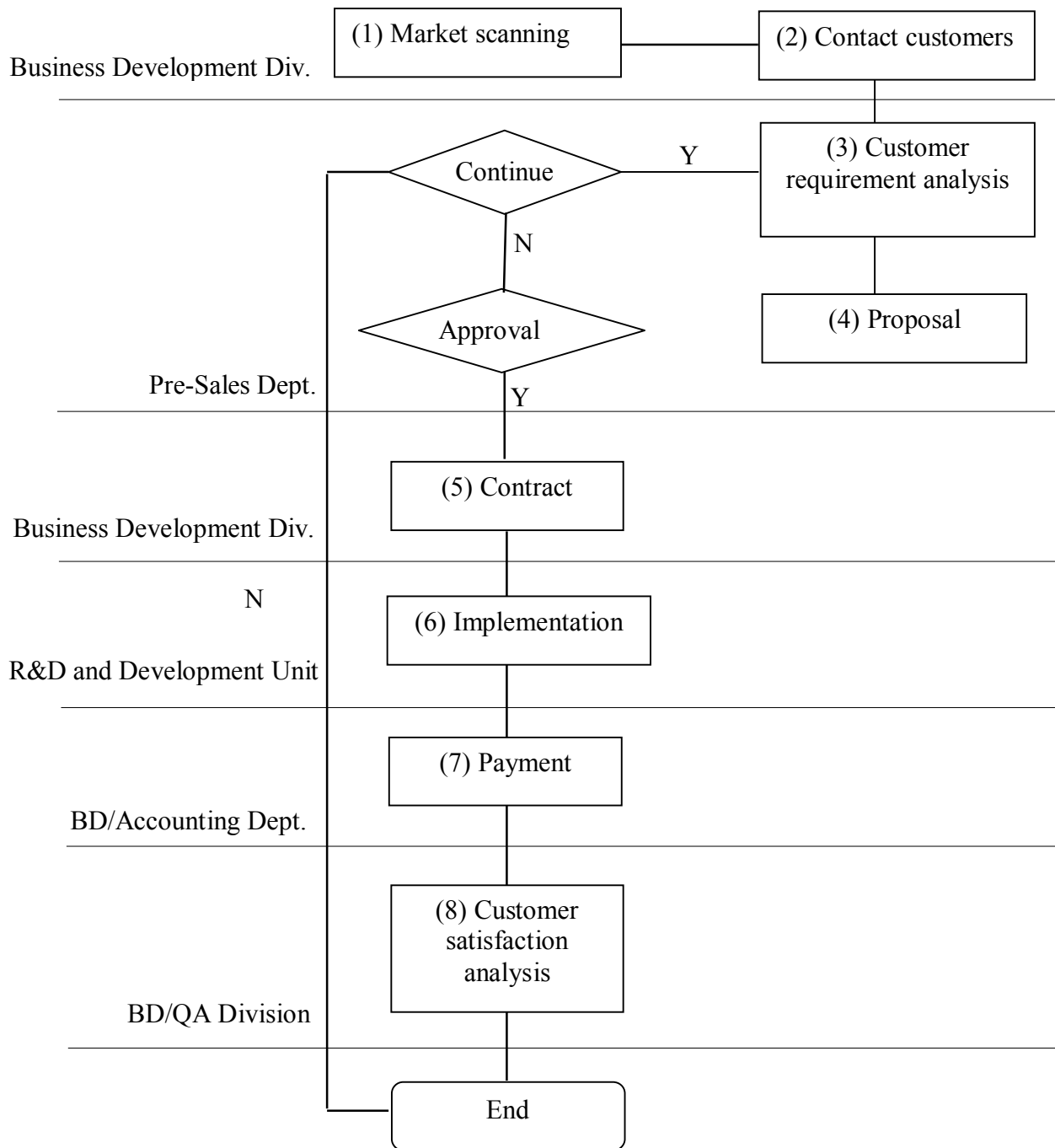


Figure 6.8. The FSS's Sales Process

Table 6.4 describes the process of knowledge transfer among individuals engaged in each stage of the sales process.

Table 6.4. Description of Knowledge Transfer in Sales Process.

Step/Influencing Factor	Knowledge Transfer Process			Description
	Initiation	Implementation	Integration	
Step 1: Market Scanning				
- Organizational culture values: solidarity, teamwork, adaptability - IT tool: Sales MIS/ Customer management	- Knowledge source (company database, salespersons)	- Transfer a list of potential customers and knowledge about market	- New way of approaching customers and target market	- Customer information is put and updated into customer database
Step 2: Contact Customer				
- IT tool: Sales MIS/ Customer management, email - Organizational culture: solidarity, adaptability	- Knowledge source: company database, salespersons	- List of customer addresses - List of customer needs	- New approach to gain customer	- Record and trace contacted customer's information
Step 3: Customer Requirement Survey				
- IT tool: Sales MIS/Business management - Organizational culture: teamwork, adaptability - Incentive system	- Knowledge source: company database, salespersons, technical staffs	- Knowledge about customer requirements - Knowledge on customer behavior, demand on products and services.	- Use the best practices	- Store and re-use the best practices
Step 4: Proposal				
- IT tool - Incentive system - Organizational culture - Organizational structure: empowerment, ISO standards		- List of suggested solutions	- New project	- Store and re-use the best practice

Table 6.4. Description of Knowledge Transfer in Sales Process.

Step/Influencing Factor	Knowledge Transfer Process			Description
	Initiation	Implementation	Integration	
Step 5: Contract				
- IT tools - Organizational structure - Organizational Culture - Incentive system		- Signed contracts - Successful deals	- New project	- Store to share contract and supporting documents - Integrated to FSS Insight to get data for project plan.
Step 6: Implementation				
- IT tool: Sales MIS/Contract management - Organizational structure - Organizational culture	- Technical staff, customer database	- Technological knowledge	- Bench-marking - Trial and new experiment	
Step 7: Payment				
- Organizational structure - Organizational culture - IT tool: Sales MIS/Contract management	- Accounting and sales staff - Customer database			- Integrated to Solomon to get data of payment
Step 8: Customer satisfaction analysis				
- Organizational structure - Organizational culture - IT tools	-Salespersons and staff of QA Division - Customer database	- Knowledge on customer	- Change performance to satisfy customer	- Integrated to FSS Insight to get data on customer satisfaction grade

As a result of individuals' involvement along different stages of the sales process, and the support of information technology tools in a culture of solidarity and teamwork and decentralized structure, the degree of customer satisfaction and customer service has been improved.

“All customer information is stored and explored for doing business and caring customers.”

(An employee in Business Development unit)

“We can access customers and business information from everywhere.”

(An employee in Business Development unit)

Knowledge of technology is mainly transferred through the development and implementation process. Working in teams when designing and testing products facilitates the sharing of expertise among technical staff.

“When we do, we often share our ideas with colleagues in order to drive for most suitable design that satisfies customers’ need.”

(An employee in Enterprise division)

“I think I share a lot of knowledge with my colleagues as we experiment in new products.”

(An employee in Enterprise division)

“I know who will help me tackle my problem. Here, my knowledge is enriched by exchanging ideas with others and self-learning.”

(An employee in R&D unit)

Overall, organizational knowledge is continuously shared through both formal and informal mechanisms. Informally, knowledge is shared whenever employees met over coffee and via the company's forum. Formal knowledge sharing occurred at the weekly face-to-face meetings led by the company director and via the intranet system. At meetings, management brings up certain topics for debate, is informed of important strategic issues, then functional managers and team leaders are invited to report project status or technical news and operations within their departments. Through the task management system, e-library, information box, and email, people can exchange organizational knowledge and information regardless of time and physical constraints.

6.4.7 Organizational Factors, Knowledge Transfer Process and Performance of FSS.

The survey and interview results proved that a culture of high solidarity, adaptability, collaboration and teamwork has the strongest impact on intra-organizational knowledge transfer processes in FSS.

The statistical results suggested that organizational culture mostly contributes to all three stages of knowledge transfer, especially to the integration stage (Adj. $R^2=0.28$, 0.34 and 0.426 respectively, $p<0.001$). This indicates that 28% of variance in the initiation stage, 34% in the implementation stage and 42.6% in the integration stage were explained by the changes in the level of solidarity, adaptability, team orientation and collaboration inside FSS. Solidarity and adaptability are two important attributes that significantly influence the initiation and integration stages. This finding is in line with the data collected by interviewing the company' managers: *“FSS culture makes people become closer... Personal interaction among individuals facilitates knowledge sharing... and then it will contribute to the company development”*.

The incentive system was also significantly associated with the knowledge transfer process. Transparency and group-oriented rewards are two attributes that are significantly related to the knowledge transfer process (Adj. $R^2=0.144$, 0.064 and 0.292 respectively, $p<0.001$). However, the impact of incentive systems on the knowledge transfer process was not as strong as the impact of organizational culture.

The statistical results suggest that two dimensions of organizational structure (formalization and decentralization) were significantly positively related to the three stages of the knowledge transfer process. This result is consistent with the analysis of information collected from the interview with FSS's employees and managers.

The frequency of using IT tools is also significantly associated with the three stages of the knowledge transfer process (Adj. $R^2=0.12$, 0.05 , 0.11 , respectively, $p<0.001$). At FSS, using IT tools for doing work was required. When people use IT tools more

frequently, they realize the usefulness of the tools for knowledge sharing and firm performance.

“By applying MIS and contract management, we can reduce administrative cost and paperwork.”

(Deputy Director of FSS)

“Accessing the Internet and company website, we can search for whatever information needed and share ideas and spirit with others regardless of space and time constraints.”

(An employee in Enterprise division)

The results of the survey suggest that there is significant positive correlation between intra-organizational processes and financial performance of the company (Adj. $R^2=0.188$, $p<0.001$). All three stages of the knowledge transfer process are significantly related to the market performance of FSS (Adj. $R^2=0.285$, $p<0.001$). and its growth and development (Adj. $R^2=0.328$, $p<0.001$).

In conclusion, the result of the case study analysis suggests that the influence of each organizational factor on the knowledge transfer process varied along different stages of the process. Among three stages, the integration stage was mostly influenced by organizational factors. The implementation stage was least affected by those factors. Moreover, among the organizational factors, the impact of organizational culture values on the process of knowledge transfer remains the largest. Group orientation and transparency attributes of the incentive system ranked second. Centralization, formalization and frequency of using IT tools also had positive impact on the process but at lower level compared with that of culture and incentive systems.

6.5 Comparison between Theory, Survey Study and Case Study

6.5.1 Consistencies between Theory, Case Study and Survey Study

The theoretical model and the case study consistently illustrate that the knowledge transfer process is a multi-stage process. The process starts when individuals know where knowledge exists and how to access that knowledge, acquire and exchange

the knowledge, and ends when people apply the new acquired knowledge to change their work behaviors.

The case study and the survey both provided support for the relationship between organizational factors and the intra-organizational knowledge transfer process. In relation to the effect of communal culture on the transfer process, the case study results suggested that an emphasis on customers and respect for the individual are the two additional values that make people align themselves with internal and external changes and provide greater values for customers. It also strongly motivates people to share their knowledge with others with the aim of best satisfying the company's customers. By searching for ways to motivate followers, listening to employees' ideas and fully engaging employees in the process of the work, leaders can create an environment of trust that facilitates the interaction among individuals and make company's culture values closer to the employees' life. The case study revealed that leadership plays an important role in building a knowledge sharing culture within the company.

The relationship between the knowledge transfer process and company performance is also confirmed by the case study analysis and the empirical survey. It was found that the more knowledge is shared amongst individuals, the better is the performance of the company. However, the result of case study analysis revealed that the knowledge transfer process had the greatest impact on the non-financial performance of the company such as growth and development, and market performance.

The case study generally supported the use of the theoretical model to study intra-organizational knowledge transfer process within an IT company. The case study, however, suggested that some specific theoretical hypotheses might be not neatly followed by every company operating within the context of Vietnam. Whereas the formalization dimension of organizational structure was hypothesized to have negative effect on the knowledge transfer process, the results of the case study and empirical study suggest that it was positively associated with the transfer process. The important reason for this difference is that the high level of uncertainty

avoidance by Vietnamese people makes them learn efficiently in the context of high formalization. In an organization having high formalization, people feel safer and can be assured of recognition when being involved in the knowledge transfer process.

6.5.2 Discrepancies between Case Study and Survey Study

The role of information technology tools is confirmed by the case study research but not by the empirical survey. In a large company like FSS, IT tools play a crucial role in facilitating the communication flow and knowledge exchange among individuals since the availability of well-recognized, useful IT tools is coupled with the corporate knowledge-sharing culture and supportive attitudes of leaders. However, in smaller firms, the availability of IT tools is limited. Employees may not be required to use IT tools so frequently, so that the effect of IT tools on the knowledge transfer process is weaker than that of other factors.

While IT has exponential potential for facilitating knowledge transfer, it is important to bear in mind the limitations of IT in any KM initiative. The current knowledge management systems still have limitations in their ability to contextualize knowledge. This means that knowledge in a database may not be optimally exploited, as it may not be put into context with other relevant metadata. Technology is not yet capable of creating new knowledge that is contextually related to other knowledge. Moreover, given the availability of KMS, the case study results revealed that the method of managing content provision of the system significantly influenced the frequency of use and sharing behavior of individuals. To facilitate knowledge transfer, there is a need to update information regularly and to provide opportunities for deeper involvement of users in the system.

The theoretical predictions and case study results differ in the relative importance of factors affecting the knowledge transfer process. On the one hand, the theoretical model did not make any predictions about the relative importance of the factors across knowledge transfer stages. On the other hand, the case study results suggest that FSS tends to attach more importance to organizational culture values than to

other factors, and that the integration stage was mostly influenced by organizational factors. The implementation stage was least affected by those factors.

The survey research and case study results differ in the relationship between the knowledge transfer process and organizational performance. The survey result suggested that the knowledge transfer process failed to mediate the relationship between its antecedents and organizational performance, while the case study revealed that organizational culture has a significant impact on knowledge transfer process and in turn, the increase in employees' work performance has contributed to the growth and development of the company.

In summary, this chapter presents the result of a case study on intra-organizational knowledge transfer process. Overall, the finding of the case study supports the theoretical foundation and the empirical study. However, it provides deeper and richer insight into how different types of knowledge are transferred among individuals and units, and how culture values, organizational structure, and information technology tools could facilitate the knowledge transfer. The case study also provides evidence about the link between antecedents of intra-organizational knowledge transfer, the transfer itself and organizational performance, especially non-financial performance.

CONCLUSIONS

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7.1 Overview

The goal of the current research is twofold. Firstly, it is aimed at identifying and examining the relationships between organizational factors, knowledge transfer process and organizational performance. Secondly, it investigates how a particular Vietnamese IT company practices its knowledge transfer process and builds its knowledge sharing culture.

To achieve the goal stated above, the following process was adopted. First, the literature related to knowledge transfer process and its relationship with organizational performance was reviewed. With that background, gaps were identified in the research, and a model was developed to integrate four organizational factors, three stages of knowledge transfer process and organizational performance. For testing the relationship between variables, thirteen hypotheses were induced from the model.

Then, a triangulation of quantitative and qualitative studies was employed. Firstly, quantitative approach with a survey of 218 individuals in 36 IT companies was employed to test the formulated hypotheses. The collected data was first used to assess and refine the measurement scales of all constructs under the study. This was

done primarily by factor analysis and item-to-total analysis. Then the data was subjected to multiple regressions to obtain statistics for testing and modifying the model.

Secondly, a case study research was conducted to explore how the process of knowledge transfer occurred in a specific IT company. The case study serves as an illustration of the theoretical model on intra-organizational knowledge transfer. It also provides basis for modifying the theoretical framework that was developed and tested throughout the survey.

7.2 Summary of Findings

The study represents one of the first large-scale empirical efforts to systematically investigate the intra-organizational knowledge transfer model in Vietnamese IT companies. The research model was constructed to describe and visualize the thirteen relationships. Multiple regression analysis supported most, but not all, of the hypothesized relationships. More precisely, nine out of thirteen hypotheses were supported. Overall, the findings of the study indicated that organizational factors and intra-organizational knowledge transfer process have positive correlations with organizational performance. However, intra-organizational knowledge transfer process failed to mediate the relationship of organizational factors with organizational performance.

The survey research specifically found that (i) organizational culture characterized by high adaptability and solidarity mostly affected the knowledge transfer process and organizational performance, (ii) a transparent and flexible incentive system motivated individuals to exchange and utilize knowledge in their daily work, (iii) high level of centralization and formalization hindered the flow of knowledge within companies, and (iv) the effect of IT tools on the knowledge transfer process remained weak.

The case study research reveals that intra-organizational knowledge transfer process plays an important role in facilitating the company's non-financial performance. In order to facilitate the transfer process, a knowledge sharing culture, flat

organizational structure and information technology system are developed. The role of information technology tools is confirmed by the case study.

7.3 Practical Implications for Managers

The findings of the study bear some implications for managers of Vietnam's IT companies.

Recognizing the Importance of Intra-organizational Knowledge Transfer Process

In IT companies, knowledge is a critical asset. Knowledge is worthless unless people turn that knowledge into action and apply it for business benefit. Thus, in order to improve company performance, knowledge-sharing attitudes and behavior must be integrated in employee's daily work. Knowledge sharing can enhance overall organizational capabilities through collective learning and synergistic benefits generated from the process of exchanging information among individuals inside the organization. Sharing knowledge across "borders", continuous learning from colleagues, customers and other parties to improve personal performance, and aligning employees' competencies and knowledge areas with company strategy are keys to company success.

However, sharing knowledge among individuals in an organization has been far from simple. Except for simple routine and operational skills, effective sharing and transfer of abstract understanding have been time-consuming and often impossible. It is particularly difficult to transfer concept beyond the observable and concrete "how-to" type of knowledge of how things are done - but not why things are done. Historically, comprehensive knowledge and understanding were transferred through long-term engagement and repeated exposure with the subject matter such as apprenticing, learning on the job, or education that focused on general principles and script knowledge. In recent years, this has changed somewhat and many new approaches are now available. Building organizational factors to create favorable conditions for knowledge sharing behavior seems to be an effective means.

However, how does a company develop organizational capabilities which are in favor of intra-organizational knowledge transfer process? This research suggests

that managers can concentrate on some key organizational factors, namely organizational culture, incentive system, organizational structure and information technology tools.

Developing Organizational Culture

A culture of high solidarity, adaptability and collaboration was proved to have the strongest impact on the process of knowledge transfer and company's performance. In Vietnam's IT companies, the major drivers that create a knowledge sharing culture include: (i) knowledge sharing was tied to the business strategy, (ii) human networks created strong knowledge-sharing relationships, (iii) knowledge sharing was integrated with daily work, and (iv) knowledge sharing behavior were reinforced through rewards, training, special events, and requirements. In order to match company culture to individual values, there is a need to provide employees opportunities to work and interact with each other. To this end, managers could consider organizing frequent meetings, and fostering after-work activities and events.

Designing Incentive Systems

While building such a culture provides a platform for facilitating knowledge sharing, its existence does not automatically result in knowledge transfer. From a management viewpoint, both soft and hard factors have to be simultaneously implemented to encourage knowledge transfer. That means that together with a communal culture, performance appraisal and incentive systems which take into account the behavior of knowledge transfer and acquisition needs to be used on timely basis. In the Vietnam's IT companies, both monetary and non-monetary incentives are needed for motivating individuals to transfer their knowledge. The human resource department will also be accountable for developing a fair, flexible and transparent incentive system that reinforces knowledge transfer. Moreover, the company also needs to create a pay-for-knowledge system that emphasizes the sharing of knowledge and pays people for sharing. Changing the performance appraisal and career advancement system to include knowledge sharing is a far more dramatic move than simply providing awards and recognition to those who are

role models in knowledge transfer. Once the incentive system has been implemented, the company needs to ensure its successful implementation by applying a continuous review system. Its effectiveness can be measured through performance feedback, or by incorporating these objectives into the evaluation of those responsible for managing the company.

Designing Organizational Structure

The way in which a company is structured and organized turns out to be important when it comes to approaching and coordinating staff with the aim of creating knowledge synergies. Formalization and centralization of organizational structure influence the transfer process. To facilitate knowledge transfer among individuals, a low level of centralization and specific level of formalization could be adopted. Formalization makes people feel safe in sharing knowledge and applying newly acquired knowledge. In a decentralized organization, action can be taken more quickly to solve problems, and more people provide input into decision making. Increasing the level of participation in decision making and reducing the boundaries between organizational levels enable easier information flow vertically inside a company (Al-Alawi et al., 2007). Reducing hierarchical constraints and increasing social interaction are the directions that managers may pursue to encourage knowledge flows inside an organization. This is why many companies tend to show increasingly horizontal, flexible structures with fewer hierarchical levels and a widespread communication at all organizational levels.

In designing a decentralized organization, managers should delegate authority to their subordinates to encourage them to become involved and take responsibility for their work. However, what managers can do to delegate authority is the main concern. There are several steps that managers need to take. The first is to clarify the assignment. The management by objective (MBO) method should be used by managers. Both managers and subordinates get agreement on what is to be done and the end results expected, but the subordinate decides on the means. The second step is to specify the subordinate's range of discretion. What managers should delegate is the authority to act on certain issues, within certain parameters. The case study

results suggest that managers should empower and provide autonomy to their subordinates to solve problems of operational management, not strategic ones. The third step is to allow subordinates to participate in determining what is delegated, how much authority is needed to get the job done, and the standards by which they will be judged. The fourth step is to establish feedback mechanisms. The establishment of mechanisms to monitor the subordinate's progress increases the likelihood that important problems will be identified early and tasks will be completed on time. By conducting periodic spot checks, managers can ensure that authority guidelines are not being abused and proper procedures are being met.

In addition, there are some good practices that managers should employ to facilitate knowledge transfer among individuals in an organization. Meetings and feedback from performance reports should be regular. The regular use of debriefings or after-action reviews helps employees learn about new ideas and effective work processes. Debriefings could be conducted in face-to-face meeting or with the use of communication aiding technologies like email and conference calls.

Introducing and Utilizing IT Tools

Despite the limited indirect effect of IT tools on the knowledge transfer process, information technologies such as Internet, intranet and company databases need to be employed since they are the main source of providing needed information to people inside a firm (Snis and Svensson, 2004). The technology can create the infrastructure needed for a knowledge culture and for knowledge distribution. Technology expands access and can get the right information to the right people at the right time. It can also aid in knowledge sharing by speeding up the virtual connection among people (Robertson, 2004). However, technology by itself will not make people share knowledge nor will it result in knowledge use. Little knowledge will be transferred unless the introduction of the technology is accompanied by changes in how people behave, the culture of the organization, and its structure. This is in line with the study of Stenmark (2003) and Coakes (2006). Moreover, when using information technology applications, several potential problems may arise that could hinder knowledge transfer. If people rely too much on

communication technologies, physical travel and face-to-face interaction, which are also important and necessary for sharing complex issues and tacit knowledge, especially in the dynamic and highly uncertainty environment, may be prevented.

In addition, managers must pay attention to the way employees collaborate as well as the way they use web technologies. Such awareness could result in efficient as well as effective use of organizational resources. Future maturing of web technologies could greatly facilitate the dissemination of information among employees to create knowledge for the benefit of the corporation. Implicit in this maturity is the professional development of individual employees. IT would allow the automation of the storage of corporate knowledge while customizing the support systems to the personal needs of the users.

The potential benefits of intranet implementation are well known and discussed widely in the literature of business and computing (Damsgaard and Scheepers, 2001; Chin, 2005; Kim and Trimmi, 2007) as well as in associated domains such as information science. It needs to be emphasized, however, that an intranet is merely a technical infrastructure and as such, its business value is contingent on the content that it holds in terms of information resources and applications.

Intranets, when they first appeared, were hailed as the ultimate solution to many organizational issues, including sharing of knowledge amongst employees (Hall, 2001). The fact that the technology enabled people from different computing environments to connect regardless of topologies or operating systems seemed to open unlimited opportunities. However, real life experiences tell a different story. Instead of employees actively sharing knowledge on a peer-to-peer level, intranets may become one-way communication channels for corporate information and may reinforce existing barriers to knowledge sharing.

It has often and correctly been pointed out that technology in itself is not enough to ensure successful knowledge management: what is important is that a knowledge-sharing attitude is fostered (Davenport & Prusak, 1997). What is evident at FSS is that although the company had a working knowledge sharing culture, where the employees willingly shared their experiences, this attitude alone was not enough to

make the intranet a knowledge transfer-enhancing environment. Whereas the web grows in a democratic and bottom-up fashion by contributions from interested users, intranet information is typically fed top-down by employees with no personal involvement in the information. This was exactly the case at FSS where the intranet was populated with semi-static, long-term, general information provided not by the employees themselves but by an appointed infomaster. Judging from the testimonies, the employees were reluctant to confirm the intranet as a tool for knowledge sharing. Instead, the intranet was perceived as an information dissemination tool for management.

Besides, there is a problem that most intranets do not contain information useful in daily work. The FSS case suggests that the lack of information useful in everyday business situations is not due to the unwillingness to share but to the difficulties associated with a traditional approach to web publishing. To achieve maximum impact in today's business environment, intranets need to go beyond being depositories of static information. They need to enhance teamwork and knowledge sharing by enabling the creation of team suites, location-independent shared spaces, and real-time collaborative tools. Intranets need to provide dynamic platforms where employees can share thoughts and insights, and collaborate in "communities of practice" - loosely organized groups of professionals within an organization who are dedicated to a specific interest or expertise. Communities of practice can significantly improve employees' ability to solve problems quickly, transfer best practices, and discover fast solutions and strategies that lead to increased business opportunities.

One strategy to position an intranet at the heart of the organization is to use it as the platform of choice for internal communications on topics such as business development, key messages from senior management, and updates on company initiatives.

In many organizations, targeting communications about new knowledge-management solutions to specific internal audiences has been an effective strategy. Every organization has informal knowledge brokers, thought leaders and teams that

are highly motivated to test and champion new approaches. These groups have to be convinced of the offering's importance and value in order to become internal marketers.

In addition to the already available IT tools in IT companies, the introduction of social software like wiki, web logs will cause a shift in ownership where the employees are given shared control. The collaborative authoring features offered by a wiki mean that knowledge could be distributed between many community members. If one employee starts developing information, others may continue to add and a “best practice document” will emerge without burdening anyone contributor in particular. When updating becomes easy, employees are transformed from merely information consumers to full participants. The introduction of such media increases the motivation to add and exchange information amongst employees since they can participate without asking for the infomaster’s permission. Employees will feel more involved in and responsible for the information on the wiki. Not only will employees be more motivated to add information, but also the frequency of updates will increase as a result of easier access. This will make the content more alive and relevant. The responsibility regarding information sharing will be influenced by the introduction of the wiki. To be successful the wiki will be assumed to be a joint responsibility shared amongst all employees, and not just a task for the infomaster. Company managers should see this feature as a major opportunity to more actively involve employees.

A positive attitude to knowledge sharing is a vital and necessary prerequisite for a successful KM initiative, since without such willingness, any KM-related effort - whether or not supported by IT - will have little or no effect. However, even when knowledge sharing is explicitly embraced by the organizational members, IT solutions such as an intranet may still fail to contribute to the organization’s KM goals. Thus, it is concluded that if people want to share knowledge and this willingness is facilitated by easy access to publication tools, the intranet may indeed become a very useful knowledge management tool.

7.4 Research Contributions

This study extends our understanding of the important facilitators of intra-organizational knowledge transfer process. It attempted to integrate both soft and hard organizational factors to create a comprehensive model of intra-organizational knowledge transfer. It has made a contribution to knowledge management and strategic management in the following aspects.

Firstly, in terms of methodology, this research has applied a triangulation of survey and case study research to examine the theoretical model. A majority of previous research used either quantitative or qualitative approach in studying knowledge transfer within an organization. In the survey research, a set of measurement scales for the 23 constructs under investigation were carefully designed and validated. Of these 23 constructs, five have been newly developed, and the rest were adopted from previous studies after relevant adjustment. Thus, to the research community, it provides a validated and reliable instrument that can be used to test the model in similar settings.

Secondly, this research developed and empirically tested a theoretical model for examining the relationship between organizational capabilities, knowledge transfer process and organizational performance. The inclusion of organizational performance into the model could increase the importance of intra-organizational knowledge transfer in the company's success. In addition, this study is a major theory building endeavor that suggests a model and presents empirical results that have remarkable implications for the field of strategic management in general and knowledge transfer in particular.

Thirdly, a large number of previous research studied knowledge transfer in different settings and in developed countries (e.g., Cabrera et al., 2006; Lee and Ahn, 2007; Yang and Chen, 2007; Al-Alawi et al., 2007; Molina and Llorens-Montes, 2006; Burgess, 2005). Few studies have been undertaken in a transition economy like Vietnam. This research contributes towards a better understanding of intra-organizational knowledge transfer process in a transition economy.

Fourthly, with a process-based conceptualization of intra-organizational knowledge transfer, this research contributes to the literature by providing empirical support for several theories and previously tested constructs. The findings of this study are consistent with several prior empirical studies about the relationship of organizational culture and knowledge sharing (e.g., Al-Alawi et al., 2007; Lai and Lee, 2007; Molina and Llorens-Montes, 2006; Park et al., 2004; Ladd and Ward, 2002) and the relationship of organizational structure to knowledge sharing (e.g., Chen and Huang, 2007; Ma, Xi and Chen, 2005; Claver-Cortés et al., 2007). Further to the results of previous researches, this study shows the relative importance of organizational factors on different stages of the knowledge transfer process in IT companies.

Finally, in terms of significance of this study to practitioners, the primary contribution is that it can provide managers with an understanding of the effect of the organizational factors on knowledge transfer processes and company's performance. Since many of these factors are within the realm of management control, identification of their relative influence on knowledge transfer could prove vital in the development of the effective knowledge transfer protocols.

7.5 Limitations of the Research

Given the contribution of the study on theoretical and practical perspectives, the study reveals several limitations.

The first limitation is related to sample and sampling methods. Judgment sampling rather than random sampling was used in the empirical study. While the sampling method is the most appropriate and practical in Vietnam situation, the sample obtained may not be representative of the population. Thus, the results may not be generalized to other companies, particularly those operating in other industries.

The second limitation is related to sample size. Since the research model is quite comprehensive and contains relatively large numbers of constructs, it required a relatively large sample size per statistical convention. While the sample size of 218 individuals in 36 IT companies obtained in this study was acceptable, a larger number of companies involved in the study could provide more reliable results.

The third limitation is related to the scale used to measure each construct in the model. Perceptual measures of constructs were primarily used in this study. Thus, there is a potential risk for common method bias due to the use of self-reported questionnaires, containing mainly perceptual measures. Nevertheless, many of the previous studies on knowledge transfer have used similar perceptual measures. There is also significant literature on cognitive perception that supports the use of perceptual measures. Therefore, while the perceptual measures might be improved through use of more direct measures, their adoption in this study is widely consistent with the intended research questions.

Data validity could have been strengthened in this study through obtaining additional in-depth data. A longer time spent interviewing people, observing teamwork and attending staff meetings at the surveyed IT companies would have provided additional data for analysis to probe deeper into the issues.

7.6 Directions for Further Research

The results of this study open several avenues for future research.

Application in Different Research Settings

The theoretical model of this study has been tested with a sample of individuals in Vietnam IT companies. Future research could test it in other settings. For instance, researchers could employ this model to address the question of how knowledge is transferred among individuals in IT projects or in consulting companies, where knowledge is an essential asset.

While the initiators of knowledge are individuals, the process of knowledge transfer could occur at any of the three levels: individual, department and project. Other research questions could be asked about factors that influence the transfer process between different projects done by employees. What does the process of knowledge transfer among individuals working in different projects look like? Which factor has most influence on that process? And, how can we measure effectiveness of the transfer process?

Comparative Research

Previous discussions indicated that business environment may impact the effect of organizational factors on knowledge transfer processes. Each industry has its specific business environment, which affects company operations. In a broader view, Vietnam differs from developed countries in several aspects such as being a transition economy with a collective culture and emerging technological development. Thus, this research lacks comparative data to examine whether a business or an industry environment influences the transfer process. Future research should address this question by comparing how the transfer process occurs within firms operating in different industries and countries.

Social Software and Intra-organizational Knowledge Transfer

This study provides evidence about the usefulness of IT tools, especially Intranet and email in facilitating the transfer process. However, the positive relationship between IT tools and different stages along the transfer process is not yet fully confirmed through both empirical surveys and case studies. Consequently, future research should thoroughly re-examine these relationships with a focus on the role of social software on the knowledge-sharing behavior of individuals.

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APPENDIX A

Table 2.5. Previous Studies on Relationship among Knowledge Enablers, Knowledge Transfer Process and Organizational Performance				
Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
<i>Previous Researches on Relationship between Knowledge Enablers and Knowledge Transfer Process</i>				
Coakes (2006)	Technology can be used successfully to assist in the knowledge sharing processes across time, space and virtuality. Successful knowledge management however, continues to need a socio-technical approach where the social aspects of knowledge creation, storage and sharing need to be considered alongside the technical. Socio-technical theory tells us we must importantly consider people, task, process, and environment (both internal and external) when considering how best to implement technology into our organizations.	Case study method was used.	Information technology tools	Knowledge sharing

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Claver-Cortés et al. (2007)	The companies adopting flexible, increasingly flat organizational forms with fewer hierarchical levels not only allow but also encourage communication and teamwork among staff members. This makes it possible for employees to take better advantage of their competencies, generating organizational routines and increasing the value of their contributions thanks to the freedom of action, they are given.	Multiple case study method, which has been applied to six Spanish firms of recognized international prestige characterized by their excellence and proactivity in matters of knowledge, was employed.	Organizational structure features	Knowledge management process
Lee and Ahn (2007)	Individual-based reward is more efficient than group-based reward in encouraging knowledge sharing behavior of employees in an organization.	Survey and qualitative analysis in Korea's firms were conducted.	Individual-based reward; Group-based reward	Knowledge sharing
Al-Alawi et al. (2007)	Trust, communication, information systems, rewards and organization structure are positively related to knowledge sharing in organizations. This research is also intended to contribute in helping businesses understand the essential role of organizational culture in nourishing knowledge and spreading it in order to become leaders in utilizing their expertise and enjoying prosperity thereafter.	A survey and a number of interviews with staff from various organizations in public and private sectors in Bahrain were conducted.	Trust, Communication Information system Rewards, Organizational structure	Knowledge sharing

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Yang and Chen (2007)	Technical, structural, and human knowledge capabilities are significant for organizational knowledge sharing. The effects of implementing knowledge management on organizational knowledge capabilities and knowledge sharing are also significant.	Regression analysis with data from questionnaires collected in different industries in Taiwan was used.	Technical, structural and human knowledge capabilities	Knowledge sharing
Voelpel and Han (2005)	Knowledge management needs to take the cultural dimension into consideration, as culture decisively influences knowledge-sharing behavior. Potential for knowledge sharing in the emerging market of China is higher than one may expect, if the necessary adjustment to the cultural context can be made.	This research is mainly grounded in an in-depth case study, Siemens in China. A total of 35 interviews have been conducted with executives, general managers, and line managers within different units at the headquarters.	Non-monetary incentives, Culture	Knowledge sharing behavior
Lai and Lee (2007)	The finding of the study suggested that enterprises should adopt an entrepreneurial culture when establishing knowledge activities.	An empirical survey was conducted in 154 Taiwanese companies to investigate understanding of the organizational cultures, determine enablers and barriers to implement knowledge activities.	Organizational culture	Knowledge activities

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Chen and Huang (2007)	An innovative and cooperative climate is positively related to social interaction. When the organizational structure is less formalized, more decentralized and integrated, social interaction is more favorable; and social interaction is positively related to knowledge management. This empirical evidence supports the process-oriented view and indicates that social interaction plays the mediating role between organizational climate, organizational structure, and knowledge management.	A survey of 146 firms in Taiwan was conducted. Regression analysis was used to test the hypotheses.	Organizational climate Organizational structure	Knowledge management
Cabrera et al. (2006)	Self-efficacy, openness to experience, perceived support from colleagues and supervisors and, to a lesser extent, organizational commitment, job autonomy, perceptions about the availability and quality of knowledge management systems, and perceptions of rewards associated with sharing knowledge, significantly predicted self-reports of participation in knowledge exchange.	A survey of 372 employees from a large multinational in the USA was conducted. Quantitative techniques were used to analyze the data.	Psychological variables, Perceptions about the availability and quality of KMS, rewards	Knowledge sharing
Park et al. (2004)	Culture's attributes: trust, fairness, closeness, team orientation, openness were positively associated with successful implementation of knowledge management technology and knowledge sharing.	Data were collected from 26 organizations in the USA. The correlation techniques were used to analyze the data.	Openness, Trust, Fairness, Closeness, Team orientation	Knowledge sharing

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Lopez et al. (2004)	Learning mediates the relationship between collaborative culture and organizational performance.	The data was collected from 195 Spanish firms.	Organizational culture (Collaborative culture)	Financial profitability, sale growth, profit
Wing (2005)	Culture is widely acknowledged as a critical success factor in KM. It found that some cultural themes including internal competitiveness, personal reward and incentive, concerns over job security and the 'devaluation' of employees were significantly associated with knowledge sharing.	A case study at MKS, an IT consulting firm based in India was conducted.	Culture values	Knowledge sharing
Burgess (2005)	Employees, who perceived greater organizational rewards for sharing, spent more hours sharing knowledge beyond their immediate work group. Employees who perceived knowledge as a means of achieving upward organizational mobility were less likely to share and somewhat more likely to seek information. Employees were less motivated to share and seek knowledge beyond their work group to the extent that they believed that reciprocity norms governed information exchange and to that extent, they identified more strongly with their subunit relative to the organization.	Data were collected through a survey of 480 individuals working in the USA.	Organizational reward	Knowledge sharing

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Ko et al. (2005)	Arduous relationships negatively relate to knowledge transfer. Shared understanding, absorptive capacity, intrinsic motivation and credibility of the source positively relate to knowledge transfer.	Data was collected from consultant-and-client matched-pair samples from 96 ERP implementation projects in 80 client organizations and 38 consulting firms over 6 months.	Shared understanding, Arduous relationship, Absorptive capacity, Intrinsic motivation, Communication competence, Source credibility	Knowledge transfer between a consultant and a client
Bock et al. (2005)	Attitudes toward and subjective norms with regard to knowledge sharing and organizational climate influenced individuals' attitudes toward knowledge sharing. Anticipated reciprocal relationships affect individuals' attitudes toward knowledge sharing while both sense of self-worth and organizational climate affect subjective norms. Anticipated extrinsic rewards exert a negative effect on individuals' knowledge sharing attitudes.	The survey on 154 managers from 27 Korean organizations across 16 industries was conducted.	Anticipated extrinsic rewards, Anticipated reciprocal relationship, Sense of self-worth, Subjective norm to share knowledge, Organizational climate	Attitude and Intention to share knowledge
Molina and Llorens-Montes (2006)	Teamwork is an important factor in improving knowledge transfer. However, greater autonomy only increases transfers when there are difficulties in transferring knowledge.	Data were collected from a survey of 179 Spanish firms.	Teamwork	Knowledge transfer

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Ras et al. (2005)	This study proposed an approach on how to motivate people for informal knowledge sharing within web logs and on content elicitation from these Web logs in the knowledge acquisition phase for learning purposes. The study also demonstrated that web logs could actually be used as an alternative source for enriching both the experience base and for producing learning content.	Empirical study was employed.	Social software (wiki, weblog)	Knowledge sharing
Taylor and Wright (2004)	Innovative culture, a capacity to learn from failure and good information quality are strong predictors of successful knowledge sharing. In addition, a factor associated with change management, and a predisposition to confront performance indicators were found to significantly influence the knowledge sharing process.	Data were collected by using both qualitative and quantitative approaches. A quantitative survey of 132 care managers in public service and 30 interviews were conducted.	Open leadership climate, Learning from failure, Information quality, Performance orientation, Satisfaction with change process, A vision for change.	Effective knowledge sharing
Khandelwa and Gottchalk (2003)	The research explored links between knowledge sharing, rewards and use of information technology.	The data were collected from 47 Australia's largest law firms through mail survey.	Reward system Information technology	Knowledge sharing

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Ladd and Ward (2002)	Organizations with culture traits exhibiting openness to change and innovation and task-centered orientation tended to be conducive to knowledge transfer. Organization with culture traits exhibiting a confrontational and competitive orientation tended not to be conducive to knowledge transfer.	A survey of 1116 people in 23 organizations from United States Air Force was conducted.	Organizational culture	Knowledge transfer
Tsai (2002)	Formal hierarchical structure, in the form of centralization, had a significant negative effect on knowledge sharing. Informal lateral relations, in the form of social interaction, have a significant positive effect on knowledge sharing among units that compete with each other for market share, but not among units that compete with each other for internal resources.	Data were collected from 24 business units in a petrochemical company and 36 business units in a food-manufacturing company. All questionnaire data were collected on site in 1996 and 1998.	Centralization, Social interaction, Inter-unit competition	Intra-organizational knowledge sharing
Robertson, Hammersley (2000)	People management practices like training and development, reward systems, trust building culture create an organizational environment in which knowledge is willing to share. Information technology was considered as a tool for low-level communication and coordination among people inside the firm.	A longitudinal case study was conducted within Expert Consulting in UK over two-year period between 1996 and 1998. Semi-structured interviews with a cross-section of workforce were conducted.	Reward system, Training and Development, Organizational culture, Information technology	Knowledge Management practice

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Bresman et al. (1999)	The result of the study showed that there is a positive relationship between communications by time elapsed since acquisition and the transfer of technological expertise, and there is a positive relationship between transfer of patents with the articulability of the knowledge, size of the acquired unit, and the regency of the acquisition.	A survey of R&D organizations in 42 multinationals analyzed with OLS and negative binominal regression combines with detailed longitudinal case studies of three international acquisitions.	Nature of knowledge Communication channels Communication frequency Size of acquired units.	Transfer of technological know-how
Cumming (2002)	At least one from each of the knowledge, distance, transfer activities, and recipient context were statistically significantly related to intra-firm knowledge transfer.	This study used the mail-survey questionnaire approach to the sample of 69 technology executives in high-tech large and medium sized companies.	Knowledge articulability, Norm distance, Basic transfer activities, Knowledge distance, Recipient motivation	Knowledge transfer
Simonin (1999)	It is found that the role of knowledge ambiguity (tacitness, asset specificity, complexity, experience, partner protectiveness, cultural and organizational distance) has a significant relationship with the process of knowledge transfer in international strategic alliances.	Cross-sectional sample of 151 multinationals were surveyed.	Knowledge characteristics Experience, Partner protectiveness, National cultural distance	Knowledge transfer process

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Szulanski (1996)	Recipient's lack of absorptive capacity, causal ambiguity, and arduousness of the relationship between the source and recipient are the major impediments to knowledge transfer.	The data were collected from 271 questionnaires spanning 122 transfers of 38 practices in 8 companies.	Absorptive capacity, Arduous relationship, Causal ambiguity	Knowledge transfer
Gupta and Govindaraja (2000)	Results of the study show that (i) knowledge outflows from a subsidiary's knowledge stock, its motivational disposition to share knowledge, and the richness of transmission channels, and (ii) knowledge inflows into subsidiary are positively associated with richness of transmission channels, motivational disposition to acquire knowledge, and the capacity to absorb the incoming knowledge.	Data are gathered from 374 subsidiaries within 75 MNCs headquartered in the US, Europe and Japan.	Motivational disposition, Existence and richness of transmission, Value of the source unit's knowledge stock, Absorptive capacity Industry resource characteristics, Nature of subsidiary's operations.	Knowledge transfer

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
<i>Previous Researches on Relationship between Knowledge Enablers, Knowledge Transfer Process and Organizational Performance</i>				
Yang (2007)	Knowledge sharing would facilitate the transformation of collective individual knowledge to organizational knowledge without the existence of orphaned knowledge and knowledge depreciation. This would result in the advancement of organizational learning and eventually, the enrichment of organizational effectiveness.	Data were collected through a survey based on questionnaire of 457 individuals in nine international tourist hotels in Taiwan. Descriptive statistics and regression analysis were mainly used to analyze the data.	Knowledge sharing, Organizational learning,	Organizational effectiveness
Lee and Lai (2007)	The study provides evidence showing that high technology firms having a clear description of KM strategy, and linking rewards to KM are more likely to pay attention to measurement performance for KM, especially, the performance measurements related to the customer and internal business process perspectives.	A survey on high technology firms in Taiwan was conducted.	Knowledge management strategy, Rewards link to knowledge management	Firm performance
Darroch (2005)	Knowledge acquisition, knowledge dissemination and knowledge responsiveness have direct effect on company's innovation, but only responsiveness to knowledge directly contributes to financial performance.	Data were obtained from a sample of 433 companies in New Zealand having 50 or more employees.	Knowledge acquisition, Knowledge dissemination, Responsiveness to knowledge	Innovation, Performance

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Lee and Choi (2003)	Culture factors (Trust, collaboration, and learning) had a significant positive relationship with knowledge creation process. Centralization had negative impact on knowledge creation process. IT support had a positive impact on knowledge combination. Knowledge creation process has positive relationship with organizational creativity. Organizational creativity positively influences organizational performance at relatively low level.	Data collected through 426 questionnaires from 58 firms operating in manufacturing, service, and financial businesses in Korea were analyzed by using multiple regression techniques.	Organizational culture (Collaboration, Trust, Learning) Organizational structure (Centralization, formalization) IT support	Knowledge creation process, Organizational creativity, Organizational performance
Syed-Ikhsan and Rowland (2004)	There are significant relationships between knowledge sharing culture, availability of knowledge assets and technology, and knowledge transfer performance. Although technology platforms play an important role in developing and sharing knowledge, without the attention to the cultural and organizational context in which people are encouraged to share their knowledge, technology may not be able to stimulate the flow of knowledge.	Data were collected through a survey in a public organization in Malaysia.	Organizational structure, Organizational culture, Information technology	Knowledge transfer performance

Sources	Findings	Sample and Research Methods	Independent Variables	Dependent Variables
Gold et al. (2001)	Knowledge infrastructure (culture, structure, IT) and knowledge process (acquisition, conversion, application, protection) contribute to the achievement of organizational effectiveness.	A survey of 300 business executives was conducted.	Infrastructure capabilities (technology, culture, structure) Process capabilities	Organizational effectiveness

APPENDIX B

LIST OF VINASA'S MEMBERS

No	Name of Companies	Website	Tel
1	Corporation for Financing Promoting Technology	www.fpt.com.vn	04-8560319
2	Computer Communication Company (CMC)	www.cmc.com.vn	04-9721135
3	Harmony Co., Ltd	www.harmony.com.vn	04-6641820
4	High Performance Technology JSC (HiPT)	www.hipt.com.vn	04-2660522
5	Vietnam Data Communication Company (VDC)	www.home.vnn.vn	04-5372754
6	CADPRO Software Development and IT Solution Co., Ltd	www.cadprovn.com	04-8469786
7	Giang Nam ISC Co.,Ltd	www.giangnam-isc.com	04-9430486
8	ICT for Business (ITB)	www.vietsoftonline.com.vn	04-5742023
9	PIACOM	www.petrolimex.com.vn	04-5182072
10	Integra Pacific Joint Venture Co., Ltd	n/a	04- 9437903
11	Hong Nam Computer Communication JSC	www.hncinfo.com	04-7731904
12	Enterprise Software Development and Training Co., Ltd (eDT)	www.edt.com.vn	04-8463856
13	Software Development Company VASC	www.vasc.com.vn	04-9782235
14	Business Software Company (BSC)	n/a	04-5130860
15	Business Information Technology Co., Ltd (BITCO)	www.bitco.com.vn	0989188853
16	Electronics Communication Technology Development Co.,Ltd (ELCOM)	www.elcom.com.vn	04-8359359
17	e-Knowledge Informatics Co., Ltd	n/a	04-2513251

No	Name of Companies	Website	Tel
18	Nhat Vinh E- Commerce Software JSC	www.nvecom.com	04-9720073
19	Advanced Information Technology Corporation (AIC)	n/a	04-9421039
20	Vietsoftware JSC	www.vietsoftware.com	04-9745699
21	Multi-tech Solution Development (MTSD)	n/a	04-2510435
22	Development of HiTech and Trading (DHT)	n/a	04-5115783
23	VIT - INFOTECH Company	www.vitinfo.com	04-2511219
24	VIT - Co., Ltd	n/a	04-8350026
25	Financial and Business Solutions - FBS	www.ebizhot.com	04-7686772
26	Tinh Van Co., Ltd	www.tinhvan.com	04-558 9970
27	Construction Informatics Corporation (CIC)	www.cic.com.vn	04-9761381
28	Software Development and Technology Promotion Company (Misoft)	www.misoft.com.vn	04-9331613
29	MK Technology	www.mk-card.com	04-2662703
30	Niem Tin Co., Ltd	www.ntc.com.vn	04-7222939
31	Hanoi Electronics Corporation (HANEL)	www.hanoisoftware.net.vn	04-8522102
32	AVASYS Vietnam Co.,Ltd	www.avasys.com.vn	04 7719105
33	New Century Soft JSC	www.newcenturysoft.com	04-7164181
34	Sao Mai JSC	www.vn-saomai.com	04-5573876
35	Hanoi Information Technology Solution Co., Ltd	www.hnits.com	04-9760628
36	JSC for Telecoms and Informatics	www.ct-in.com.vn	04-8634679
37	T & V Co., Ltd	n/a	04 5121 548
38	MISA Joint Stock Company	www.misa.com.vn	04-7627 891
39	Informatic Technology and Environment Development Company	n/a	04-5181099
40	The Indochina Professional Training Corporation	www.indochinapro.com	04-8344669
41	Infovision Joint Stock Company	n/a	04-7336 533
42	ISA Informatic Technology Co.,Ltd	www.isa.com.vn	04-7340408

No	Name of Companies	Website	Tel
43	Vietnam Image Partner System	www.vips.com.vn	04-9427720
44	SARA Vietnam JSC	www.sara.com.vn	04-6413761
45	ADCOM Co.,Ltd	www.adcomvn.com	04-7722790
46	VITEC	www.vitec.org.vn	04-2511600
47	Microsoft Representative Office in Vietnam	www.microsoft.com/vietnam	04-8251955
48	FSC Informatic Electronic JSC	www.followmesoft.com	04-8688809
49	Nhat Hai JSC	n/a	04-7332122
50	Pyramid New Technology Trade Corporation (PYTHIS)	www.pythis.com	04-9782747
51	CFTDNET Ltd.	www.cftdnet.com	04 5147370
52	Digital Telecommunication Technology Corporation (DTT)	www.dttvietnam.com	04-9422727
53	Luvina Software Company	www.luvina.net	04-7754999
54	Fujitsu Vietnam Ltd	http://vn.fujitsu.com	04-8313895
55	RunSystem Corporation	www.runsystem.net	04-6408239
56	Esoft Software Solution JSC	www.esoft.com.vn	04-9421586
57	Hanoi Institute of Technology (Hanoi Tech)	www.hanoitech.net	04-5121866
58	Smart Solutions Corporation	www.smartsolutions.com.vn	04-7853952
59	Technology and Media Investment - Development JSC	www.neo.com.vn	04-5729946
60	Cyber Software for Business Management JSC	www.cybersoft.com.vn	04-7847223
61	New Asia Equipment and Automatic Technique Co.,Ltd (NASIA Co., Ltd))	www.nasia.com.vn	04-5624386
62	Aprotrain-Applied Professional Training Corporation	www.aprotrain.com	04-7623654
63	Information Technology Center of Electricity of Vietnam	www.icon.evn.com.vn	04-9741910
64	Lacviet - Nippon Net Technology Ltd	www.business-in-vietnam.com/lacviettravel.htm	04-8239907
65	Freshwind Information Technology Corporation	n/a	04-8535580
66	VNNET Information Technology Solution JSC	www.vnnet.com.vn	04-7624188

No	Name of Companies	Website	Tel
67	EConTech JSC	www.econtechvn.com	04-6340245
68	NEC Solutions Vietnam Co.,Ltd	n/a	04-9333585
69	USOL Vietnam Corporation	www.usol-v.com.vn	04-7556500
70	JV - IT Co., Ltd	www.jv-it.com.vn	04-5574204
71	iNET Media Co., Ltd	http://inet.vn	04-5567888
72	Intelligent Software Joint stock Company	www.intelsoft.vn	04-7910269
73	Vietsoftware International Joint Stock Company	www.vsi-international.com	04-7280366
74	Fast Software Company	www.fast.com.vn	04-7715590
75	HARVEY NASH SDC Viet Nam	www.harveynash-vn.com	04 834 2050
76	Communication and Information Services Company Limited (CIS)	http://www.cis.com.vn	04 2811512
77	TRI -VISION Shareholding Company	www.tri-vision-vn.com	04 7724719
78	Hue Software Development Center	www.huesdc.com	(054)849861
79	Da Nang Software Center	www.softech.com.vn	(0511)810 534
80	Can Tho University Software Center	www.cuscsoft.com	(071)835581
81	Center of Software Engineering of VIMARU	www.vimaru.vn	(031) 828455
82	ASNET Commerce and Informatics Co., Ltd	n/a	(0511)89317 0
83	Software Development Center of Department of Science and Technology of Dong Nai Province	www.dost-dongnai.gov.vn	061 825 564
84	SCOM Software Co., Ltd	www.scomcorporation.com	056 821999
85	Maritime Infomatic and Technology jointstock Company	www.miteco.com.vn	031 383681
86	Vietnam Data Communication Center II	www.saigon.vnn.vn	08-8245525
87	Computer Science Center - University of Natural Sciences HCMC	www.hcmuns.edu.vn	08-8256120
88	Harmony Co.,Ltd	www.harmony.com.vn	08-9303644
89	Gen Pacific Information Technology Company	www.genpacific.com.vn	08-8483255

No	Name of Companies	Website	Tel
90	HPT Vietnam Co., Ltd - HCMC	www.hptvietnam.com.vn	08-8458518
91	AZ Solution JSC	www.azsolution.com.vn	08-9450701
92	TMA Solutions	www.tmasolutions.com	08-9903848
93	Dan Phong Software Solutions	www.danphong.com	08-9252932
94	Vietnam Technology and Development Corporation (TECH CORP)	www.techvn.com	08-8342720
95	Paragon Solutions Vietnam (PSV)	www.psv.com.vn	08-8481788
96	Saigon Telecommunication and Technologies Corp.	www.saigontel.com	08-9322301
97	SilkRoad System Vietnam Co., Ltd.	www.silkroad-net.com	08-8106200
98	MITANI SANGYO Co.,Ltd	www.mitani.com.vn	08-8219442
99	DolSoft Company	www.dolsoftvn.com	08-8443522
100	Fujitnet Co., Ltd	www.fujinet.net	08-8250100
101	Gfk Asia Pte. Ltd	www.gfkasia.com	08-9101383
102	QUANTIC Co., Ltd.	www.quantica.com.vn	08-8204308
103	Global Cybersoft Vietnam	www.globalcybersoft.com	08-9321077
104	ELCA Information Technology Vietnam Ltd.	www.elca.ch	08-8236481
105	Vinh Nam Co.,Ltd	www.vinhnam-dtp.com	08-8121043
106	Sang Tao Corporation	www.sangtao.net	08-8485723
107	Pyramid Software Development Co.	www.psdus.com	08-7155048
108	C.S.FACTORY Co.,Ltd	www.csfactory-vn.com	08-8127150
109	TRG International	www.trginternational.com.vn	08-8236900
110	ICHI Corporation Vietnam Co., Ltd	www.ichi-corp.jp	08-9105734
111	Tân Thuận Export Processing Zone Development Corp	www.tanthuan.com	08-7701777
112	VietnamThink Inc.	www.vietnamthink.com	08-9321005
113	GHP Far East Co.,Ltd	www.ghp-fareast.com.vn	08-7155359
114	Xanh Bie Company Limited	www.xanhbiec.com	08-9491046
115	IACP Asia Co., Ltd	www.iacpasia.com	08 9144368
116	DIGI-TEXX Vietnam Co., Ltd	www.digi-texx.com	08 7155325
117	LHV Software Co.,Ltd	www.lhv.vn	08 9305920

APPENDIX C

QUESTIONNAIRE FOR THE MAIN SURVEY

Dear Sir/Madam,

This study is being conducted by me in cooperation with staffs the Management Consulting and Training Center, CIEM, under the direction of Prof. Dr. Andreas Meier, Dean of the Faculty of Economics and Social Science Studies at the University of Fribourg, Switzerland. The purpose of this survey is to collect information regarding actual situation of the management practices and process of knowledge transfer inside IT companies. Based on collected information, the relationship between management practices, process of knowledge transfer and performance of the company will be examined.

I am interested in your own judgment about management practices (IT tools, organizational culture, organizational structure, incentive systems) and its effects on process of knowledge transfer among organizational members.

The enclosed questionnaire will take you about 15 minutes to complete. This questionnaire contains a number of statements about management practices of the company in which you work. Please kindly response to each of the statements by circling the appropriate numbers that are closest to your opinions or putting a cross in the box, which most accurately fits the extent to which you agree that the statement describes your company. If you are interested, I will be happy to send you a summary of research results after completing this study. Please indicate the request and your contact address in the questionnaire.

The free and frank expression of your own opinion will be most helpful. There is no right or wrong answer to any item in this questionnaire. It is your opinion on each of the statements that matters. The confidentiality of your responses is guaranteed. The results of the study will be aggregated in order to protect the confidentiality of participants and their organization.

Thank your for your kind collaboration!
Sincerely,

Pham Thi Bich Ngoc

Contact address: Faculty of International Education

Room 16, 3rd Floor, Building No 6, National Economics University

207 Giai Phong Road, Hai Ba Trung Dist., Hanoi

Tel: 84 4 6283505, Email: ngocpb@yahoo.com

PART 1: ORGANIZATIONAL FACTORS AND KNOWLEDGE TRANSFER PROCESS

Q1. How are the following types of knowledge important to you or/and your company? Please rate the importance level associated with each of the following knowledge by using this scale: (1: *Not important at all*; 5: *Very important*; N/A= *Not Applicable*.)

	1	2	3	4	5	N/A
Knowledge of management						£
Knowledge of external environment						£
Knowledge of company's culture						£
Knowledge of market						£
Knowledge of technology						£

Information Technology Tools

Q2. Which information system does your company currently use?

£ Paper-based system £ Computer-based system £ Mixed of the two systems

Q3. Which IT tools does your company currently use?

£ Intranet £ Company's website £ Decision support system
£ Email £ Video-conferencing £ Expert system
£ Internal electronic bulletin board £ Internet £ E-library

Q4. How often do you use the following IT tools in the company?

[1=*never*, 2=*occasionally (less than once a month)*, 3=*often (between once a month and once a week)*, 4=*regularly (several times a week)*, 5=*all the time (everyday)*; N/A = *not applicable*]

	1	2	3	4	5	N/A
E-library						£
Intranet						£
Email						£
Company website						£
Video-conferencing						£
Internet						£
Internal electronic bulletin board						£
Decision support system						£
Expert system						£

Q5. How often do you use the above IT tools for following activities?

[1=*never*, 2=*occasionally (less than once a month)*, 3=*often (between once a month and once a week)*, 4=*regularly (several times a week)*, 5=*all the time (everyday)*]

	1	2	3	4	5	N/A
Search for information within department/company						£
Gather information for own interest						£
Publish information that will be of use to others in the company						£
Store information in the database for general access in the company						£
Search for information from sites outside a company						£
Exchange information with others						£

Q6. To what extent each of the following IT tools support the process of knowledge transfer within the company? (1=Little; 2=, 3= Moderate; 4 =; 5=Very much; N/A= Not Applicable)

						N/A
E-library	1	2	3	4	5	£
Intranet	1	2	3	4	5	£
Email	1	2	3	4	5	£
Company website	1	2	3	4	5	£
Video-conferencing	1	2	3	4	5	£
Internet	1	2	3	4	5	£
Internal electronic bulletin board	1	2	3	4	5	£
Decision support system	1	2	3	4	5	£
Expert system	1	2	3	4	5	£

Please indicate your level of agreement with the statements appear in the question 7 to question 20 by using the scale: (1= Strongly disagree; 2= Somewhat disagree; 3= Neutral; 4= Somewhat agree; 5= Strongly agree; N/A= Not Applicable)

Q7. How did the IT tools support the process of knowledge transfer in your company?

	L		K		J	N/A
The knowledge storage capacity is significantly increased	1	2	3	4	5	£
The knowledge transmission capacity is significantly increased	1	2	3	4	5	£
The speed of exchanging information is significantly increased	1	2	3	4	5	£
The accessibility to the wide range and depth of information is significantly increased	1	2	3	4	5	£
The process of exchanging knowledge is more convenient	1	2	3	4	5	£
The location and time constraints in communication is overcome	1	2	3	4	5	£
Overall, the IT tools support a lot for the process of exchanging knowledge among people in the company	1	2	3	4	5	£

Q8. How do you find the level of ease in using company's IT tools for exchanging knowledge with others along following aspects?

	L		K		J	N/A
There is a clear guideline of using IT tools	1	2	3	4	5	£
Interaction with the available IT tools does not require a lot of my mental effort	1	2	3	4	5	£
It is easy to manage the use of available IT tools	1	2	3	4	5	£
Overall, I find the use of the available IT tools easy	1	2	3	4	5	£

Organizational Culture

Q9. Please indicate your level of agreement with the following statements that describe the degree people in your company is encouraged to work in team.

	L		K		J	N/A
People work like they are part of a team	1	2	3	4	5	£
Teamwork is used to get work done, rather than hierarchy	1	2	3	4	5	£

	L		K		J	N/A
When work together as a team, member's task can not finished until everyone in team has finished his/her task.	1	2	3	4	5	£
The work is divided up so that everyone has a part and everyone has to share	1	2	3	4	5	£
When work in a team, the assignment or project can not be completed unless everyone contributes	1	2	3	4	5	£
Interdisciplinary cross-functional teamwork is extremely important for taking decision and solving problem	1	2	3	4	5	£
People from different departments frequently interact to discuss work-related issues	1	2	3	4	5	£
Overall, teamwork is much encouraged	1	2	3	4	5	£

Q10. Please indicate your level of agreement with the following statements that describe the level of adaptability (i.e., attitude toward learning, taking risk and creating change) of people in your company.

	L		K		J	N/A
People view failure as an opportunity for learning and improvement	1	2	3	4	5	£
Innovation and risk taking are encouraged and rewarded	1	2	3	4	5	£
Learning is an important objective in daily work	1	2	3	4	5	£
The way things are done is very flexible and easy to change	1	2	3	4	5	£
New and improved ways of doing works are continually adopted	1	2	3	4	5	£
Overall, people in the company demonstrate a high level of adaptability	1	2	3	4	5	£

Q11. Please indicate your level of agreement with following statements that describe the level of collaboration among individuals in your company.

	L		K		J	N/A
People in the company coordinate with one another in doing tasks very well	1	2	3	4	5	£
Cooperation among employees across different parts of the company is actively encouraged	1	2	3	4	5	£
It is easy to coordinate projects across different parts of the company	1	2	3	4	5	£
Overall, the level of collaboration among individuals in the company is high	1	2	3	4	5	£

Q12. Please indicate your level of agreement with the following statements that describe the degree to which members of your company share goals and tasks.

	L		K		J	N/A
There is a long-term purpose and strategic direction of an organization	1	2	3	4	5	£
There is a clear mission that gives meaning and direction to people's works	1	2	3	4	5	£
People understand and share the same business objectives	1	2	3	4	5	£
People continuously track their progress against stated goals	1	2	3	4	5	£

People understand what needs to be done for a company to succeed in the long run	1	2	3	4	5	£
There is a clear and consistent set of values that governs the way people do business	1	2	3	4	5	£
When disagreement occurs, people work hard to achieve "win-win" solutions.	1	2	3	4	5	£
It is easy to reach consensus, even on difficult issues.	1	2	3	4	5	£
There is good alignment of goals across organizational hierarchy levels	1	2	3	4	5	£
Overall, the level of solidarity in the company is high	1	2	3	4	5	£

Organizational Structure

Q13. Please indicate your level of agreement with the following statements that describe the degree employees in your company are encouraged to participate in the process of making both strategic and operational decisions.

	L		K		J	N/A
Company's top management team determines business strategic plan alone.	1	2	3	4	5	£
Employees at different management levels are encouraged to participate in the strategic decision process.	1	2	3	4	5	£
Employees at different management levels try to achieve consensus about major strategic changes.	1	2	3	4	5	£
Company's top management is involved in optimizing day-to-day operations.	1	2	3	4	5	£
Employees are free to make operational decisions about production, service, and customer-oriented problems.	1	2	3	4	5	£
The strategic decision team and employees make decisions about daily operation.	1	2	3	4	5	£
Employees are free to change things to get better task performance.	1	2	3	4	5	£

Q14. Please indicate your level of agreement with the following statements describe the degree to which the work process of your company are explicitly represented and documented under the form of written policies, rules.

	L		K		J	N/A
The company has many rules and procedures that must be followed during doing jobs.	1	2	3	4	5	£
ISO standard is applied to manage company operation.						
Company's standard operating procedures manuals help employees deal with routine problems.	1	2	3	4	5	£
People must follow formal procedures for non-routine processes.	1	2	3	4	5	£
People can get the information that they need when they face unusual problems without going through channels.	1	2	3	4	5	£
There are no written instructions for doing non-routine tasks in a company.	1	2	3	4	5	£
Employees are allowed to figure out the best way to complete non-routine task.	1	2	3	4	5	£

Incentive Systems

Q15. Please indicate your level of agreement with the following statements about the availability of incentive systems for knowledge sharing in your company.

	L		K		J		N/A
Monetary incentives are provided for individual who has knowledge improvement as a result of exchanging knowledge with others in a company	1	2	3	4	5		£
Monetary incentives are provided for individuals who contribute new knowledge to the company' database	1	2	3	4	5		£
Monetary incentives are provided for individuals who have effectively solve problem as a result of exchanging knowledge with others	1	2	3	4	5		£
Non-monetary incentives are provided for individual who has knowledge improvement as a result of exchanging knowledge with others in a company	1	2	3	4	5		£
Non-monetary incentives are provided for individuals who contribute new knowledge to the company' knowledge repository	1	2	3	4	5		£
Proactive problem solving and problem prevention are recognized	1	2	3	4	5		£

Q16. Please indicate your level of agreement with the following statements, which examine how fair, transparent, opened, group-oriented the incentive system of your company is.

	L		K		J		N/A
People's performances at work are rewarded in an equitable manner.	1	2	3	4	5		£
The incentives people received truly reflect their job performance.	1	2	3	4	5		£
People's involvements in their work group are appropriately rewarded.	1	2	3	4	5		£
Overall, the incentive system is fair enough.	1	2	3	4	5		£
People are able to anticipate and calculate the incentives they can receive in return for their effort and performance.	1	2	3	4	5		£
People understand the criteria used to administer rewards.	1	2	3	4	5		£
People clearly understand what is required of them to get a desired reward.	1	2	3	4	5		£
Overall, the incentive system is clear enough.	1	2	3	4	5		£
People are rewarded more for their skills than for their performance.	1	2	3	4	5		£
Rewards are based more on general criteria of competency than on specific measures of performance.	1	2	3	4	5		£
Rewards are specified only for formal activities.	1	2	3	4	5		£
Overall, the incentive system of the company is flexible.	1	2	3	4	5		£

	L		K		J	N/A
The reward system in the company encourages more group performance than individual performance.	1	2	3	4	5	£
People participate in setting criteria for rewarding performance in work group.	1	2	3	4	5	£
Rewards are based more on group work than on individual work.	1	2	3	4	5	£
Overall, the incentive system is group-oriented.	1	2	3	4	5	£

Intra-organizational Knowledge Transfer

Q17. To what extent do people in your company know how to access to knowledge they need? Please indicate your level of agreement with the following statements.

	L		K		J	N/A
People know place/person where they can find new knowledge	1	2	3	4	5	£
People can access the place/person to gathers knowledge relevant to their works	1	2	3	4	5	£
People can find needed information from company's databases on timely basis	1	2	3	4	5	£
Overall, people know very well where they can access to the needed knowledge	1	2	3	4	5	£

Q18. How do you perceive the volume of knowledge being transferred inside your company?

As a result of the interaction among individuals in the company,

	L		K		J	N/A
Our professional knowledge is significantly enriched	1	2	3	4	5	£
Our knowledge of management is significantly increased	1	2	3	4	5	£
Our knowledge of external environment is significantly increased	1	2	3	4	5	£
Our knowledge of culture is significantly increased	1	2	3	4	5	£
Our knowledge of market is significantly increased	1	2	3	4	5	£
Our knowledge of technology is significantly increased	1	2	3	4	5	£
Overall, the volume of knowledge is significantly increased	1	2	3	4	5	£

Q19. To what extent does the application of the received knowledge result in the changes in people' work behavior? Please indicate your level of agreement with the following statements

	L		K		J	N/A
People usually do a trial experimentation of the new knowledge	1	2	3	4	5	£
The transferred knowledge resulting in improved performance	1	2	3	4	5	£
The transferred knowledge resulting in new way of doing things	1	2	3	4	5	£
The transferred knowledge resulting in new ideas	1	2	3	4	5	£

	L		K		J	N/A
The transferred knowledge resulting in wider thinking	1	2	3	4	5	£
The transferred knowledge resulting in increased ability to solve other problems	1	2	3	4	5	£
Overall, people satisfy with quantity and quality of knowledge being transferred	1	2	3	4	5	£

Company Performance

Q20. All of the indicators given below reflect the performance of your company. Comparing the performance of your company this year with the last two years, Please circle on the appropriate number that best reflect the changes associated with each indicator based on the scale

	L		K		J	N/A
Average return on sale has significantly increased	1	2	3	4	5	£
Annual sale growth has significantly increased	1	2	3	4	5	£
Annual revenue growth has significantly increased	1	2	3	4	5	£
Percentage of profit generated by new products has significantly increased	1	2	3	4	5	£
Market share in primary market has increased	1	2	3	4	5	£
Number of customer's complaints has been decreased	1	2	3	4	5	£
Customer service has been improved	1	2	3	4	5	£
Operational cost has decreased	1	2	3	4	5	£
Employee satisfaction has increased	1	2	3	4	5	£
Rate of employee turnover has decreased	1	2	3	4	5	£
Number of new product has increased	1	2	3	4	5	£
Investment in R&D has increased	1	2	3	4	5	£
The rank of company in comparison with average industry in terms of new product introduction has increased	1	2	3	4	5	£
Overall, the performance of the company has increased	1	2	3	4	5	£

PART 2: BACKGROUND INFORMATION

About your company

Q21. Name of your company:.....

Q22. Year of company's establishment:.....

Q23. Main business area of your company:

- | | |
|---|--|
| <input type="checkbox"/> Software related product | <input type="checkbox"/> Telecommunication service and equipment |
| <input type="checkbox"/> Hardware product | <input type="checkbox"/> Electronic equipment |
| <input type="checkbox"/> IT service | <input type="checkbox"/> Others |

Q24. Your company's ownership:

- | | | |
|--|---|---|
| <input type="checkbox"/> Private company | <input type="checkbox"/> Liability Ltd. company | <input type="checkbox"/> Joint venture company |
| <input type="checkbox"/> Joint stock company | <input type="checkbox"/> State-owned enterprise | <input type="checkbox"/> Others (Please specify)..... |

Q25. *Number of full-time employees in your company:*

£ 1-49

£ 50-99

£ 100-249

£ >= 250

About You

Q26. *Gender:*

£ Male

£ Female

Q27. *Your working experience in the company:*

£ Less than 6 months

£ 7 months -2 years

£ 2 - 5 years

£ More than 5 years

Q28. *Your current working position:*

£ Administrative staff

£ Technical staff

£ Middle manager

£ Senior manager

Q29. *Your contact address:*.....

Tel:.....

Email:

Thank you for cooperation!

Some key terms

In order to ensure that all participants have the same understanding of knowledge transfer practice, the following types of knowledge are defined:

- **Knowledge of management** - Knowledge of the managerial strategies and practices that are used to manage the processes of production, and the operation within a company
- **Knowledge of external environment** - Knowledge of the external business environment in Vietnam. This pertains to Vietnamese government laws and regulations, industrial policies, business procedures, and the political, social and economic environment.
- **Knowledge of company's culture** - Knowledge pertaining to the social norms, values, and beliefs, of employees' such as attitudes, and different communication styles.
- **Knowledge of market** - Knowledge pertaining to the related product and service markets, such as market share, and typical behaviors of local customers.
- **Knowledge of technology** - Knowledge about tools, machines, procedures, and processes involved in producing products or providing services, and the theories and concepts that support them.

