Factors Influencing Knowledge Transfer in ERP System Implementation within Indonesian Small and Medium Enterprises

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Abstract

Enterprise Resource Planning (ERP) systems provide an IT platform with the capability to integrate various business functions both across and within a company. While Indonesian SMEs have recently begun to implement ERP in their operations, the systems remain under-utilised. Authors have recognised that Indonesian SMEs struggle with knowledge-related problems in their ERP system implementation projects, yet research investigating the role of knowledge management to leverage ERP systems in Indonesian SMEs is scarce.

Drawing from the relevant literature of ERP system success measures, knowledge management and user behaviour, particularly the Information System success model posited by DeLone and McLean (2003) and the Knowledge Management System Success Model developed by Kulkarni et al. (2007), this study has developed a research model to examine the role of knowledge transfer process in delivering successful ERP implementation. The original models were modified to include specific constructs and paths deemed appropriate for the current research context. Quantitative surveys were used to collect data from a respondent sample to validate the model. Qualitative case studies were later conducted to explore user perceptions and experiences relating to knowledge transfer in ERP implementation at two selected Indonesian companies.

The study found that the outcomes of ERP system implementation in Indonesian SMEs are predicted by the Effective Knowledge Transfer. The findings also validate Absorptive Capacity, Knowledge Sharing Culture, SME Owner Leadership, Incentives, Consultant Credibility and Knowledge Content Quality as significant antecedents to the factors that lead to the implementation of successful ERP projects. The findings suggest that consulting companies and management support both play a major role in encouraging knowledge transfer activities in ERP system projects. The research model developed in this study is recommended for future research evaluation of knowledge management in ERP system implementation projects.

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Student Declaration

"I, Indra Cahyadi, declare that the PhD thesis entitled 'Factors Influencing Knowledge Transfer in ERP System Implementation within Indonesian Small and Medium Enterprises' is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work".

Signature: ███████████████   Date: 2 March 2016

List of Publications

The following papers have been published from this research project

1. Cahyadi, I. and Zeleznikow, J. 2011, 'Factors influencing knowledge transfer process in ERP system implementation within Indonesian SMEs ', *in The Proceedings of 10th International Research Conference on Quality, Innovation and Knowledge Management (QIK 2011),*Kuala Lumpur, Malaysia, 15 - 18 February 2011.

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Chapter 1 Introduction

1.1. Introduction

Modern companies utilise computerised process and automation in various operational fields ranging from accounting, supply chain management to production supervision. Over the years, modern businesses have been considering Enterprise Resource Planning (ERP) system implementation as a strategic endeavour in the area of information and operation management. The implementation of ERP systems has been acknwoledged as one of the most widely adopted innovations in management information systems (Al-Mashari, 2002) that integrates major business functions both across and within a company (Wylie, 1990) and replaces a legacy systyem with an enterprise application that carries significant business process imprevements (Al-Shamlan and Al-Mudimigh, 2011). The adoption and use of ERP systems have mostly been initiated by large companies. However, the growing trend towards computerisation in the business world and availability of more affordable options of ERP system, in the form of open source software or modular version of complete software, have acted as catalysts for Small and Medium Enterprises (SMEs) to consider investing in ERP systems.

Morevoer, the difficult global economic environment continues to pose more severe challenges for SMEs in Indonesia. In order to increase the competitiveness, capabilities and expansion initiatives, Indonesian SMEs need to implement new technologies that bring efficiencies and innovative ideas to their business practices. Therefore, Indonesian SMEs have started to adopt ERP systems to support their business operations. The available reports from ERP implementation project in Indonesia reveal that Indonesian SMEs acquired ERP system to manage raw material inventory, track work-in-process and record any finished customer orders (Handayani 2008; Mohammad 2007; Sarosa 2007).

While Indonesian SMEs have started to implement ERP in their operations, the systems remain under-utilised in these firms and many are yet to fully experience the benefits of ERP systems. The recent studies of ERP adoption in Indonesian SMEs by Sarosa (2007) and Handayani (2008) reveal that the problems in under-utilisation of ERP come from a considerable knowledge gap between ERP vendors, consultants and recipient companies. The critical role of knowledge for ERP success is also reflected in the broader literature on ERP implementation, where authors generally agree that an

effective knowledge transfer facilitates corporate investment to adopt ERP system, in particular, to capture, elevate and retain ERP system knowledge among their employees (Albadri and Abdallah 2010; Gable, Scott, and Davenport, 1998; Heinze and Hake 2010; Skok and Legge 2002; Soja 2008).

As the optimum utilisation of ERP can deliver significant competitive advantage to Indonesian SMEs, the current study focuses on understanding the concept and importance of knowledge transfer in ERP system implementation projects. This research attempts to investigate various factors influencing the knowledge transfer process and the dynamic relationships between these factors that affect ERP implementation in Indonesian SMEs. With this objective, a widely-accepted Information System success framework called the DeLone and Mclean IS success model (DeLone and Mclean, 2003) and Knowledge Management Success model (Kulkarni, Ravindran and Freeze, 2007) is developed and validated with data collected from questionnaire surveys and case studies. A complete knowledge transfer framework can be developed on the basis of the implications and findings of this research to assist Indonesian SMEs in their efforts to adopt ERP system into their business processes.

1.2. Research background

SMEs can be set up with relative ease without the large capital outlay and business network usually required by big companies. As a result, SME have become a preferred avenue for private individuals seeking to venture into business and entrepreneurship, increase their income and earn respectability in the wider society. This is evident in developing countries where SMEs constitute at least 80% of business and "represent the best hope for generating strong and local economies" (Oyelaran-Oyeyinka and Lal, 2006, p. 9). In Indonesia, data from Biro Pusat Statistik (BPS) or Central Statistical Agency shows that 90% of non-agricultural private sector firms are SMEs primarily concentrated in tourism services and basic manufacturing industries. SMEs play an important role in bringing income growth and boosting national economies. Even though Indonesian SMEs only rate marginally higher than their larger counterparts in terms of their contribution to the GDP growth rate, Indonesian SMEs play a larger role in the economy in terms of providing employment opportunities rather than just being engines for economic growth (Tambunan, 2009).

Information Technology (IT) has now become an important instrument by which modern organisations can develop better flexibility and managerial processes in their business. Indonesian small and mid-size firms are using IT platform to improve their competitiveness, achieve better performance and sustain their business processes in diverse areas, such as marketing support, order processing and communication functionalities. (Sarosa and Zowghi, 2003; Kartiwi, 2006; Sarosa, 2007). It has been suggested that approximately 30% of Indonesian SMEs have implemented IT solutions to support their business activities (Imanullah and Landhika, 2004; Kapoor, M., 2013).

In many cases, the adoption and use of IT, particularly complex software such as ERP system, seem to be initiated by large companies who normally are the earliest adopters of IT innovations. However, since there are now more affordable options of ERP system in the form of open source software or modular version providing basic integration functionalities, SMEs are more inclined to invest in ERP system solution (Koh and Simpson 2005). SMEs can now find a wide range of ERP products such as Alliance Manufacturing, MFG/PRO, WinMan or open source software with lower implementation costs than the full feature products from big software companies, such as Microsoft, Oracle or SAP (ERP Focus, 2013).

Moreover, the introduction and development of globalization, online trade and e-commerce have put some pressures on SMEs. Companies with ERP systems would have better transactional efficiency and communication that improves the firm's overall performance (Bendoly and Kaefer, 2004). Therefore, SMEs are required to transform their business processes to provide accurate and timely information to fulfill their customers' business requirements (Stockdale and Standing, 2004).

Many authors reveal that Indonesian SMEs have started to adopt ERP systems to support their business especially in marketing, inventory management and production order processing functionalities (Handayani, 2008; Kartiwi, 2006; Mohammad, 2007; Sarosa, 2007). By adopting ERP systems, Indonesian SMEs hoped that the systems can improve their competitiveness in global market, cope with rapidly changing market trends and shorten their product life cycles (Handayani, 2008; Mohammad, 2007; Sarosa, 2007).

Since investment in ERP can often be a lengthy and costly process, SMEs should be made aware of the changes in their business processes and the amount of effort

involved in ERP implementation. It is important as well as difficult for Indonesian SMEs owners to understand the measures required to make ERP implementation projects successful. Therefore, a comprehensive knowledge and information on ERP systems would enhance the understanding of SMEs business managers and support their ERP implementation and adoption processes.

1.3. Research problems and questions

ERP systems have ability to provide quick access to quality information, integrate different business functions and improve business performance, but Indonesian SMEs are yet to experience the full benefits of ERP systems. The studies of ERP adoption in Indonesian SMEs by Sarosa (2007) and Handayani (2008) reveal that these problems arise as the consequences of a considerable knowledge gap between ERP vendors, consultants and recipient companies.

In a case study on ERP project implementation in a small furniture company, Handayani (2008) found that the management's lack of knowledge about ERP systems' data requirements, the consultant's incapability to provide technical support and insufficient training materials all combined to seriously delay ERP project completion. In a related study, Sarosa (2007) found that problems concerning management of knowledge were apparent in both the ERP systems vendor and users in an Indonesian SME. The users did not quite understand about the ERP business requirements workflow and the whole business process in that company was slowed down because of it. On the other hand, the vendor was not competent enough to provide adequate support for the users over the ERP project period. Both these factors significantly contributed to the failure of ERP implementation in that company.

Taking a more general view of the situation, Indrajit (2003) asserts that Indonesian people suffer from low "information literacy" or awareness of the importance of information in society, and this often acts as a barrier to people's enthusiasm for IT and increases the difficulty of implementing IT solutions in Indonesian companies. These studies have highlighted situations in Indonesian SMEs that emphasise the need for further investigation focusing on knowledge related factors on ERP system project in Indonesian SMEs.

One of the major barriers challenging SMEs in management of knowledge is the process of knowledge transfer. ERP system implementation is not simply a

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technological process but also related to how dimensions of culture, management and knowledge accommodate the process of implementation (Gosain, 2007). In a similar vein, Pan, Newell, Huang, and Galliers (2001) explained that knowledge is contained and embedded in complex organisational processes, in legacy systems and in external business processes. However, problems may arise when the knowledge recipient does not have sufficient capability to absorb any new knowledge provided by the source of knowledge (Lichtenstein and Hunter, 2008). Furthermore, SMEs may only have limited internal expertise in understanding the concepts of their ERP systems and wholly depend on the consultants' capability to succesfully deliver the ERP projects (Timbrell, Andrews and Gable 2001; Lech 2010; Basu and Lederer 2011). Therefore, it is vital for SMEs to develop systematic methods to recognise and transform their employees' skills, experience and expertise to manage the process of knowledge transfer within their ERP projects. From this context, Indonesian SMEs need to anticipate many issues associated with the process of knowledge transfer that could potentially lead to undesirable results of ERP projects, such as project delay, cost overrun or overall failure implementation. The adopting company is required to develop a robust strategy focussing on knowledge transfer process execution because the process is not an incidental occasion, but a continuous route that runs throughout the ERP system project cycle. All the complications mentioned above require a comprehensive understanding of both the ERP system project and the knowledge transfer process in which it is embedded.

The overall purpose of this research is to evaluate the relationship between knowledge transfer and success of ERP system implementation in Indonesian SMEs. The current study seeks to examine the various factors influencing knowledge transfer that will contribute to both a theoretical understanding of the issues and practical strategies to overcome the obstacles. In order to achieve that objective, this study revolves around developing a research model of knowledge transfer in the context of Indonesian SMEs and ERP system implementation. The main problem guiding the research process in this study is:

How suitable is the Knowledge Transfer model developed in this thesis for predicting the results of ERP system implementation project in Indonesian SMEs?

Building on previous studies conducted on knowledge acquisition needs by different scholars in various contexts, the study develops a conceptual model of Knowledge Transfer Effectiveness/ERP System Success and empirically evaluates this hypothetical model in Indonesian SMEs. The research process is guided by a twofold purpose of identifying the factors influencing knowledge transfer during ERP adoption by Indonesian SMEs and how these findings can be developed into practical strategies for ensuring the success of ERP adoption in Indonesian SMEs. Thus, in order to answer the main question, the study is guided by the following two research questions:

Question 1: What are the factors influencing the knowledge transfer process during ERP implementation projects in Indonesian SMEs?

Question 2: How can the parties involved in the ERP implementation project in Indonesian SMEs utilise knowledge transfer to facilitate and achieve successful outcomes?

Of interest to the current study are the determinants of knowledge transfer in ERP implementation, and verifying whether the factors identified by previous scholars might be useful to this study. After reviewing the literature on the dynamic relationships between ERP Systems, knowledge management and organisational characteristics, the DeLone and McLean's (2003) IS Success Model modified with Knowledge Management System Success framework proposed by Kulkarni et al. (2007) is found to be the most relevant for this study. This model is based on the assumption that specific perceptual factors can lead to certain user attitudes that may play an important part in predicting key users' behavioural intentions in knowledge sharing activities in their company. In order to support this assumption, this study employed measurement scales with proven applicability, validity and reliability in its survey instruments.

1.4. Research methodology

In order to solve the research problem and answer the research questions posed in section 1.3, a specific set of questions and hypotheses are formulated before further investigation in the research objects is carried out. Types of data, methods of data collection and data analysis are selected and applied based on relevant theories and research methodologies which have been extensively verified in the field of IS research. The following paragraphs provide a brief outline of the research methodology employed in this study, whereas a more comprehensive explanation of research design,

constructs and survey administration related to data collection and analysis is discussed in Chapter 4.

The research design in this study is based on a pragmatic paradigm where it allows the utilisation of methods combination to match with the research questions. In pragmatic paradigm, researchers can choose about what question is important and what methods are appropriate for the study (Morgan, 2007). One of the central premises of the pragmatic philosophical reasoning in research is that the mixed of qualitative and quantitative methods would enable researchers to better understand the research problem than the use of either method alone in a study (Creswell and Plano Clark, 2011; Tashakkori and Teddlie, 2003). This study is conducted using a sequential mixed method that includes sequential collection of both quantitative and qualitative data to provide answers to the research questions. Petter and Gallivan (2004) suggested that researchers to follow a mixed approach melding quantitative and qualitative methods to achieve a comprehensive understanding of IS implementation in an organisation.

The research starts with quantitative analysis of relevant knowledge management factors and their relationships to ERP projects success, then continues with semistructured interviews with ERP project members in selected SMEs. As this research is based on information about ERP system project implementation in their firms obtained from key users and team members of Indonesian SMEs, this study assumes that these persons are familiar with the issues with ERP usage in their workplace.

A conceptual framework and hypotheses based on the research questions are identified. The model for this study incorporates the factors in a stratified two-tiered chain of causality where certain knowledge related capabilities are hypothesises to lead to some factors which then result in ERP success (ESUCC). On the first level, Consultant Credibility (CCRED), SME Owner Leadership (OLEAD), and Incentives (INC) are identified as antecedents of Knowledge Content Quality (KNCONT), whereas Absorptive Capacity (ABCAP), Knowledge Sharing Culture (CULT) are identified as leading to Knowledge Transfer Effectiveness (EFKTR). In this respect, OLEAD, INC and CCRED can be regarded as significant factors that meet the employees' needs of certain knowledge content, whereas KNCONT, ABCAP and CULT can be considered as essential factors that influence knowledge transfer effectiveness. Then, these factors

proceed as facilitators for employees to assess the company's ERP system project. Here, SME owner leadership (OLEAD), user satisfaction (USAT) and incentives (INC), along with knowledge transfer effectiveness (EFKTR) are believed to predict the success of ERP system implementation (ESUCC) in Indonesian SMEs. The research model which is developed as the framework of the empirical tests is shown in Figure 3.6.

The quantitative portion of the study involves a statistical analysis of data collected from survey questionnaires. A pilot study was initially conducted on a group of postgraduate students at the School of Management and Information Systems of Victoria University, Melbourne, Australia to ensure that the content of the survey questionnaire was acceptable and to check for its measurement reliability. Following this, two ERP system experts were asked to evaluate and review the instruments in the pre-test survey questionnaire.

The sampling technique employed is purposive sampling. Chapter 4 explains the specifications of the sample obtained in detail. In this study, paper and online surveys were distributed to target participants from the member directories of the Indonesian Ministry of Small and Medium Enterprises and ERP system users' mailing list community. The survey questionnaire consisted of two parts. In the first part of the survey, participants were requested to answer a set of questions on the demographic background of the company. In the second part of the survey, participants were asked to answer a set of questions representing relevant variables and their relationships to ERP success in the proposed model.

Based on the data collected during the quantitative phase of the study, the researcher identified SMEs which had been either been successful or had experienced difficulties in their ERP system implementation projects. The researcher selected two companies, one with a successful ERP project and one that had failed to meet its ERP objective, for the in-depth case studies. Following the results from the quantitative method, the qualitative portion of the study employs interviews and site observations at these selected SMEs to validate the results of the quantitative method.

These interviews and site observations are conducted with the purpose of collecting non-numerical data elaborating subjective perceptions of participants to acquire a deeper understanding of the users and socio-technical contexts of ERP systems within

the selected firms. The office environment where ERP projects took place were observed in order to generate possible concerns for further discussion during the interview sessions. The Interviews consists of semi-structured questions in order to ensure that the ERP project team members and the managers/owners from the selected SMEs answers all the topics discussed during the interview. A comparative analysis of these two cases would help illustrate the different experiences of Indonesian SMEs, and highlight specific organisational practices that are either detrimental or beneficial to ERP success.

1.5. Statements of significance and contributions of this research

In terms of the broader literature, although scholars have posited an array of factors affecting knowledge transfer in ERP projects, there are very few studies that attempt to incorporate multiple factors and hypothesise about their relationships under one model. Further, most of the available researches focus on factors that influence the process of knowledge transfer but do not investigate further into how those factors can affect the success or failure of ERP implementation projects as a whole. A review of the current literature on the implementation of the ERP system indicates that specific studies in such project within SMEs using an analytical model of knowledge transfer in technology are still scarce. This points to a need for developing a comprehensive picture of the complex and dynamic relationship between ERP system success, and knowledge management, internal as well as external organisation factors is required.

The existence of a deep relationship between knowledge transfer and IS implementation is commonly accepted, as is the notion that effective knowledge transfer robustly predicts the outcome of IS implementation, including, employees' intention to use the system and perceived benefits for the organisation (Gable et al. 1998; Jones and Price 2004; Mustonen-ollila and Lyytinen 2004; Mohammed et al. 2009). Although previous scholars have studied the adoption of ERP systems in SMEs (Al-Mashari, Ghani and Al-Rashid 2006; Argyropoulou, Loannou and Prastacos 2007; Loh and Koh 2004; Ramdani and Kawalek 2007; Snider, da Silveira and Balakrishnan 2009), there are still some aspects that need further investigation. Particularly, given the significance of knowledge transfer, these studies have not yet shown how different factors related to transfer of knowledge may significantly affect SMEs in their ERP implementation projects. On the other hand, there are many studies that have investigated the problem and success in ERP implementation projects (Haines and

Goodhue 2003; Jones, Cline and Ryan 2006; Ko, Kirsch and King 2005; Lee and Lee 2000; Park, Suh and Yang 2007; Vandaie 2008; Wang Wang, Lin, Jiang and Klein, 2007). However, these studies are usually conducted in large companies, and knowledge-related issues in ERP implementation within SMEs have barely been observed even though the characteristics of SMEs differ from their larger counterparts.

Lack of awareness, inadequate staff knowledge and insufficient infrastructures have been reported as the main hindrances for IT implementation in SMEs in developing countries (Kapurubandara, Arunatileka and Ginige, 2003). Rajapakse and Seddon (2005) suggested that limited countrywide knowledge of ERP systems is one of the main factors of the low implementation level of ERP systems in developing countries in Asia. These problems may not hold the same significance for SMEs in developed countries. The results of studies on ERP projects, which have mostly been conducted in developed countries, may not be sufficient to answer the problems faced by SMEs in developing countries like Indonesia. In addition, Soh, Sia, Boh and Tang (2002) have suggested that national culture might have an influence on the outcomes of ERP implementation. Indonesian SMEs may still adhere to traditional norms of hierarchy, age, sex or kinship which create major barriers for people with different attributes or backgrounds to share their knowledge. This situation is less prevalent in Western societies where rationalism is put above all else and employees are expected to act according to formal organisational goals.

Furthermore, the majority of studies on Indonesian SMEs focus on issues related to e-commerce, entrepreneurship development and government policy. There appears to be little research emphasising the importance of knowledge transfer in ERP system implementation by SMEs in the Indonesian context. This is a significant gap in the literature given that most small business organisations in Indonesia largely employ people with different educational backgrounds, particularly those with lower educational qualifications, who are likely to be more reliant on knowledge acquisition for using a new technology (Indarti and Langenberg 2004; Kartiwi 2006; Sarosa 2007). Indonesian SMEs may experience difficulties in acquiring sufficient expertise or diffusing knowledge among their employees, so the problems in knowledge transfer currently faced by Indonesian SMEs in their ERP implementation projects need to be recognised.

Research on the use of IT in Indonesia, especially ERP usage in SMEs, has not received adequate attention. The goal of this study is to understand the perceptions of users of ERP system in Indonesian SMEs and efforts in managing their knowledge assets for supporting their ERP system implementation. As the ERP technology is in its nascent stage of adoption in the Indonesian SME sector, the use of such system among their employees is presumed to be voluntarily motivated rather than mandatory organisational policy. Since Indonesian SMEs have just started to implement IS to support their business activities, it is important to understand the current situation of ERP system adoption and examine the implementation strategy of the small and medium firms that this study's sample represents.

This research is also significant because it focuses on how the result of ERP system implementation is predicted from the knowledge transfer process during the project. Given the problems of knowledge deficit in IT implementation in developing countries, a study focussed on knowledge transfer process will bring benefits to ERP system implementation projects in Indonesian SMEs. Focussing on the issue of knowledge transfer could help develop measures to improve knowledge gaps between project stakeholders for a shared understanding of the issue at hand. Indonesian SMEs will be able to fully realise the benefits of ERP systems for their business, once they have acquired knowledge needed to activate and utilise the full range of functionality offered by ERP. The results from this research will also provide guidance for ERP system vendors and consultants in developing better strategies to improve their product acceptance in small business firms in Indonesia.

The overall purpose of this research is to contribute to fill the knowledge gaps identified in the relationship between knowledge transfer and ERP system results in Indonesian SMEs setting. Therefore, the main contributions of this study are:

1) By understanding how different environmental and organisational factors influence knowledge transfer process in an ERP system project, this study contributes to the current literature of ERP system implementation, especially in the context of SMEs.

2) This study extends and synthesises the DeLone and McLean's (2003) IS Success Model with the Knowledge Management model advanced by Kulkarni et al. (2007) into a coherent framework which is then validated in

the Indonesian context. It is expected that the design, data collection and analysis enacted in this research will provide common framework for IS researchers who want to apply similar studies to more broadly areas. If the predictive power of the model is proved it could potentially be used for further studies on ERP success within Indonesia.

3) By determining the factors of effective knowledge transfer in an ERP system project, this study provides practical lessons about knowledge management that might assist Indonesian SMEs and other related parties in their ERP system implementation projects.

1.6. Organisation of the thesis

This thesis consists of eight chapters. This first chapter has served as an introduction to the study by providing a broad overview of the research background and the rationale for the focus of this study in terms of the research problem and research gap. The chapter also touched on the main research questions followed by an outline of research design that guides the investigation of these questions. Finally, the chapter reiterated the importance of the research by making a statement of significance on the need for a better understanding of knowledge transfer in ERP implementation to develop practical strategies for Indonesian SMEs. The remainder of the thesis is organised as follows.

The next chapter delves into a more detailed background underlying the research focus in this thesis. The chapter explains the position of SMEs in the Indonesian economy and the need for IT implementation as a means to modernise their business model and process. This discussion segues into the next section giving an overview of ERP as a business management tool, the benefits and problems behind ERP implementation along with an overview of the current status of ERP usage in Indonesian SMEs. After this preliminary discussion of ERP implementation, the chapter focuses on the issue of knowledge transfer process in ERP system implementation, methods of knowledge transfer generally used in such projects and factors that may influence of the efficacy of knowledge transfer.

Chapter 3 conducts a literature review of the existing theories on IS success to examine the problem at hand and proposes a model of knowledge transfer process by building on these theories. The seminal work done by DeLone and Mclean (1992) in their Information System Success model modified with elements from the Knowledge

Management System model advanced by Kulkarni et al. (2007) is found to be relevant to this research. Because the proposed model extended and modified the original models of D and M IS model in ERP and Knowledge Management system, this chapter cites related studies that support the necessary modifications made to the model. After a discussion of literature, the chapter presents a detailed overview of the final research model and related hypotheses to be tested in this study with individual sections on each hypothesis.

The research methodology used in this study is discussed in Chapter 4. This study follows a mixed method approach that includes a quantitative part based on statistical analysis of survey responses and a qualitative part involving case studies with two firms. The chapter begins with broader questions involving the justification of the research paradigm and the methodologies chosen for the study. This is followed by a section explaining the development of the measurement of scales for each variable from previous literature. Following this, the chapter presents individual sections on the quantitative and qualitative phase of the research, explaining the unit of analysis, data collection and data analysis used in each phase.

Quantitative survey research was taken as the first step in the research process. Chapter 5 presents the results from the data analysis of the quantitative method using information provided by survey participants. Once the survey responses are edited and cleaned, they are checked for normality and reliability. Following this preliminary procedure, the data is examined using a factor analysis technique. The research model and the hypotheses are tested using Partial Least Square (PLS) analysis. The refinement of research model and the results of the measurement and structural model are presented at the end of this chapter.

After identifying two suitable candidates from the statistical analysis, case studies involving semi-structured interviews and site observations were conducted at two Indonesian SMEs. Chapter 6 discusses presents the results from the research conducted in the case studies in some detail. In order to present the case studies in a more systematic and comparative form, the findings of each case study are structured under sections touching on similar issues. Each case study includes a description of the company and its motivation to implement ERP system, the company's experience during ERP system project, the main factors on knowledge transfer process in ERP

system project, and the results of ERP system implementation as perceived by the respondents.

The objective of this study was to identify key antecedents behind successful knowledge transfer process in ERP implementation at participating Indonesian SMEs. The discussion and implications of the results of this study are presented in Chapter 7. To begin the chapter, the first section presents an overview of the research process conducted over the time span of this study. The next two sections contain critical discussion of the results from the statistical analysis of the quantitative surveys and the content analysis of the case studies with an attempt to relate the research questions with the study findings.

Chapter 8 provides a discussion of the implications of this study for academic literature on knowledge transfer process in ERP implementation and practical implications for improving the success rate of ERP implementation in Indonesian SMEs. The chapter continues with a note to the thesis identifying the limitations of the study and suggestions for future research. The last section concludes the research and provides an overview of the chapters in this thesis.

1.7 Limitations and assumptions of this study

There are some limitations and key assumptions identified in this study.

1) This study used perceptual measures from respondents as a variable, which can be quite subjective. Even though this is acceptable in IS research fields, it should be noted that respondent's perceptions of given phenomena may not reflect what happened in reality. Furthermore, the findings of this study are limited to the phenomenon of knowledge transfer process in Indonesia SMEs' ERP system project and their key users. These key users were the core survey participants and have been considered as representative of their respective companies. The justification of this approach is that this study obtained information from these participants in order to address an important goal of validating a proposed model in predicting knowledge transfer effectiveness in ERP system project. Moreover, key users are usually employed in study of ERP system implementation and responsible for getting the ERP system working (e.g. Haines and Goodhue, 2003; Wu and Wang, 2007).

2) Because there are few Indonesian SMEs implementing ERP systems, data analysis in this study is conducted on a small sample size which can lead to a generalisation issue. More Indonesian SMEs are expected to implement ERP system solutions in the future and develop different strategies in managing knowledge assets on their ERP system project. Therefore, this study's findings may need to be tested to larger sample of Indonesian SMEs from different industry sectors beyond timeframe considered in this study.

3) This study's findings are limited to the proposed research model and only applicable in the limited context of ERP implementation in Indonesian SMEs. Results of this study may not be relevant to other Asian countries, because the research model and its entirety may not be generalised or used to assess knowledge transfer process in SMEs from other countries. Hawking (2007) analysed about ERP implementation in Asia and indicated that differences in language, currency and culture make ERP implementation issues different from country to country.

Therefore, improvement and refinement of the research model may be made by incorporating other untested variables apart from the conceptualised variables included in the model. This study encourages the application of other IS success theories as the foundation of a research model that can explain the results of ERP system project with regards to Indonesian SMEs efforts in knowledge management. Also, it suggests that future research in this topic should consider actual characteristics of employees in other countries than Indonesia in order to obtain generalisable findings on the dynamic relationships of the factors being studied.

Several assumptions are made in this study in order to address the aforementioned limitations.

1) By obtaining information mostly from key users and team members of Indonesian SMEs ERP system project, this study assumes that they understand the reality of such project in their workplace. The view that these users are considered as the important parts of the knowledge transfer process in ERP system project supports this assumption.

2) This study assumes that a considerable number of Indonesian SMEs have implemented ERP system to support their business. For this reason, the sample framework for this research was gathered from the Indonesian Ministry of

Cooperative and SMEs companies' database and ERP system users' mailing list community. In addition to traditional channels of collecting data from the survey samples, email and internet-based approach were implemented in order to obtain a larger sample size. Further, questionnaire in the web-based or mail-based approach were designed as to avoid response bias, reduce the amount of incomplete surveys and increase the response rates.

3) This study assumes that the knowledge transfer process has occurred in Indonesian SMEs' ERP system project. Indonesian SMEs have initiated particular strategies that promote knowledge transfer to obtain positive perceptions from their employees towards the project. Therefore, the study assumes that a knowledge management model is applicable in this setting. In order to support this assumption, this study employed measurement scales with proven applicability, validity and reliability in its survey instruments. It is expected that the design, data collection and analysis enacted in this research will provide common framework for IS researchers who want to apply similar studies to more broadly areas.

1.8. Summary

This chapter has presented as an introduction to provide a broad overview of the thesis. The main research problem along with its related research questions has been discussed. Following this, it provides justifications and contributions of the study. Next, it briefly describes the research design employed in this study and the organization of the thesis to address the main research problem. Finally, it has outlined the possible limitations of the study and identified some assumptions made to address those limitations. The next chapter discusses the relevant theoretical backgrounds underlying the thesis.

Chapter 2 Literature Review

2.1 Introduction

The focus of this study is on the factors influencing knowledge transfer during Enterprise Resource Planning (ERP) system implementation projects in Small and Medium Enterprises (SMEs) in Indonesia and the effects of the knowledge transfer process on the outcome of ERP system implementation. This chapter provides an overview of the research background to familiarise the reader with the context and the issues underlying the thesis.

The chapter begins with an overview of SMEs and their management strategies in relation to their efforts to adopt IT system in their operations, with a particular focus on the context of Indonesian SMEs and their governing laws and regulations. This is followed by a discussion of ERP system including its definition, potential benefits and problems in implementing ERP system. This overview of ERP system serves to lay the groundwork for the second section of the review, which discusses knowledge transfer process in ERP implementation projects along with the methods and factors influencing such knowledge transfer.

2.2 IT implementation and SMEs

SMEs need accurate, rapid and relevant information to improve their business process. IT can be an effective tool for SMES to improve their efficiency in decision making process, resources planning, organising, staff administration and business activities. This section is comprised of two parts, the first one delves into a background on SMEs and the second one on IT implementation in SMEs.

2.2.1 Defining SMEs

Many countries endeavour to promote their SME sector in order to revitalise and increase their contribution to economic development (Ramsey, Ibbotson, Bell and Gray, 2008). In many developing countries, SMEs are considered a vital part of the economy especially as a means of tackling high unemployment rates. SMEs provide a viable avenue for people to venture into entrepreneurship without needing extensive technological backup or financial resources needed by large companies. This not only generates source of income for entrepreneurs but creates employment opportunities for people employed in these SMEs. Therefore, SMEs play an important role in developing

economies in creating more jobs, reducing poverty and fostering economic growth (Hallberg, 2000).

Generally, SME definitions are commonly based on a set of measurements such as, number of workers, amount of assets, and/or annual sales turnover. But there are some disparities in the manner in which multilateral institutions and countries have advanced their definitions of SMEs. The International Finance Corporation under the World Bank defines an SME as a small company with less than 250 employees, total revenues of US$ 15 million and US$ 15 million worth of assets. The Australian government refers to SMEs as small businesses, but there is no formalised definition of what it is, although the number of employees is often used as the common indicator of business size classification by different government agencies. The Australian Bureau of Statistics classifies a small business as a business entity with zero to 19 employees, while a firm with 20 to 199 is considered as medium-sized business (Australian Bureau of Statistics 2002). In addition, Fair Work Australia defines a small business entity as a firm with less than 15 staff (Fair Work Australia 2010).

The situation is not any different in developing countries where governments employ a wide array of methods to classify the size and scope of SMEs in their economy. Gibson and Van Der Vaart (2008) proposed a formula based on annual sales turnover data for identifying SMEs in developing countries, while Kushnir (2010) suggests that governments and agencies in developing countries should adapt the parameters of annual sales turnover and/or number of employees to specific conditions in their country. For instance, the Thai government categorises their SMEs as independent firms which employ less than 200 workers and has a fixed capital of less than Baht 200 million (around US$ 6 million), excluding land and properties, while Malaysia defines its SMEs as firms with less than RM 25 million (about US$ 7,4 million) and 150 employees. Pandey (2007) claims that although definitions of SMEs vary across different Asian countries, they share a similar pattern in their classifications, where the vast majority of SMEs are relatively small and over 95% of them have less than 200 employees.

There are several definitions of SMEs given by different government agencies and ministries in Indonesia. The Indonesian Law on Small Enterprises Number 20 of 2008 defines a small enterprise (SE) as a business unit with total initial assets of up to Rp. 200 million (about US$ 20,000 at current exchange rates), not including land and

buildings, and an annual value of sales of a maximum of Rp. 2.5 billion (US$ 250,000) (Indonesian Ministry of Cooperatives and SMEs 2008). On the other hand, a medium enterprise (ME) is classified as a business unit with an annual value of sales of more than Rp. 2.5 billion but less than Rp 50 billion (US$ 5,000,000). Ministry of Industry of Indonesia and the Central Statistical Agency (BPS) also incorporate the number of workers as an indicator to classify the size of the company (Tambunan 2009). BPS classifies small businesses as firms with 5-19 employees and medium businesses as business entities that have workforce strength ranging between 20 to 100 people.

Indarti and Langenberg (2004) indicate that most Indonesian SMEs operate within a family-based organisational culture where their managerial positions are both established or inherited within the family circle. Their survey revealed that 97% of their respondent SMEs were either established or inherited from the family circle. According to Sarosa (2007), Indonesian SMEs have a centralistic management style where the owner managers make the final decision in every aspect of organisational activity with minimal or no input from their employees.

Despite the two severe economic crises that struck the country in the past 14 years, the SMEs sector in Indonesia has managed to re-establish itself and progress on a path of steady growth. Latest data from the Indonesian Ministry of Cooperative and Small and Medium Enterprises show that in 2011 there are more 52 million SME units in Indonesia which are projected to grow at an estimated rate of 10% per annum. Further data from the Ministry and BPS show that most Indonesian SMEs are engaged in activities such as agriculture, manufacturing, trade or hospitality, and have contributed 57.9% of the nation's economic growth (Indonesian Ministry of Cooperatives and SMEs 2011).

The SMEs sector in Indonesia is regarded as one of the main drivers of the Indonesian economy. Data from BPS survey in 2006 shows that the SME sector in Indonesia constitutes more than 99.98 per cent of all Indonesian enterprises and employs 96.2 per cent of the total workforce. With respect to the GDP contribution, Indonesian SMEs have recently contributed around 55 per cent to Indonesian GDP (Tambunan 2010). Most Indonesian SMEs are recognised and fostered by the government to reduce unemployment and number of workers within Indonesian SMEs fluctuates widely. This

has prompted Sarosa (2007) to remark that SMEs definition based on number of employees alone may often be irrelevant to study Indonesian SMEs.

While the SME sector in Indonesia is recognised for its contribution to the economy, there are considerable obstacles faced by these companies, especially from the lack of technological infrastructure and business expertise. In this context, Tambunan (2008) cites the need for making Indonesian SMEs more competitive through technological advancement and financial support and refers to a survey conducted by the APEC SME Innovation Center in 2006 to show that Indonesian SMEs have the least competitive index among the 13 APEC member countries. According to Tambunan (2010), Indonesian SMEs share the same predicament as their counterparts in developing countries, in that, while Indonesian SMEs have acquired the capability of producing a wide range of products, only a few of them are capable of manufacturing sophisticated products such as machinery or automobile spare parts. His research shows that the technological capacity of Indonesian SMEs is mostly obtained through linkage with some Foreign Direct Investment (FDI) which sources their supply from various small manufacturers across the country.

Globalization, intense competition from similar companies in Asian regions along with increasing demand for better quality products has prompted Indonesian SMEs to improve their competitiveness to stake a larger share in the world markets. In order to support SMEs in overcoming the obstacles posed by financial and technological deficiencies, the Indonesian Government has launched many programs to help small business owners. The Government passed the Law on Small Enterprises Number 20 in 2008 and established Directorate-General of Small-Scale Industry under the Ministry of Industry and the Office for the State Minister for Cooperatives and SMEs to further support the development of Indonesian SMEs. This is accompanied with numerous programs ranging from technical assistance, subsidised credit schemes, marketing campaigns to industrial clusters establishment. However, scholars have reported that the majority of these programs are quite impractical for SMEs business owners who lack the knowledge base to estimate and understand the impact of such programs for their organisations (Sarosa 2007; Tambunan 2007).

Studies about Indonesian SMEs have revealed that even though government and non-government organisations have offered government-subsidised SME credit schemes,

Indonesian SMEs mostly draw on personal savings, money invested by relatives, or informal credit to establish and support their businesses (Indarti and Langenberg 2004; Tambunan 2009). Previous studies have confirmed that Indonesian SMEs still face many constraints in receiving feasible financial scheme from potential investors, although the Indonesian government and non-government agencies have introduced some initiatives to resolve this problem (Indarti and Langenberg 2004; Indrajit 2003; Tambunan 2009; Utomo and Dodgson 2001).

Tambunan (2009) also found that Indonesian SMEs have some other traits that may distinguish them from their counterparts in developed countries. He found that employees in Indonesian SMEs were not highly educated and not formally trained in their occupation, while many business owners established their businesses to pave their way out of poverty rather than to unleash their spirit of entrepreneurship. So, the major problems faced by Indonesian SMEs relate to difficulty in accessing financial capital, and limited knowledge base of manpower to support SMEs owner initiatives (Indarti and Langenberg 2004; Indrajit 2003; Tambunan 2009; Utomo and Dodgson 2001).

2.2.2 Implementation of IT in SMEs

Nowadays, organisations are required to be flexible, responsive and innovative to survive in an ever changing business landscape. Combs (1995) explains that like their larger counterparts, SMEs need accurate, rapid and relevant information to improve their business process. One of the important components that may improve the responsiveness and flexibility of any organisation is Information Technology. SMEs could use effective information systems to support their decision making process, resources planning, organising, staff administration and business activities in order to better achieve their organisational goals (Hicks 1993).

Currently, there is only a small batch of publications investigating IT implementation in Indonesian SMEs. The available research shows that Indonesian SMEs have only recently begun to embrace the application of IT in their workplace. Kartiwi (2006) finds that Indonesian SMEs have adopted IT in the form of e-commerce technology as a tool to tap into market opportunities that are spread around the Indonesian archipelago. But the author also indicates that most of the Indonesian SMEs are not familiar with e-commerce technology, especially for marketing service and customer transactions. The Indonesian government has supported a national campaign to increase

e-commerce adoption as well as to improve the SMEs awareness of the e-commerce's benefit for their businesses. Her research is in line with a previous study by Sarosa and Zowghi (2003) which revealed that Indonesian SMEs were seeking marketing support and order processing functionalities when they adopted e-commerce. The implementation of IT could help SMEs in managing long-distance relationships with their regional clients or international customers. Sarosa (2007) found that Indonesian SMEs rely on their IT applications to extensively communicate with their international customers who need to regularly check on their ordering progress through the company web site.

However, the promise of organisational efficiency and innovation with the implementation of IT projects often remains unfulfilled as many projects fail in delivering functionality on time and within budget. Since SMEs may spend a larger portion of the sales turnover to invest in IT, SMEs need to be careful before deciding to make such investments. It is necessary to look into factors that will help them arrive at a better understanding of their IT needs and assist SMEs to make the right decision. Literature suggests that there are internal and external factors that influence SMEs decision to implement IT in their business.

Internal factors refer to aspects within the business organisation itself that influence the IT adoption decision made by SME owners. This may be affected by input from their family members, the role of the owner, financial back up and in-house expertise availability. Studies have also identified the support programs from government, demands from supply chain partners, and information gained from external experts as important external factors driving IT acquisition in SMEs.

Internal factors Because most of the small business decisions are made by the owner manager, SMEs depend on the knowledge and experience of the owner in regards to establishing IT usage in business processes (Igbaria, Zinatelli and Cavaye, 1998). According to Romijn and Albaladejo (2000), SME owners' education level, knowledge of recent technology development and willingness to learn new knowledge has a significant effect on the firms' strategies to adopt new technology. A lack of knowledge can hinder SMEs in adopting IT since there is a myriad of choices in the market and SME owners must have adequate knowledge to choose the right IT packages.

The extent of business uncertainty must be considered by SMEs when looking at IT opportunities. Since IT investment requires considerable economies of scale and SMEs expect to gain their return on investments sooner than larger businesses, SMEs have shorter timeframes for developing projects than their larger counterparts (Lange, Ottens and Taylor. 2000). In general, most SME owners invest their own assets to expand their business due to lack of financial back up from financial institutions (Fuller-Love 2006). Lybaert (1998) revealed that SME owners who are supported by adequate financial capital are more likely to adequately implement IT in their business.

In-house capabilities in terms of employee readiness and employee acceptance towards new technology also play a significant role in a SMEs decision to adopt IT. Prior literature suggests that SMEs owners should ensure that their employees are ready and conversant with current IT knowledge before adopting IT for their business (Chapman, James-Moore, Szczygieland Thompson, 2000; Lange et al. 2000). The willingness of their employees to employ IT for business process in their daily tasks should also be a part of the consideration. Caldeira and Ward (2002) suggest that SMEs owner should develop proper training programs for their employees so that they have the requisite skills to support and implement IT adoption projects.

External resources External resources and support are crucial for SMEs since SMEs have fewer resources than their larger counterparts (Sarosa and Zowghi 2003). According to the literature, governments often play a pre-eminent role to drive the adoption of technology and build the technology capability of SMEs. They do so by developing adequate infrastructure, introducing policy and offering incentives to promote SMEs IT development (Tambunan 2009; Utomo and Dodgson 2001). In Australia and New Zealand, Fink (1998) reports that governments had encouraged SMEs to engage in various informal and formal associations in order to assist information transfers to SMEs. Furthermore, recent studies in developing countries reveal that government assistance and policies have significantly increased the IT implementation projects in SMEs. For example, Hourali, Fathian, Montazeri and Hourali (2008) report that the readiness of Iranian SMEs to embrace IT has been boosted by the Iranian government's plan called TAKFA targeting ICT development. In a similar context, Tan, Chong and Lin (2009) explain that the Malaysian government provides policies and comprehensive financial support to reduce IT training costs and simplify IT adoption process for Malaysian SMEs.

IT adoption is also associated with the relationship between SMEs and external experts such as IT vendors or business consultants. Vendors usually seek new market opportunities and propose numerous IT products, after-sales service and training needed in small companies. SMEs tend to rely on consultants or trusted independent experts to inform them on the IT solutions suited to their needs (Foong 1999). Findings of other studies also confirm the significant role of ICT vendor marketing strategy and customer support as an important factor that encourage SMEs decision to implement IT (Caldeira and Ward 2002; Southern and Tilley 2000).

For many SMEs, demand for better service by business partners or customers often provide the impetus for IT implementation. In many SMEs, their supply chain partners have often pushed their decision to adopt IT. Studies about IT adoption in European SMEs reveal that the small firms often decide to implement IT in order to deliver quality service and effective communication to their suppliers and customers (Caldeira and Ward 2002). Argyropoulou et al. (2007) state that the efficiency of ERP system-based communication in supply chains at large enterprises has motivated SMEs to implement ERP application to develop supply networks with their business partners. As noted above, there is range of internal and external factors prompting IT implementation in SMEs, but it must be noted that those factors external to the company (often coming from government policy or customer demand) are often difficult for SME management to control.

2.3 ERP systems

Research on the implementation of ERP systems has attracted the interest of many researchers (e.g. Davenport 1998; Parr and Shanks 2000; Timbrell et al. 2001). The following sections review some main topics related to the ERP system implementation phenomenon and their effects on small and medium firms. Business owners need to understand the business needs underlying their organisation and the functions that the ERP system can provide to address those needs before they decide to invest their money.

2.3.1   ERP system overview

The term ERP stands or Enterprise Resource Planning was originally coined by Gartner Group to describe a group of applications that integrated various business functions both across and within a company (Wylie 1990). Based on the concepts of material

requirements planning (MRP) and its extension, manufacturing resource planning (MRP II), ERP system contains various business applications or software modules for product planning, inventory control, purchasing and distribution, accounting, finance, marketing and human resources management that built around one central database with the ultimate objective of improving data flow across the organisation.

Davenport (1998) described ERP system as complex software that employs single relational database management to integrate data, automate business processes and provide information in real-time manner across internal and external value chains of an organisation. Cox and Blackstone (2004, p. 185) from the American Production and Inventory Control Society define the ERP system as an information system based on accounting technique "for identifying and planning enterprise-wide resources needed to take, make, ship, and account for customer orders". They also explain that ERP relies on complex technical tools using "graphical user interface, relational database, use of fourth generation language, and computer-assisted software engineering tools in development, client server architecture, and open-system portability".

According to Wallace and Kremzar (2001, p. 5) ERP system is an enterprise-wide set of management software "that balances demand and supply, containing the ability to link customers and suppliers into a complete supply chain, employing proven business processes for decision making, and providing high degrees of cross-functional integration". This is useful for managing product flow between organisations that delivers quality customer service and productivity with lower costs and inventories as well as establishes the ground for e-commerce development. As ERP systems have become more popular and widely used in an organisation, additional software modules that extend and enhance the ERP capabilities, such as customer relationship management or business intelligence, can be added to leverage the organisation's ERP system investments (Duplaga and Astani 2001; Chen and Popovich, (2003).

Mabert, Soni and Venkataramanan (2003) found that business managers often expect standardization and simplification from their ERP systems just like other IT implementation but they neglect the fact that ERP systems main goal is to improve the whole business processes and the company's overall productivity. Therefore, they emphasise the importance of viewing ERP system as a business solution of complete integration across organisation's units through "improved workflow, standardization of

various business practices, improved order management, accurate accounting of inventory and better supply chain management" (Mabert et al., 2003, p. 53).

While ERP is an IT platform, its concept may extend beyond merely being a technological instrument to the crux of operation management because computer software and hardware are just vehicles used to achieve a holistic system to manage resources and people in the adopting organisation (Wallace and Kremzar 2001). Kapp (2001) argued that ERP system as a concept should be examined from five different levels; An ERP system can be viewed as 1) a database management system or repository for organisational data, 2) a collection of business modules connected to a central database, 3) philosophy of manufacturing process and not a software application, 4) a business philosophy communication tool, and 5) a knowledge management system. This means that ERP system should be viewed as a philosophy rather than just a software package because it contains a compilation of best business practices and procedures to transform an organisation's business functions (Kapp 2001).

ERP vendors have expanded their market segment to SMEs since almost all of the large enterprises have already implemented ERP systems and the market has become close-to-saturation (Stein and Hawking 2003). As a result, there are now a wide range of ERP products for SMEs to choose from including products dedicated to the SME market. These versions from big vendors or open source ERP softwares developed for SMEs contain fully functional ERP systems adequate for the needs of small businesses with minimal license fee and low overall implementation (Koh and Simpson 2005). According to Shaul (2005), there are many types of ERP systems on the market nowadays and based on the size of the company they cater to, these systems can be classified into 4 tiers:

1. Tier 1 ERP software is meant for large enterprises, usually comprising of globally dispersed and multiple companies, with revenues in excess of $200 million dollars;

2. Tier 2 is for companies with several branches or localised sites and total revenues between $20 million and $200 million dollars;

3. Tier 3 software caters to small or medium corporations, which usually only have 5-30 registered users, with total revenues under $40 million dollars;

4. Tier 4, is a basic accounting system software that can be used by individuals or very small businesses.

ERP vendors are trying to expand their market into different tiers by bringing down implementation cost, simplifying business modules or providing outsourced hosting service. Each ERP system has its own features and advantages, but generally most systems offer the same standard functions. This is meant to allow even a small or medium sised company to experience the extensive functionalities of the Tier 1 software used by large corporations (Singh 2006). IT capability and specific business requirements have pushed further advancements in ERP system technology and ERP vendors have focused on improving technical aspects such as module functionalities, software content. ERP developers focus on further improvement in functions dedicated to general business aspects of maintaining relationships with a variety of stakeholders, creating value with partners, and developing other Business-to-Business alliances.

2.3.2 Benefits of ERP system implementation

Companies implement ERP system in their workplaces to fulfil certain business goals including timely production delivery, accurate cost calculation, better inventory handling, and integrating data across the departments. The idea behind developing the ERP system was to provide businesses with a system that could manage internal and external business resources in an integrated fashion. ERP systems promise some benefits, including, avoiding software development risks (Kelly, Holland and Light 1999), addressing the issues of out-dated legacy systems and providing global competition advantage (Holland, Light and Kawalek 1999) as well as increasing business efficiency (Markus and Tanis 1999).

In the mid-and late-1900s demands of ERP system technology saw a tremendous rise when many large business organisations were preparing to address the Y2K problems generated from their legacy systems. Previous research studies have cited the Y2K glitch and euro conversion issues as the predominant reason behind the acquisition of ERP systems by companies during that period (Sprott 2000; Brown, Vessey and Powell 2000; Parr and Shanks 2000). The business sector also saw a need to adopt a fresh approach to achieve improved standardization in technologies that could integrate data and reduce data errors across organisations.

The existent IS systems were marred with problems of system partition where each department within the organisation tended to separately enter their data and present them in many different formats. Businesses realised that it was becoming increasingly difficult to collect information and analyse situations with the data provided by legacy systems. ERP solutions are designed to unify information which can often be fragmented and scattered across different departments and personnel in large companies, and integrate all the information streaming within a business organisation (Davenport 1998). Because ERP system integrate various business functions under one system and data is put into the system only once, this makes it easier for companies to manage and analyse their business information. Therefore, many companies have implemented ERP systems in order to solve data disintegration and contradictory information problems emerging from disparities in their old systems (Davenport 1998; Markus and Tanis 1999; Parr and Shanks 2000).

The desire to improve business agility and learn better business practices have also encouraged many organisations in their decisions to adopt ERP. Previous studies indicate that business organisations recognised the capability of ERP systems to support their functional activities by delivering more efficient reporting process (Davenport 1998; Parr and Shanks 2000). Further studies report that ERP systems have assisted adopting companies to track actual costs of activities, manage their resources to get better inventory turnovers, reduce material replenishment costs from quality vendors, and deliver quality service that leads to repeat customer orders (Connolly 1999; Parr and Shanks 2000).

With its capability in continuously updating and integrating business process data, ERP system has also emerged as an essential instrument for companies that want to engage more business and thrive in new ventures. In today's emerging market, business organisations are hard pressed to maintain their value chain and to improve their relationship with customers, suppliers and other business partners. ERP systems provided the tool for electronic networking and collaboration that could help maintain complex logistical chains and business relationships. Coupled with internet and telecommunication technology, the adopting companies can expect their ERP system to provide a communication platform that can help retain their current customers and reach new customers and business partners around the world (O'Leary 2000; Parr and Shanks 2000).

2.3.3 Problems with implementing ERP

While recognised for their strengths as integrated software suites that provide automation and integration of main business activities, ERP systems have also been noted for some significant drawbacks. The amount of money and effort invested in ERP implementation may result in failure due to a number of issues that may occur during the adoption process. These issues can be classified into three categories including, process, technical and organisational issues.

The conflict with the business process is one of the main problems of ERP systems. According to Pang (2001), adopting companies need to decide whether they fully adopt the embedded business practices inherent in ERP packages or customise the software to match with the company's existing business process. Many companies choose to implement a minimally customised version of ERP, in order to achieve faster completion time and avoid unnecessary customising or software reprogramming. However, installing a standard version of the system usually turns out to be unsuited to the specific business processes followed in a company.

The non-flexible nature of the standard installation disallows customisation of the ERP package for the individual needs of adopting companies. In fact, companies might have to alter their practices around the software which might put the companies at the risk of abandoning their strategic advantage in their current business process and creating substantial unrest among their employees. On the other hand, the second option of customisation of ERP package around the business process in the adopting company also poses its own problems. In this case, companies will normally be faced with a higher cost in maintenance and upgrades as well as expenditure to meet compatibility problems during customisation. Grosmann and Walsh (2004) state that although it is necessary to adapt ERP system to specific organisational needs, the process of customization can generate a huge long-term cost with contract complications and legal issues.

From a technical perspective, when companies begin to implement ERP systems, they expose themselves to the risk of technical problems in managing transfer of information to ERP due to different capabilities in operating systems, database migration requirements, and lack of interoperability between legacy and new software. In addition, issues relating to vulnerability of network and client server architecture,

and maintenance of complex systems may further complicate the transference. However, these problems can be solved as long as the adopting organisations are well equipped and supported by implementation partners with sound technical skills (O'Leary 2000; Pang 2001). For example, Themistocleous, Irani and O'Keefe (2001) found that integration with existing systems is a serious technical problem and many of their respondent companies followed their consultants' suggestion to install Enterprise Application Integration software to resolve this problem of data migration and system change.

The people, organisational structure, and culture of the company may also raise organisational problems for ERP implementation. Many studies report that a considerable lack of in-house skills and knowledge of ERP systems in the adopting companies have forced adopting companies to rely on the external sources to configure, install and modify the system (Timbrell et al. 2001; Lech 2010; Basu and Lederer 2011). Adopting companies may allocate resources in their ERP project to acquire and assimilate knowledge from external experts but lack they might not have enough absorptive capacity to convert and make use of the knowledge for ERP systems project development. In addition, Sumner (2003) notes that employees engaged in ERP projects tend to leave the organisation during or after finalization phase, which leaves adeficit in the organisation in terms of the experience and knowledge that flows out with these employees. In addition, ERP system projects may also fail because of other organisation-related problems. There might be resistance to change in the organisation where users opt to perform their business activities in old familiar ways. There may also be lack of top management support to properly introduce new business practices and provide sufficient training for the users (Koch 2007; Pang 2001).

2.3.4 ERP in Indonesian SMEs

The available studies in Indonesia show that Indonesian SMEs in the manufacturing sector seem to be aware of the changes needed in ERP adoption and have made a considerable effort to acquire ERP systems. Previous studies (Handayani 2008; Mohammad 2007; Sarosa 2007) revealed that Indonesian SMEs use ERP systems to support their operation management especially in managing raw material inventory, tracking work-in-process and recording finished customer orders. These firms have realised the need to adopt ERP as a solution to cope with rapidly changing market

trends and shortening product life cycles. But it has also been noted that Indonesian SMEs are yet to fully experience the benefits of their implemented information systems. These firms are yet to incorporate ERP packages more cohesively into their business operations, even though the systems are equipped with suitable functions that can assist them in improving their businesses (Sarosa and Zowghi 2005). At this moment, the major problems facing Indonesian SMEs in their efforts to implement information systems are lack of capital and shortage of internal expertise. Apart from the financial limitations, some authors have recognised that Indonesian SMEs also struggle with the knowledge-related problems in conducting and completing their ERP system projects (Handayani, 2008; Sarosa, 2007).

Recognising their knowledge limitations in managing daily business activities, most Indonesian SMEs tend to seek assistance from a consultant company to support them with necessary technical skills for ERP system installation, configuration and modification. As SMEs lack of in-house skills and knowledge about ERP systems, they need to rely on these external sources for assistance to set up their ERP system project (Timbrell et al. 2001; Lech 2010; Basu and Lederer 2011). But due to limited financial resources, SME owners often employ the most affordable consultants even if their credibility and experience is not established. Some ERP vendors and consultants may just apply generic strategies from their implementation handbooks, expecting the management to comply with business models embedded in the system. This created a situation where the ERP system failed to match with the SME's business process, but the vendor was unable to develop an application that could capture and reflect the unique manufacturing process used by the SME.

In a case study examining ERP adoption in a small Indonesian furniture company, Handayani (2008) found that lack of knowledge at the management level about the data required by the system and the consultant's incapability to provide technical support and sufficient training materials combined to seriously delay project completion. She also found that ERP projects in her respondent companies were inhibited by the inability of the SMEs employees to comprehend the given training materials and to provide required technical data. According to Indrajit (2003), E-business solutions in Indonesian firms may be hampered by the low awareness of the importance information among Indonesian people.

In a related study, Sarosa (2007) found one case in which both the vendor and users were faced with problems concerning knowledge-related issues. The ERP system did not match with the SME's business process and the vendor was unable to develop an application that could capture and reflect the unique manufacturing process used by the SME. As the users were unaware of the required workflow of the system being installed, the whole business process was slowed down. He concluded that both these factors contributed to the failure of ERP implementation in that company.

2.4 Knowledge transfer in ERP adoption

Research on the successful implementation of IS has been a constant subject of inquiry in the field of IT. The literature on IS adoption suggests that many researchers have tested the construct of knowledge transfer and found it to have an effect on information technology adoption projects (e.g. Haines and Goodhue 2003; Karlsen and Gottschalk 2004; Skok and Legge, 2002). The use of knowledge management as one of the main instruments for facilitating corporate investment in ERP system adoption, in particular, for capturing and retaining ERP system knowledge among their employees, has been generally accepted. This section focuses on the use of effective knowledge transfer as a key tool for facilitating corporate investment to adopt ERP system, in particular, to capture and retain ERP system knowledge among their employees has been generally accepted. The review is conducted with the aim of applying a specific focus on the literature to distinguish research that has examined the process of knowledge transfer in ERP system adoption. The section also reviews the methods of knowledge transfer identified in past studies and a list of factors that influence the process of knowledge transfer.

2.4.1   Knowledge transfer effectiveness in ERP implementation

Polanyi distinguished the two different forms of knowledge, tacit or explicit knowldege (Li and Gao, 2003). Polanyi (1958) refers tacit knowledge to cognition of 'how to do' that resides within a person's mind, and can be difficult to describe except by that person's performance. Tacit knowledge contains personal experience, cumulated wisdom, institutional knowledge, social lore, and orientations, which are reflected in how a person acts, commits, or involves in a specific situation (Nonaka, 1994). Explicit knowledge, on the other hand, refers to articulated and recorded knowledge embedded in standardised forms of manuals, instructions, database, documents,

drawings or textbooks (Martin and Salomon, 2003). The main characteristic of explicit knowledge is that it can be captured, stored and transmitted easily. However, even though explicit knowledge is made available that does not mean knowledge transfer process will occur.

Knowledge transfer process basically involves transmission and apllication of knowledge (Ko, Kirsch, and King, 2005). Szulanksi (1996) defines knowledge transfer as the communication of knowledge from a source to a recipient so that the knowledge can be absorbed and applied. The most influential research on knowledge transfer is the series of knowledge creation study by Nonaka (1991, 1994; Nonaka & Takeuchi, 1995). Particularly, the knowledge creation studies enable us to understand how knowledge can be converted and how new knowledge may be created.

Between the two forms of knowledge, tacit knowledge is the most challenging knowledge to transfer because naturally it resides in a person's intuition (Polanyi, 1958). Tacit knowledge transpires when a person combines various experiences and analogical reasoning to form new knowledge and refines it for specific or generalised use (Hatsopoulos and Hatsopoulos, 1999). The practices of this person embodies the new and unique knowledge that has been created or acquired through this person's life. Nonaka and Takeuchi (1995) invesigated how tacit knowledge can be acquired through apprenticeships, relationships, and socialisation. Some authors believe that trust and long term relationships between parties improve tacit knowledge transfer process (Chen, Sun, and McQueen, 2010; Sun and Scott, 2005). Mitton, Adair, Mckenzie, Patten, and Perry (2007) found that lack of experience and capacity to assess knowledge evidence, mistrust and resistance against change deteriorated tacit knowledge transfer process.

Explicit knowledge transfer process is more straightforward and less ambiguous for the reason that explicit knowledge can be easily identified, stored and retrieved (Wellman, 2005). Direct communication or attachment between knolwedge source and recipient is not necessiraley required during the knowledge transfer process, because explicit knowledge is embedded in standardised doccuments to refer to the knowledge at their own convenience as many times as they want. Nonaka and Takeuchi (1995) found that explicit knowledge can be transformed into tacit knowledge the process of

internalisation. This is where explicit knowledge is converted to tacit knowledge through a translation of theory into practice.

Research in end user's training for IT implementation projects support the notion that knowledge transfer plays an essential role for successful IT system implementation (e.g. Haines and Goodhue 2003; Karlsen and Gottschalk 2004). This case applies to the implementation of the ERP system as a complex IT product that can be distinguished from other software solutions due to its explicit and inherent business rules which could impose different ways of doing business and bring about culture change in adopting organisations. In the process of ERP implementation, the transfer of knowledge during the projects is considered as one of the significant support factors for ensuring a successful and beneficial ERP project (Haines and Goodhue 2003; Skok and Legge 2002). These scholars argue that the better knowledge of the ERP projects will allow for better training of staff on wider level as a result of being exposed to new knowledge.

The main objectives of knowledge acquisition and transfer in every phase of an ERP implementation project are to leverage the existing knowledge within the adopting organisation and shorten the learning time of ERP projects-related activities. The project delivery should be less-dependent on external support and should be seamlessly integrated with existing business process where there are no abrupt disruptions to impact the project. The adopting company also needs to make sure that the complete documentation of the project is accessible whenever it is needed by team members.

Since ERP systems are expensive, complex, time consuming and difficult to implement, competent external experts are important to increase the likelihood of ERP implementation success. Many organisations lack the personnel with IT expertise to carry out ERP system implementation, and often those organisations acquire the required expertise by hiring consulting companies to guide them through the whole implementation process. Most organisations appoint a third-party implementation partner as their knowledge source who presumably would provide them with in-depth understanding of the ERP systems' ideas, architecture of the ERP systems, the expertise in business process re-engineering or project implementation and the incremental experience from previous ERP projects in other organisations (Li, Liao and Lei 2006).

The process of knowledge transfer involves exchange of knowledge and its application between the knowledge source and its recipient. According to Argote and Ingram (2000, p. 151), knowledge transfer is "a process through which an individual or an organisational unit (e.g., a group, department, and division) is influenced by the experience of another individual or unit which becomes apparent by changes that are produced in the knowledge base or results of the individual or recipient unit". Knowledge transfer in an ERP system implementation must occur in both directions. When the implementation partners fail to capture the adopting organisation's business process and requirements for the system, the ERP system implementation may be deemed as unsuccessful in fulfilling the needs of the adopting organisation. Conversely, even a perfectly-installed ERP system can turn out to be a wasteful investment when the end-users do not understand how to operate the ERP system in their daily activities.

For instance, Hawari and Heeks (2010) in their case study of a Jordanian SME found that ERP systems project in that SME failed due to incompetence of project team members and the ERP consultants. In their cases study on Malaysian SMEs, Goni, Chofreh and Shahran (2011) found that limited knowledge of end-users in understanding ERP and lack of training process during the implementation phase diminished the effectiveness of ERP system in the business process. Upadhyay and Dan (2008) revealed that managers at Indian SMEs were generally hesitant to invest more on employee education and the maintenance of their IT infrastructure, hence, creating further problems during and after implementation of their ERP systems.

According to Haines and Goodhue (2003), there are three different parties involved in ERP implementation projects including, the adopting company (the implementer), the company that built or developed the system (the vendor), and the organisation hired to convey the skills used in assisting the adoption process (the consultant). During the project, each party plays a different role and contributes in a different manner to the overall project. The vendor supplies the software along with documents, implementation guidance and training sessions for the implementer. The consultant provides the technical knowledge and expertise for installing the system, delivering training, and helping business process re-engineering in the adopting company. The implementer is the adopting company which must ensure that its business processes, value chains, culture and employees are ready to receive and use ERP.

ERP projects goes through various processes ranging from knowledge acquisition, knowledge transfer, and knowledge updating. Pan et.al. (2006) applied the phase model of knowledge management to explain the different types of knowledge transfer and knowledge management challenges during ERP implementation project. Their model consists of different phases of agenda formation, design, implementation and appropriation. Agenda formation is the initial phase of the project where the team must acknowledge each member's cognitive abilities and conceptual skills. Then, during the design phase, the project team needs to understand current work processes and legacy systems functionalities as well as the daily routines and procedures in the adopting company. In the implementation phase, the project team starts to recognise the challenges posed by the system user's tendency to compare the new system with the old one, and establish foundations to overcome those issues. Lastly, in the appropriation phase, the project team records the information gathered from the whole project in printed forms and electronic documentation systems on the success of adoption that will then be delivered to the adopting organisation.

Researchers have also studied the different phases of knowledge transfer in ERP system adoption from its delivery perspective. Referring to the work of Kostova (1999), Lee and Lee (2000) separate the knowledge transfer process in ERP adoption into two different phases, implementation and internalization:

1. The implementation phase is described as 'the degree to which the recipient unit follows the formal rules implied by the practice'. Most of the explicit canonical knowledge of ERP systems embodied in business process reference models is transferred during this phase.

2. The next phase called internalization phase is defined as 'the state in which the employees at the recipient unit attach symbolic meaning to the practice'. In this phase, the tacit non-canonical knowledge of ERP systems which represent how employees will effectively perform their functions under the influence of the new strategy, structure or culture initiated by the adopted system.

It is also worth considering the different forms of knowledge acquired during ERP systems project. In project management environments, Koskinen (2004) identifies two classifications of knowledge: explicit vs. tacit and additive vs. substitutive. Explicit knowledge refers to knowledge that can be easily documented, written or transferred

via different kinds of media. Tacit knowledge is more about implicit knowhow that is subconsciously learnt in the process of engaging with the system and it can be difficult to transmit because it mostly comes from experience, attitudes, routines or intuitions. Tacit knowledge transfer occurs when the internal and external project team members acquire the required knowledge to complete complicated tasks, such as documenting business process strategy, installing initial software set-up or reviewing the implementation project stages. The additive vs. substitutive classification is based on whether the knowledge adds or substitutes the existing knowledge base possessed by the project team. Additive knowledge can be easily acquired without help from external parties, but if the team needs to substitute the old knowledge with new knowledge, it would be necessary to collect knowledge elements from different knowledge sources outside.

2.4.2   Methods of knowledge transfer in ERP adoption

The previous section has shed some light on the multifaceted connection between ERP systems and knowledge management. Failure to establish a suitable strategy to leverage the knowledge transfer process in ERP projects will lead to adverse situations when the project ends, such as improper use of the software tools, lack of knowledge to make software configuration changes and, even worse, the ability to execute basic transactions in the software. In order to determine the most appropriate knowledge transfer methods, the involved parties should recognise which kind of knowledge is involved during the whole project timeline.

Companies can provide workshop/seminar, study visit, internship/professional exchange or contacts networking that serve to address the companies' specific requirements of knowledge acquisition. Companies can start preparing manuals and procedures to provide basic information to their employees and index that information to make it easier for them to search and navigate in the future. Adopting the right knowledge transfer tools can facilitate the main objectives of ERP system implementation projects by organising, creating, capturing or distributing knowledge and ensuring its availability for future users (Lee and Lee 2000; Pan et al. 2006).

Lech (2010) mapped the knowledge transfer process from the third-part implementation partners to end-users in three ways, namely through formal training conducted directly by the tutor or the eLearning system, through the system

documentation, on-line guide or other users' help guide which can be studied alone, and by acquiring knowledge of the consultant during the implementation process. These methods mentioned, referred to as knowledge transfer process mechanisms, allow ERP system users to learn new ways of working, to access and integrate old and new knowledge in ERP system design and implementation process.

As mentioned in the last section, knowledge transfer process within ERP implementation projects involves the transfer of explicit and tacit knowledge of technical and business processes between the adopting organisation and its third-party implementation partners (Lee and Lee 2000). While the use of manuals or guides usually deal with transfer of explicit knowledge, it is trickier to assess the transfer of tacit knowledge. Vandaie (2008) observes that the tacit knowledge transfer process during ERP adoption transpires, at best, during the time of interaction between the team-members and external consultants, and also when the company is attempting to retain knowledge of its ERP team members in anticipation of their departure during or after completion of the project.

Tacit knowledge transfer may happen in an informal way, during various occasions such as break time during job training sessions, telecommunications, internet communications or even social gathering events. Gallivan, Spilter and Koufaris (2005) and Vandaie (2008) further state that informal communication between the lead-users and consultants have the same important meaning as classroom training because it produces a stronger social bound among the team members, which ensures the knowledge transfer process within the project. Nevertheless, transferring tacit knowledge which entails close communication between the source and the recipient of knowledge is quite a challenging task, due to its risk of generating conflicts and resistance among employees (Lee and Lee 2000).

External knowledge source acquisition is one of the most widely used strategies by which organisations seek to increase their knowledge capacity. Technical knowledge and business knowledge are explicitly revealed once companies have bought their ERP system package and ERP vendors have organised the implementation guide. In recent years, many well-established organisations are employing the service of external consultants to complement their knowledge acquisition strategies. These methods appear to be based on the assumptions that the adopting company requires as much

knowledge as possible and the consultant company can provide the technical knowledge and business knowledge required. However, relying too much on third-party partners introduces unnecessary project risk as the adopting company might be left without adequate knowledge of the systems.

At this stage, it is compulsory for the implementer or the adopting company to establish an internal team composed of experienced employees with specific knowledge about their department and organisation, who can then be required to be share the system knowledge among team members, end users, top managers as well as the consultant (Haines and Goodhue 2003; Vandaie 2008). The company owners or managers should select employees that have the aspiration and capacity to understand the ERP systems as part of the ERP system team members (Haines and Goodhue 2003; Vandaie 2008). The internal team members should possess the necessary core skill set includes understanding of business processes, business systems analysis skills, and the willingness to further study and learn into the software.

2.4.3   Factors influencing knowledge transfer in ERP implementation

It is a common mistake among the adopting organisations to assume that ERP systems knowledge will somehow be involuntarily absorbed in the business process. Therefore, it is important to understand those factors or barriers that support or hinder knowledge transfer in ERP systems implementation projects.

A framework for this study is developed based on the models proposed by Karlsen and Gottschalk (2004) and Wang et al. (2007). Karlsen and Gottschalk (2004) built a model to evaluate the roles of communication technology, system, company procedures and organisational culture in affecting transfer of knowledge and its magnitude for IT project success. Wang et.al (2007) proposed a model based on knowledge-stock theory to explain the relationships between the adopting firms absorptive capacity, consultant expertise and knowledge transfer effectiveness in ERP implementation, and demonstrate the association between effective knowledge transfer with organizational process of ERP implementation. Those two models are linked because they provide a bigger picture of two major areas of concern in this research which are factors associated with knowledge transfer and role of knowledge transfer in ERP implementation project. The following figure shows the factors influencing knowledge

transfer in ERP implementation identified by Karlsen and Gottschalk (2004) and Wang et al. (2007).
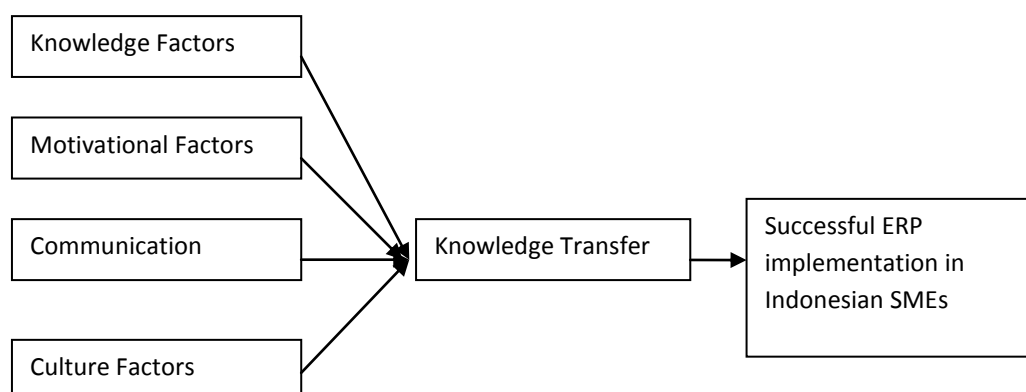
Figure 2-1 Framework of Knowledge Transfer Factors
(Source: Karlsen and Gottschalk, 2004; Wang et al.,2007)

Knowledge is not merely a component of the training given to users while adopting ERP systems, but the ability of trainers to disseminate the knowledge and the users to absorb that knowledge can be a significant factor of ERP success. ERP success is not merely a matter of logistical success in implementation of the technology, but is determined by the way the organisation is able to disseminate knowledge about the usage and benefits of IS among its employees. Timbrell et al. (2001) have argued that knowledge management plays a significant role in evaluating the sources of knowledge transfer problems and solving the most important barriers in ERP system projects.

Organisations need to pay attention to certain motivation factors that can encourage their employees to be involved in the organisations' knowledge management initiatives. Ko et al. (2005) suggest that motivational factor has a significant effect in the knowledge transfer process within ERP system projects. They explain that the motivational factor can be in the form of intrinsic motivation when participants find satisfaction in their work, and/or extrinsic motivation which drives participants' satisfaction by providing incentives or compensation. Motivation factors including reward provision and recognition have been recognised as interventions that facilitate knowledge sharing initiatives in a company (Kim and Lee, 2006; Nelson, Sabatier and Nelson, 2006).

Scholars have identified communication between stakeholders as one of factors in knowledge transfer process in ERP implementation. King (2005) asserts that communication and knowledge exchange between the consultants and lead-users plays

a significant role in ensuring the success of ERP implementation. Ko et al. (2005) argue the need for communication competence to encode and decode messages to accomplish the ERP systems project effectively. Karlsen and Gottschalk (2004) underline the importance of IT as a means for project team members to extend their contact beyond formal communication channels in the form of discussion databases or corporate directories, including discussion groups, newsletters, e-mailing list and web-based documents.

It is also important for the adopting company to understand their organisational culture. The culture of an organisation is the collection of common history, expectations, custom practices and social values that influence behaviour within the organisation. Jones, Cline and Ryan (2004) highlight the importance of cultural factors in organisational change management to facilitate knowledge transfer within ERP implementation projects. They argue that supportive culture in organisational change management and willingness of the employees to share their knowledge may facilitate the knowledge transfer process in ERP implementation projects. Karlsen and Gottschalk (2004) argue that organisational culture influences knowledge transfer in four ways. First, organisational culture shapes the assumption about knowledge worth exchanging. Then, it defines the relationship between knowledge source and recipients. Thirdly, it develops channels for social interaction where knowledge sharing may occur. Finally, it shapes the process of knowledge creation and distribution in the organisation.

2.5 The ERP implementation success measures

In the IS literature, the term "success" can be equated with effectiveness of an IS implementation (Markus and Tanis 2000; Thong, Yap and Raman, 1994). IS can be said to have been effectively implemented in an organisation if the implemented system is able to provide the technological support the organisation needs to better achieve its objectives. The ERP system success measurement itself is an intricate matter because success will be evaluated from different point of views. Therefore, it is important for the involved parties within the ERP projects, e.g. business owners, end-users, consultants, suppliers or customers, to have the same perspective on how ERP implementation success will be measured. Project cost, completion time and system functionality are the common success measures in the project phase. Yet, the traditional

definition of a successful project being one that is established on criteria of cost, time and quality system specifications may no longer be sufficient to measure the results of ERP implementation projects.

Markus and Tanis (2000, p. 247) use the term "optimal success" to assess the success of ERP implementation, which they define as "best outcomes the organization could achieve with enterprise systems, given its business situation, measured against a portfolio of project, early operational, and longer term business result metrics". They proposed a framework to measure the intermediate outcomes of a sequence phases in ERP system projects which they argued would influence the final outcome or the optimal success of the project. Tan and Pan (2002) developed a framework based on their qualitative data to assess ERP systems success by evaluating the technical and strategic value of the implemented ERP systems.

Gable, Sedera and Chan (2003) redefined the dimensions in the original DeLone and McLean IS success model and developed a measurement model for assessing ERP systems success in public sector organizations. They argued that dimensions of System Quality, Information Quality, Individual Impact and Organizational Impact reflect how their respondent companies utilized ERP systems to improve organizational effectiveness. This model has been employed and validated in other studies (e.g. Sedera, Gable and Chan, 2003; Sehgal and Stewart, 2004). Considering the measurement model proposed by Gable and colleague as the most comprehensive ERP systems success measurement model, Ifinedo (2008) attempted to complement the dimensions of success in that model by adding several other factors. He discovered that Workgroup Impact and Vendor/Consultant have relevant implication in ERP systems evaluation and suggested future researches on ERP systems success to incorporate those two factors.

ERP system success measures can be examined from technical factors, such as cost savings, timeliness and project management scales among others, as measurement indicators. In addition, the success of ERP systems may also be associated with objective measures, for instance, inventory cost savings, improved product quality, increase in sales turnover, timeliness of delivery and so on. Yet, obtaining data on these values from any organization is a difficult task, especially from SMEs that still have lack of a decent management administration. Thus, most of the recent ERP systems

success measures researches collect the data from the users' perspective that later can be developed into measures instruments without further difficulty. Sedera et al. (2003) argue that the users' perspective on measurement is an important design factor in ERP system evaluation, because ERP systems involve various users, ranging from data entry operators to top executives, and consist of modular applications installed in diverse business units and functionalities across the organization. Some researchers have used the user's perspective to measure the effectiveness of ERP software (Nelson and Somers, 2001; Somers, Nelson, and Karimi, 2003; Wu and Wang, 2006; Zviran, Pliskin and Levin, 2005). Therefore, this study concurs with the above mentioned literatures that measure ERP system implementation success from perspective of users, to evaluate how adopting companies can utilize the features provided by their ERP systems to support their business.

2.6 Knowledge transfer and ERP implementation projects in Indonesian SMEs

The previous sections have reviewed some main topics related to the ERP system implementation phenomenon and their effects on small and medium firms. In this regard, the literature review has implied that ERP system can be successfully implemented through leveraging users' knowledge. Furthermore, the available studies have provided a picture of how a better knowledge management can aid SMEs that have been struggling with their ERP system implementation. An effective knowledge transfer process along with knowledge quality within ERP projects are expected to play significant roles in predicting the results of SMEs efforts to implement ERP systems.

Knowledge sharing or transfer process has proved to be essential during ERP system implementation projects, in particular in Indonesian SMEs. For the Indonesian SMEs, effective knowledge transfer will enable them to make a huge leap toward gaining benefits of ERP systems to reengineer the way they perform their business processes. With improved knowledge sharing, Indonesian SMEs could form integrated networks of their employees to leverage their knowledge capabilities by leveraging common business procedures, standardizing job classification, and eliminating organization silo inside the firms that hinder the enterprise-wide IS implementation. Moreover, by leveraging knowledge capabilities during the ERP projects, Indonesian SMEs' project team members will likely understand of what is happening with the system and provide more contribution into the project that could lead to wide acceptance of the system from the rest of the employees and the successful implementation of ERP systems.

2.7 Research gaps

In terms of the broader literature, although scholars have posited an array of factors affecting knowledge transfer in ERP projects, there are very few studies that attempt to incorporate multiple factors and hypothesise about their relationships under one model. Further, most of the available researches focus on factors that influence the process of knowledge transfer but do not investigate further into how those factors can affect the success or failure of ERP implementation projects as a whole. A review of the current literature on the implementation of the ERP system indicates that specific studies in such project within SMEs using an analytical model of knowledge transfer in technology are still scarce. This points to a need for developing a comprehensive picture of the complex and dynamic relationship between ERP system success, and knowledge management, internal as well as external organisation factors is required.

The existence of a deep relationship between knowledge transfer and IS implementation is commonly accepted, as is the notion that effective knowledge transfer robustly predicts the outcome of IS implementation, including, employees' intention to use the system and perceived benefits for the organisation (Gable et. al. 1998; Jones and Price 2004; Mustonen-ollila and Lyytinen 2004; Mohammed, Aisyah and Abdullah, 2009). Although previous scholars have studied the adoption of ERP systems in SMEs (Al-Mashari et. al., 2006; Argyropoulou et. al., 2007; Loh and Koh 2004; Ramdani and Kawalek 2007; Snider et al. 2009), there are still some aspects that need further investigation. Particularly, given the significance of knowledge transfer, these studies have not yet shown how different factors related to transfer of knowledge may significantly affect SMEs in their ERP implementation projects. On the other hand, there are many studies that have investigated the problem and success in ERP implementation projects (Haines and Goodhue 2003; Jones et. al., 2006; Ko et. al., 2005; Lee and Lee 2000; Park et. al., 2007; Vandaie 2008; Wang et al. 2007). However, these studies are usually conducted in large companies, and knowledge-related issues in ERP implementation within SMEs have barely been observed even though the characteristics of SMEs differ from their larger counterparts.

Lack of awareness, inadequate staff knowledge and insufficient infrastructures have been reported as the main hindrances for IT implementation in SMEs in developing countries (Kapurubandara, Arunatileka and Ginige, 2003). Rajapakse and Seddon (2005) suggested that limited countrywide knowledge of ERP systems is one of the

main factors of the low implementation level of ERP systems in developing countries in Asia. These problems may not hold the same significance for SMEs in developed countries. The results of studies on ERP projects, which have mostly been conducted in developed countries, may not be sufficient to answer the problems faced by SMEs in developing countries like Indonesia.

Soh et al. (2002) suggested that national culture have particular implications on the outcomes of ERP implementation. They found that misalignments between ERP functionalities and adopting company's requirements can occur when implementing ERP favoured Western business models within an Asian context. In addition, Hawking (2007) found that differences in language, currency and culture across the Asian region make ERP implementation issues different from country to country. Issues may occur from companies' efforts to translate the functionalities of their ERP system into local language because of the system's inability to reflect the level of cultural complexity. In the ERP implementation in Indonesia, for instance, employees tended to have only one name for their naming conventions, whereas the Korea implementation was found that a person's legal name and their titles are very important. Another cultural issue that still exists in many business organisations in Indonesia is the 'Anything that pleases the Boss' behaviour, this practice dictates that employees should say whatever they think will please their superiors and spare their superiors from receiving bad news. In this case, project managers need to understand the problems that affect their projects and check the performance of their team project members' duties more often (Hawking, 2007).

The above studies show how national culture may influence ERP implementation projects. The impacts were often due to ERP logics which differed and conflicted with existing values held by ERP project team members. This is in line with the study of Raboy (1997) and Riis (1997) who suggested that different national culture will likely lead to different results of IS usage. Overall, the prior studies illustrate that national culture issues are considered as crucial. The purpose of this paper is to examine the ERP projects within Indonesian SMEs. By their nature, ERP systems carry their own logical procedures on business processes and organisational structures of the adopting company (Davenport, 1998), therefore it is expected that national culture will determine the perception and have impacts on the development and use of ERP technologies in Indonesia. Indonesian SMEs may still adhere to traditional norms of

hierarchy, age, sex or kinship which create major barriers for people with different attributes or backgrounds to share their knowledge (Oikawa, 2014). This situation is less prevalent in Western societies where rationalism is put above all else and employees are expected to act according to formal organisational goals.

Moreover, the majority of studies on Indonesian SMEs focus on issues related to e-commerce, entrepreneurship development and government policy. There appears to be little research emphasising the importance of knowledge transfer in ERP system implementation by SMEs in the Indonesian context. This is a significant gap in the literature given that most small business organisations in Indonesia largely employ people with different educational backgrounds, particularly those with lower educational qualifications, who are likely to be more reliant on knowledge acquisition for using a new technology (Indarti and Langenberg 2004; Kartiwi, 2006; Sarosa 2007). Indonesian SMEs may experience difficulties in acquiring sufficient expertise or diffusing knowledge among their employees, so the problems in knowledge transfer currently faced by Indonesian SMEs in their ERP implementation projects need to be recognised.

The knowledge about important topics related to the phenomenon of knowledge transfer during ERP system projects in Indonesian SMEs has been obtained. The previous paragraphs include some discussions of these topics that shed some lights on the understanding of the multifaceted connection between ERP systems and knowledge management which have been quite limited.

The literature review has revealed that even though an array of factors affecting the knowledge transfer in ERP projects has been recognized, there are very scant studies that attempt to investigate this phenomenon by including multiple factors and hypothesizing about their relationships under one model. Most of the available researches focuses on factors that influence the knowledge transfer but does not investigates further into how those factors can affect the success or failure in ERP implementation projects as a whole. Therefore, a research to develop a comprehensive picture of the complex and dynamic relationship between ERP system success, and knowledge management, internal as well as external organization factors is required.

Particularly, although many authors have conducted related studies in ERP systems success factors (e.g. Markus and Tanis, 2000; Tan and Pan, 2002; Sedera et.al., 2003;

Sehgal and Stewart, 2004), there are only a few researches that have attempted to explain the ERP projects within Indonesian SMEs. Moreover, research that investigates knowledge transfer process in Indonesian SMEs' efforts to leverage their ERP systems implementation, if it exists, is very difficult to find. The literature review has shown that an effective knowledge transfer process tends to aid firms in their ERP projects, thus the influence of the process in Indonesian SMEs investment in ERP systems is well worth investigating.

2.8 Summary

This chapter has provided a context to the research aims of this study and covered a range of issues, including, a definition of SMEs, IS use in SMEs and an overview of ERP systems, benefits and obstacles to ERP implementation, as well as ERP system adoption in Indonesia. The chapter also explained the central role played by knowledge transfer to argue that ERP system can be successfully implemented by leveraging users' knowledge. This literature review summarizes the theoretical foundations that have utmost relevance to this study and covers some references related to the research topic. The next chapter proceeds to the development of a conceptual model of knowledge transfer in ERP projects for predicting the results of ERP adoption in Indonesian SMEs.

Chapter 3 Research Model and Hypotheses

3.1 Introduction

Chapter 2 examined the broad body of literature associated with the issue of knowledge transfer in ERP system implementation and the relevance of ERP in leveraging the competitiveness of Indonesian SMEs. This chapter presents an overview of research on recent concepts and theories that are relevant for developing a research model for this study. It argues for the relevance of adopting a knowledge management conceptual framework to examine the implementation of ERP systems in the Indonesian context. Next, it presents the conceptual model and explains the hypotheses posited for all the variables in the research model to be evaluated through data analysis.

This study has employed a framework integrating the DeLone and McLean IS (D and M IS) success and Knowledge Management System (KMS) models to investigate ERP system implementation projects in Indonesian SMEs from the context of knowledge management perspective. The early work of DeLone and McLean (1992) on an IS success model is widely recognised as a fundamental theory for examining IS implementation. The theory has been adapted to a range of research contexts examining IS success from the late 1990s to the early 21st century. Based on D and M model of IS success, IS implementation in an organization may result in individual and organizational benefits (DeLone and McLean, 2003). This study investigated the factors and benefits of the knowledge transfer to a ERP system project. Several studies suggest that there are benefits that may result from knowledge sharing behavior (Hendriks, 1999; Lee and Choi, 2003; Tsai, Li, Lee, and Tung, 2011).

In order to provide a more comprehensive model and well suited with the the research objectives, this study proposes to extend the D and M IS success model to include factors that are considered critical to the success of knowledge management initiatives in an organization. In 2007, Kulkarni and his colleagues adapted the D and M IS success model to the knowledge management context to address some of the shortcomings in that model and make it suitable as a model to determine the process of KMS in IS implementation projects (Kulkarni et al. 2007). Since Kulkarnis's KMS model seems to cover most of the issues proposed in the study, the KMS model is adopted, albeit with some modifications.

3.2 Theories related to the research model

This section comprises a literature review of major themes in the development of fundamental theories applied in the study. The section reviews two prominent theoretical fields in IS success, namely, attitude-behaviour theories, D and M IS success model. In addition, a review of several KMS models developed based on D and M IS success model is provided to explore the factors that may be significant to ensure knowledge management success in organisations. Taken as a whole, the design of this literature review is to support the research with relevant theoretical perspectives on ERP system success.

3.2.1   Attitude-behaviour relationship theories

Most modern researchers agree that attitudes are represented in memory and attitudes can have strong effect on behaviour (Fazio 1986). When encountering a new object, individuals can be expected to form attitudes by matching up the new stimuli with information of familiar objects that is already stored in memory. Rosenberg (1960) regards attitude as a predisposition towards some class of objects with cognitive, affective and behavioural responses. Attitude has been conceptualised as manifestations of evaluative processes towards a psychological object portrayed on bipolar scales, such as, pleasant-unpleasant, adequate-inadequate or good-bad (Ajzen 2001). Individuals' evaluative responses towards an object/entity will form attitude which, once formed, will affect those responses when the attitude object is consequently encountered (Eagly and Chaiken 1993).

Many scientists in the social and digital world have analysed attitude as a central feature of their research. Corresponding literature in the field of IS suggests that attitudes towards a computer system, in particular measures of perceived usefulness and comfort, will affect the intention to use the system and the actual use of the system (Zhang and Espinoza 1997). Applying these theories to the ERP context, Boudreau (2002) found that the inclusion of factors relating to learning can explain the acceptance of an ERP system by individual users. Barker and Frolick (2003) assert that end-users who are reluctant or unwilling to adopt or use new systems are frequently cited as the causes behind ERP implementation failures. Since ERP systems are a technological application designed to meet the different requirements of their clients,

an understanding of the attitudes of all respective users would enable more business intervention that leads to increased use and acceptance of the system.

For an ERP system adopting company's employees seeking related knowledge about ERP and its business process reengineering strategy, their evaluations can be based on their current business activities being performed on day-to-day basis. It is assumed that the employees' attitudes are already available in memory and that their expectations of ERP system knowledge are inclined to be unique, including their requirement of specific types of information that are regarded as highly important and deemed as useful for adopting the system in their day-by-day operations. One can expect that the employees will perform related behaviours as a result of attitudes being formed. For instance, when a business owner finds out that a consulting firm has a reputation for being capable of implementing an ERP system, and based on the belief that acquiring ERP system knowledge from the firm's consultant will be straightforward, he or she will dispense a positive value when acquiring such knowledge, which will in turn encourage them to develop positive attitudes towards the consulting firm and its consultants.

The value of the attitude concept assumes that attitudes have significant effect upon behaviours (Olson and Zanna 1993). Several theories of adoption/acceptance based on behavioural intention have been developed and empirically examined, including the theory of reasoned action (TRA) (Fishbein & Ajzen 1975); the theory of planned behaviour (TPB) (Ajzen 1988); the technology acceptance model (TAM) (Davis, Bagozzi, and Warshaw, 1989); and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis and Davis, 2003).

With the aims of explaining and predicting human behaviour, the Theory of Reasoned Action (TRA) was proposed by Fishbein and Ajzen (1975). According to this theory, the evidence of an individual's behaviour is determined by behavioural intention, attitudes and subjective norms. This theory suggests that an individual's attitude is influenced by their beliefs, experiences and feelings of carrying out a specific type of behaviour. As this attitude determines if performing the behaviour is a good or bad thing, it influences the strength of an individual's intention to carry out that behaviour. The behaviour can be expected to occur when an individual has a strong behavioural intention to do it and vice versa. The framework of TRA is shown in figure below.
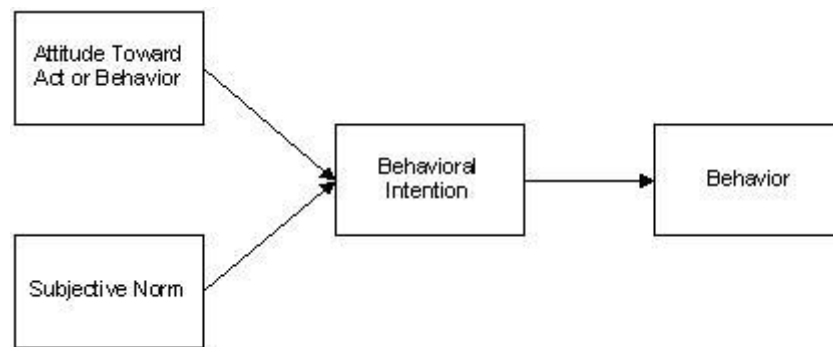
Figure 3-1 Theory of Reasoned Action Framework

(Source: Fishbein and Ajzen, 1975)

Fishbein and Ajzen (1975) proposed that the behavioural intention can be considered as a function of the attitude towards a specific behaviour and subjective norms governing that behaviour. In this theory, subjective norm represents the social point of view which is reflected by whether people important to the individual think about the behaviour. Werner (2004) clarified that the subjective norm refers to 'the individual's subjective judgment regarding others' preference and support for a behaviour'.

Whilst the theory has been widely used to examine a range of consumer behaviour as well as user acceptance of IS (Kanungo and Bagchi 2000; Korzan 2003; Kolekofski and Heminger 2003), in most cases the TRA model have been customised by these researchers to suit the objects being studied. The TRA model has been criticised for neglecting external variables, such as time and social events, which could be related to behaviours in a particular situation and where the subjects being studied have a lack of information and volitional control over their behavioural performance (Sheppard, Hartwick and Warshaw, 1988). Moreover, Davis et al. (1989) found that the variable of subjective norm has not been influential in explaining the variance of user acceptance towards IS technology in the model.

In order to the address the limitation issues of the TRA model, Ajzen (1988) subsequently introduced the Theory of Planned Behaviour (TPB). It was developed on the basis of the original TRA model to incorporate situations where people feel they have limited power over their behaviour. To support this theory, Ajzen (1991) argues that the situations are similar with Bandura, Adams, Hardy, and Howells (1980)'s theory of self efficacy. The theory suggests that an individual's actual behaviour is driven by that individual's confidence about his or her capability to perform a particular behaviour (Bandura et al., 1980; Bandura, 1997). In contrast to the TRA model, TPB

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believes that attitudes towards behaviour, subjective norms and perceptions of control over behaviours affect the individual's likelihood that he or she will perform that behaviour, which together with the perceived behaviour control, will determine the individual's actual behaviour accordingly. The TPB is presented in figure below.
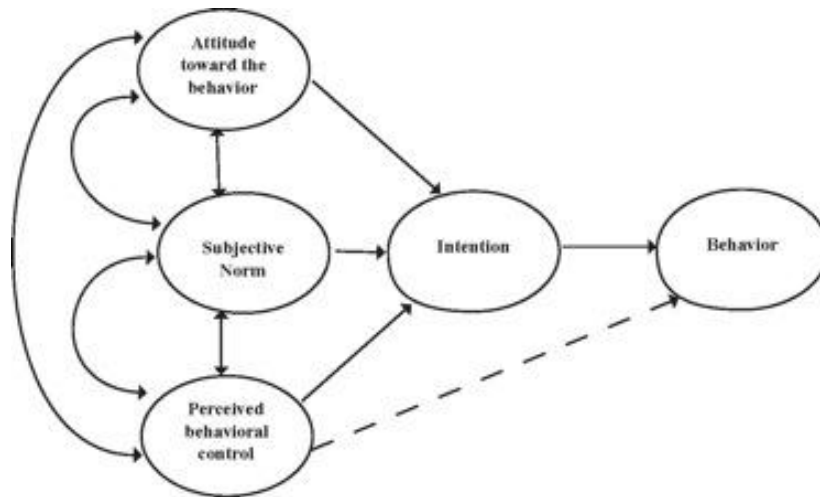
Figure 3-2 Theory of Planned Behaviour Framework
(Source: Bandura et al., 1980; Bandura, 1997)

The TPB has generated a large body of empirical research concerned with the motivations behind human behaviour many fields. These include studies on health-related promotion, such as exercise (Nguyen, Potvin and Otis, 1997), blood donor intentions (Masser, White, Hyde, Terry and Robinson, 2009), obesity factors in Chinese Americans (Liou and Bauer 2007), and research on human behaviour in the business sector, for instance, prediction of entrepreneurial behaviour (Krueger and Carsrud 1993) and intentions to purchase organic produce (Arvola et al. 2008).

In the context of technology adoption in organisations, numerous studies (Cooper and Zmud 1990; Mathieson 1991; Moore and Benbasat 1991) have echoed a similar point, arguing that the TPB measurements of beliefs, attitudes, intentions and behaviour require additional constructs to become a powerful model to predict user acceptance for different technologies and tasks. Although the TPB has been validated in many studies as a theoretical framework that provides a more adequate prediction of a wide range of behaviours, Mathieson, Peacock, and Chin (2001) found that the TPB requires customisation in every context that it is used in. Furthermore, in her review of TPB application in previous studies, Ogden (2003) found that the degree to which these constructs of attitudes, subjective norm and perceived behavioural control can predict

actual behaviour is highly variable. This evidence has guided the evolution of a new framework that aims to predict and explain behaviour in the context of the user's acceptance of technology.

Davis (1989) developed the Technology Acceptance Model (TAM) to focus on user acceptance and usage of IT applications and systems. The TAM model has theoretical similarities with TRA and TPB as it posits that the actual use of a system is a behaviour that can be predicted on the basis of the beliefs and evaluations of the consequences of that behaviour. The TAM framework is presented in figure below.
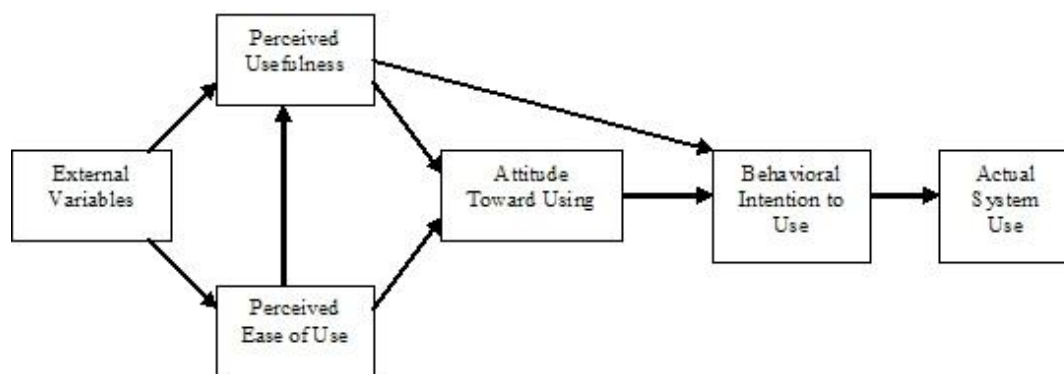
Figure 3-3 Technology Acceptance Model
(Source: Davis, 1989)

However, there are two main differences between TAM and TRA model. Firstly, TAM does not take subjective norms into account in predicting the individual's actual behaviour. Davis (1989) argues that the theoretical status of subjective norms is still uncertain and is considered as the least understood feature of TRA. Secondly, based on several related studies in technology adoption, he identified two constructs of 'perceived usefulness' and 'perceived ease of use', which are argued to be adequate to predict user attitude towards technology use. Davis et al. (1989) explained that perceived usefulness and perceived ease of use are also determined by external variables such as differences between user, situational limitations and controllable management interventions.

TAM has been widely tested and validated as a sound theory which can consistently explain and predict usage intentions and acceptance behaviours of information technology (Adams 1992; Hendrickson, Massey, and Cronan, 1993; Sazjna 1994). However, despite the widespread support, TAM has several limitations. Hierschham

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(2007) compiled series of article that criticize the utility of TAM and others that suggests to go beyond TAM in future adoption research. In the series, Straub and Burton-Jones observed that methodology of relying on self-reported usage data as an instrument to measure actual use of a system, may result in common methods bias. In another article of the series, Babinsat and Barki criticized the model as it is overly focused on the belief perception and ignores the antecedents of its belief constructs. Babinsat and Barki suggest that researchers should consider to expand the core of TAM model to maintain its usefulness in the context of IT adoption. Chuttur (2009) highlighted the paucity of the model and its limited variables for measuring complex situations of IT adoption in the real world. Another limitation is that TAM assumes each technology under review to be completely new for the users and does not account for their own experience when presented with the technology, which is often not the case in reality because most technologies have evolved from previously established ones (Willis 2008).

Driven by a necessity to develop a comprehensive instrument that consolidate the research literature in technology acceptance, Venkatesh et al. (2003) proposed the Unified Theory of Acceptance and Use of Technology (UTAUT). The theory was developed based on elements from eight different technology acceptance models. These models are the Theory of Reasoned Action (TRA), the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), the combined model of TAM and TPB (C-TAM-TPB), the Motivational Model (MM), the Innovation Diffusion Theory (IDT), the Social Cognitive Theory (SCT) and the model of Personal Computer utilization.

Conceptually, UTAUT bears obvious resemblance with TAM and acts as an extension to TAM. The theory takes into account four key constructs that have significant influence on Behavioral Intention to Use and ultimately lead to Usage Behaviour of technology, which play important roles in representing Technology Acceptance. These key constructs are Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Condition. The theory also posits that Gender, Age, Experience, and Voluntariness of Use moderate the relations between the four key constructs and and Intention to Use. Fig 3.4 llustrates UTAUT showing the theoretical constructs, the moderating factors and interrelations between them.
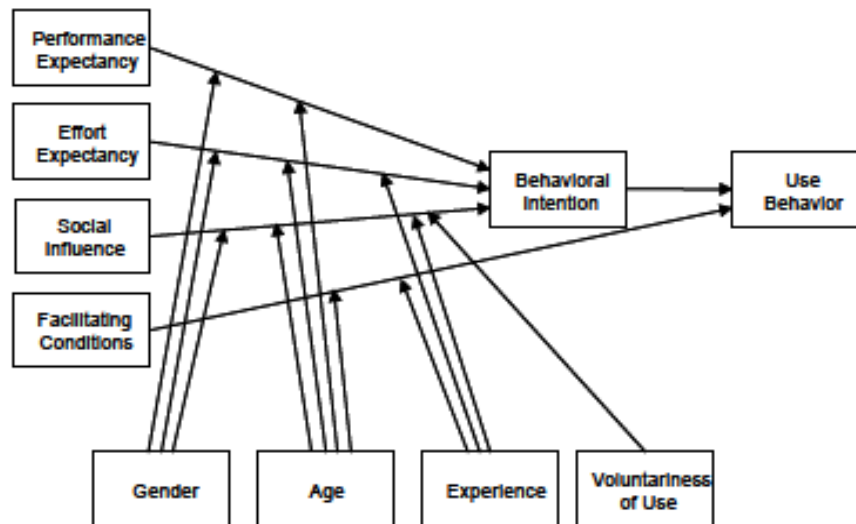
Figure 3-4 The Unified Theory of Acceptance and Use of Technology
(Source: Venkatesh et al., 2003)

While TAM is developed to measure general and volitional use of technology, Venkatesh et al. (2003) designated UTAUT for in an environment where the use of technology is mandatory. It is expected that mandatory use of technology in an organization will support the users to perform their job and increase their job performance. According to Chan et al. (2010), since most IS in organization is mandatory in nature, Performance Expectation variable in UTAUT is suitable to measure the degree by which a user believe that using a particular technology will enhance his or her job performance. Therefore, UTAUT is often employed by researchers to investigate IS implementation in mandatory environment of organizational setting, such as e-government technology (Alawadhi and Morris, 2009; Chan et al., 2010), e-learning (Dečman , 2015) as well as ERP system implementation (Seymour Makanya and Berrangé, 2007).

In general, various researchers have used TRA, TPB, TAM and UTAUT to explain the factors behind the acceptance of technology in IS implementation (e.g. Adams 1992; Alawadhi and Morris, 2009; Hendrickson et al., 1993). Although end-users' acceptance is not equal to success, it is an essential indicator of success in IS implementation. However, these theories do not examine the impacts of IS usage in an organisation.

Early studies of the IS success definition and factors contributing to it were difficult to compare, because of the complexity, interdependent and multidimensional aspects of IS success (Urbach and Müller, 2012). In order to better understand the problem, DeLone

and McLean (1992) conducted an extensive study of research publications from the 1981-1987 periods to determine factors leading to IS success. Based upon their literature review, they identified six primary dimensions of factors for evaluating IS success and proposed IS success model that will be discussed in detail in the next section.

3.2.2 Delone and McLean IS Success model

The work of DeLone and McLean (1992) on IS success model is widely recognised as a fundamental theory in research on IS implementation. In a comprehensive research about factors that influence the success of IS implementation, DeLone and McLean (1992) found that there are many similarities between the results of studies on how IS were adopted successfully. In 1992, DeLone and McLean introduced their model of IS success to explain the possible factors that influence the successful implementation of IS in an organisation. DeLone and McLean Information System (D and M IS) success model has been broadly acknowledged in the domain of IS research, where cognitive evaluation of the interconnections among the complex dimensions of usage, user satisfaction, system quality, information quality, individual impact and organisational impact is believed to influence the perceived results of IS implementation project.

Even though DeLone and McLean did not empirically test their model, their model has been accepted and developed by many researchers through the years. The D and M IS success model can generally be adapted to a range of contexts and has provided a foundation for development of various models examining IS success from the late 1990s to the early 21st century. The D and M IS success model has been applied in studies which have proved that their model can be extended to measure ERP system success. Previous authors have conducted qualitative studies to explore the current state of theoretical literature on IS success in IS research (Petter, DeLone and McLean, 2008; Urbach and Müller, 2012). Petter et. al. (2008) found that there were 180 research studies using the D and M IS success model published between 1997 and 2008. However, it is worth noting two points made by Petter et. al. (2008) for studies utilising D and M IS success model.

   a) First, most researchers have tended to measure individual's perception towards IS implementation, which can be difficult to validate at the organisational level.

b) Second, many of the studies have only investigated a portion of relationships inside the model which may give biased results.

In addition, Urbach and Müller (2012) point out that the D and M IS IS success model is a leading model in the theoretical literature that is capable of explaining how an organisation succeeds in adopting IS. Based on their literature review of the articles published between 2001 and 2010 in the field of IS research, Urbach and Müller believe that as far as the current state of the literature is concerned, the D and M IS success model is still one of the leading theories of IS success measurement. They find that the D and M IS model has been tested in a wide variety of IS types, including e-government, e-commerce, e-learning and other specific business systems (Urbach and Müller 2012).

Due to the popularity of their initial research on IS success model, in their updated model DeLone and McLean (2003) presented an updated IS success model emphasising that the factors that influence IS success are multidimensional and interrelated. They recommended that researchers should investigate and recognise the interrelationships among the involved dimensions during the IS implementation in order to achieve a valid measurement IS success. DeLone and McLean suggested that research on IS measurement requires an established measurement and researchers in this field should consider

a) the nature of the research,

b) the kind of systems being measured, and

c) the organisational context being studied, among other factors.

They observe that the success of IS implementation can be measured in terms of system quality, information quality, usage, user satisfaction, individual impact and organisational impact. Based on their observation, they proposed a concept of the IS success model illustrated in the figure below.
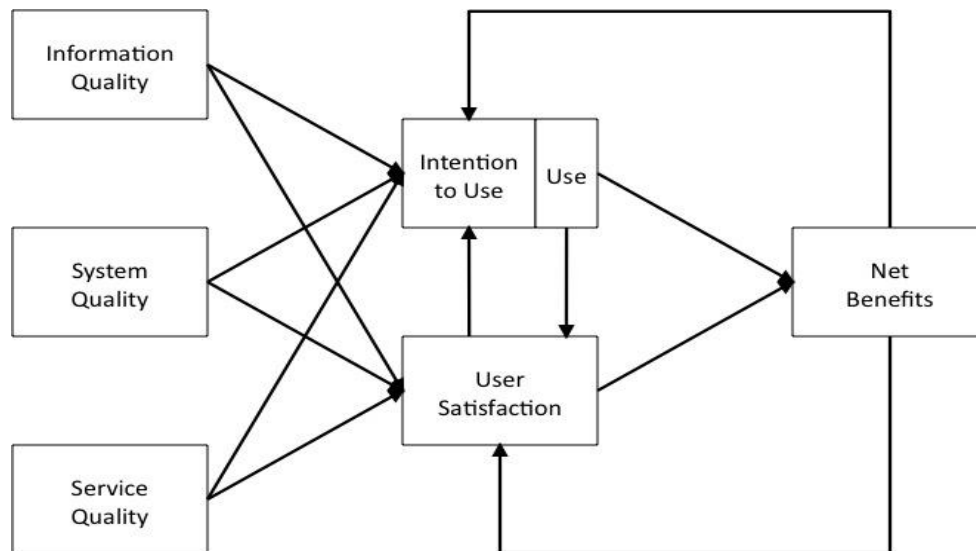
Figure 3-5 DeLone and McLean IS Success model
(Source: DeLone and McLean, 2003)

A number of studies have been carried out to test the factors proposed by the D and M IS success model (e.g. Rai, Lang and Welker, 2002; Seddon, 1997). Most of these researchers have indicated that the D and M IS success model can be modified or extended to match with the context of the research and the expected results. Many have subsequently made additional modifications to the model to expand its purview and improve its predictive power. Seddon (1997) examined the relationship between the D and M IS success model and usage behaviour. He added the construct of user satisfaction in D and M IS success model on the basis that user satisfaction was found to have a significant effect on the perceived benefits of using the systems in the future.

Rai et al. (2002) attempted to validate the D and M IS success model and the modified model proposed by Seddon, and tested their hypotheses about the influence of user satisfaction on IS usage. The findings from the data analysis proved that there was a strong relationship between user satisfaction with behavioural intentions and actual usage of IS technology and provided strong support for their modified structural model, adopted from both the D and M IS success and Seddon models.

Apart from Seddon, some other scholars also developed versions of the D and M model incorporating user satisfaction as a key variable affecting IS success. Schaupp, Bélanger and Fan (2009) employed an adjusted D and M IS success model in their study of e-commerce to examine the influence of the IS information quality on user satisfaction and overall quality of the website.

Bradley, Pridmore and Byrd (2006) added the variable of IT quality and organisational culture into the D and M IS success model to predict the outcome of the IS implementation. They conducted an empirical test which confirmed their hypothesis about the influence of organisational culture in any IS implementation project. They acknowledged that the contribution of the D and M IS success model to the IS field is to provide a theoretical foundation and a set of guidelines for IS research. They argued that organisational factors should be considered as a significant factor in future research on IS adoption. The inclusion of organisation culture by Bradley et al. (2006) was widely acknowledged by other scholars and has contributed significantly to the development and refinement of the D and M IS success model.

Almutairi and Subramanian (2005) assessed IS implementation success in private sector firms in Kuwait by applying the D and M IS success model. Their analysis reaffirmed direct association between the variables of the model. Further, they asserted that the construct of information quality can be employed as important indicator to predict user satisfaction, which will increase individual impact along with the use of IS.

Molla and Licker (2001) proposed an e-commerce system success measurement using the D and M IS model to investigate correlation between e-commerce success and organisational performance. They empirically tested D and M IS success model and their analysis results support the notion that an appropriate adoption procedure is required to predict IS implementation with the existing measurement model.

With the emergence of ERP systems as the leading business system, many authors have also applied D and M IS success model to measure the success of ERP system implementation projects (e.g. Gable et al. 2003; Ifinedo, 2006; Lin, Hsu and Ting, 2006; Zhang, Lee, Zhang and Banerjee, 2003). Gable et al. (2003) redefined the dimensions in the original DeLone and McLean IS success model and developed a measurement model for assessing ERP systems success in public sector organisations. They argued that dimensions of System Quality, Information Quality, Individual Impact and Organisational Impact reflect how their respondent companies utilised ERP systems to improve organisational effectiveness. Individual impact measures the impact of the IS on the individual in the work environment. Organisational impact means the impact of the system on the organisation. System quality measures the technicality of the IS itself. Information quality means the output quality of the IS. All in all, a

comprehensive picture of the success achieved in ERP system implementation is reflected by these four dimensions (Gable et al. 2003). This model has been employed and validated in other studies on ERP implementation (e.g. Sedera et al., 2004; Sehgal and Stewart, 2004; Ifinedo 2006).

Considering the measurement model proposed by Gable and colleague as the most comprehensive ERP systems success measurement model, Ifinedo (2006) attempted to complement the dimensions of success in that model by adding several other factors. He discovered that workgroup impact and vendor/consultant have significant implications for the evaluation of ERP systems. He argued that organisations need a competent partner to manage ERP system projects. Users will use the system effectively and efficiently in fulfilling management goals when the adopting firm is well supported by vendors and consultants. On the other hand, Workgroup Impact means to determine the effect of company-wide or inter-departmental communication that contributes to success of an ERP project. As a result, Ifinedo proposed an extended version of ERP success model developed by Gable et al. (2003) including dimensions of vendor/consultant quality and workgroup impact for future studies on ERP implementation.

In their empirical research on ERP success, Lin et al. (2006) proposed the addition of another variable into the four-dimensional factors of D and M IS success model to determine the impact of individual user on acceptance of ERP systems. The results of their study reveal that user satisfaction plays an important role in the user acceptance of technology and user satisfaction also helps to break through the boundaries of multinational culture, which is often considered as a constraint in the implementation of ERP system projects.

Zhang et al. (2003) adopted the D and M IS success model and Ives' (1980) model of computer-based management information systems to develop an ERP implementation success framework for their empirical study in China. They found that business process change, top management support, education and training programs are the critical success factors for the ERP implementation. In addition, their study confirms that local culture has an important role in the ERP system implementation project in China. They argued that the models from Western countries are applicable in China and suggested that culture must be considered as a unique critical success factor. As the data analysis

results in the study of Zhang et al. (2003) indicates a significant influence of culture on ERP system projects, it is now considered a staple reference for other researchers who are studying the impact of national or organisational culture on the implementation of ERP software.

The D and M IS success model has also been found to be relevant for examining IS implementation in SMEs. Ghobakhloo, Sabouri, Hong and Zulkifli (2011) applied the D and M model to analyse the success factors of IS adoption in the context of SMEs in developing countries. They conducted their research in their home country Iran to test whether the determinants in the D and M model would have a significant effect on IS implementation success in their research objects. The results of their study shows that the user's IT knowledge, user's involvement, top management support and external assistance are significant determinants in the successful IS adoption in the Iranian SMEs. They also found that the successful adoption of IS can be measured from the multidimensional factors, namely, IT usage, user satisfaction, and IT-enabled organisational impacts.

In particular, Armstrong, Fogarty, Dingsdag,and Dimblesby (2005) conducted a study on the benefits of the ERP system implemented in SMEs by using the D and M IS success model modified by Seddon (1997). They used ERP systems technology usage as an indicator to improve productivity, perceived benefits and success probability of ERP systems implementation in SMEs. In their research, they found that users' perceived benefits of IS are positively correlate with user satisfaction of the implemented IS. Based on their results of survey method and statistical analysis, they confirmed their hypotheses that the success rate of computer systems in SMEs needs to be measured on the basis of its success in supporting the SME's business functions. Their research is an important reference for this current study because of the parallels in the objective and contexts of both studies.

All in all, the aforementioned studies are in line with DeLone and McLean's notion that the application of their D and M IS success model requires a careful consideration of the context of the system being studied and the results to be achieved. As the literature review has shown, the D and M IS success model has been acknowledged for its utility in examining IT implementation, in general, and ERP implementation in SMEs, in particular. In light of these suggestions and the review of the literature, this study will

be based on the D and M IS success model while making the requisite modifications validated by previous research.

3.2.3   Knowledge management success model

Knowledge in the workplace is regarded as a valuable resource in an increasingly unpredictable and competitive world. Given the importance of knowledge management in IS implementation, many scholars have conducted research on extending existing models of IS success, particularly the D and M model, leading to the development of newer Knowledge Management Success (KMS) models. These KMS models contend that IS success is not merely a matter of logistical success in implementation of the technology, but is determined by the way the organisation is able to disseminate knowledge about the usage and benefits of IS among its employees. Therefore, organisations need to implement knowledge management with care in order to encourage contributors to answer this challenge and provide quality information to get the desired results from their IS implementation.

In one of the pioneering works on KMS models, Wu and Wang (2006) proposed a model that modified D and M IS success model with the addition of "knowledge quality" as a success measure and two additional factors of "knowledge/information quality" and "system use". They argue that knowledge can be distinguished from information based on context and the users. They verified that knowledge quality has a strong correlation with the perceived benefits, users' satisfaction and system use.

Halawi, McCarthy and Aronson (2007) articulated the same view about knowledge/information quality in the KMS context. They extended the D and M IS success model by adding a factor of knowledge quality to examine the success of IS in the knowledge management domain. They argued that KMS is more than just technology and discussed the role of people and process as well as value of technology to guide the successful implementation of KMS. They investigated the effect of knowledge/information quality and conformed that knowledge quality affects the system use and success of KMS. They suggested that the knowledge reserved inside the KMS should be of high quality and relevant to the firms' business process in order to improve the users' perception of the benefits of using a KMS.

Ko et al. (2005) suggested that knowledge factors, like absorptive capacity and shared understanding affect the capability of ERP project team members to acquire knowledge from their external partners. A shared understanding represents experience and heuristics similarity between knowledge source and recipients (Ko et al. 2005). While knowledge sharing process can be facilitated by IT implementation within organisations, there is no assurance that people will immediately share and utilise their knowledge. Ko et al. (2005) studied knowledge transfer from ERP consultants to an organisation and found that the organisations' absorptive capacity and prior knowledge about ERP systems influence the knowledge transfer between their employees and consultants.

Kulkarni et al. (2007) are credited with developing the most rigorous model based on KMS principles that include a wide range of internal, organisational and external factors to predict ERP usage and success. They modified the D and M IS success model by including various variables of organisational support such as leadership, incentives, co-workers and supervisors, to develop a KMS success. They posit organisational support in form of commitment and support from top management, supervisors, and co-workers, as a significant factor that either directly or indirectly determines the relationship between the organisation and its employees. They argue that the knowledge sharing and usage of KMS are affected by the support and advice coming from senior management, supervisors as well as co-workers.

Kulkarni et al. (2007) also assert that the commitment of the management to providing both monetary and non-monetary rewards can improve employee efforts to share and reuse knowledge. They recommended top management in organisations to carefully set the project objectives and design a reasonable reward system for employees in their KMS implementation projects. Lack of sufficient incentives may lead employees to hoard their knowledge and utilise it as their power source to block the knowledge sharing process.

In an administered survey to a group of 150 midlevel managers of various firms American firms enrolled in universities, they found that perceived usefulness and user satisfaction exert an influence on knowledge sharing and knowledge reuse activities and organisational support leverages the quality and usage of knowledge. In the field of IS, user satisfaction is the assessment of the user's experience on the whole and

individual's affective reaction after the user accesses the system. Failure of the knowledge validation process, lack of understanding in what is happening and lack of contribution in the knowledge repositories usually lead to rejection of knowledge management initiatives from employees. The KMS model posited by Kulkarni et al. (2007) is illustrated in the figure below:
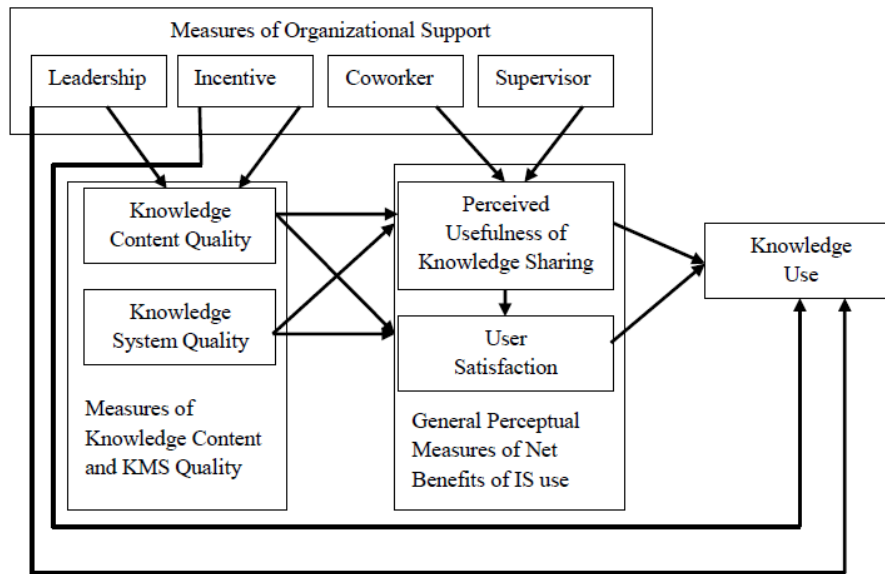
Figure 3-6 Knowledge Management Success Model
(Source: Kulkarni et al., 2007)

3.3 Conceptual model development

In this study, an integrated framework, combining DeLone and McLean (1992) IS success and Kulkarni et al. (2007) KMS models, is proposed to investigate the factors influencing knowledge transfer in ERP implementation in Indonesian SMEs. Since most of the issues in this research are covered by the KMS Success model proposed by Kulkarni et al. (2007), their model is adopted with several modifications.

a) In order to make KMS model more relevant for the context of ERP system, the original construct of Knowledge Use was replaced with ERP system Success. As discussed in section 2.5, ERP system success is a very debatable term. DeLone and McLean (2003) assess frequency and length of use, which shows the actual usage of application and its output within the organisation, to measure IS implementation success. They posit that the decrease of system use can lead to a lack of perceived benefits of the IS, and vice versa. There has been some criticism of the D and M IS success model based on the inclusion of Use construct, particularly when IS is used in a mandatory environment (e.g.,

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Seddon, 1997; Seddon and Kiew, 1996; Kim and Lee, 1986). Because usage may not be free to vary, the D and M IS success model has a limited power to explain the outcomes of the IS implementations.

However, this study still employs dimension of Use as ERP system success measure, even though most SMEs have mandatory environment (Berthon, 2008; Palvia and Palvia, 1999), since variablility in the intensity and quality of usage of different ERP system modules might have a significant result on ERP system benefits. In the context of small businesses, Armstrong et al. (2005) suggest that system usage characteristics, as well as perceived system usefulness, has significant impacts on the success rate of IS implementations in SMEs. In this study, the construct of ERP System Success covers questions about both ERP usage and perceived ERP system benefits to indicate ERP system implementation success. The model does not aim to examine any causality between the Use and Benefits dimensions. Rather, the model posits that both dimensions correlate and have combination measures of ERP system success in Indonesian SMEs.

b) Kulkarni et al. (2007) built on the information quality construct proposed by Seddon (1997) and Rai et al. (2002) to posit a more comprehensive concept called knowledge content quality. This research follows previous studies that have used the construct of knowledge content quality as a single construct covering both data and information quality.

c) The model adopted for this study evaluates the owner's role in ERP system project by including a construct of SME owner leadership. An organisation with good leadership stands out from its competition because it provides a rewarding work environment where the employees at all levels are encouraged to create business value (Antonakis, 2000; Luthans, 2000), work with others who have same state of mind (Northouse, 2007) and experience accomplishment in their work (Horner, 1997; Webb, 2007). Sarosa (2007) recognised that Indonesian SMEs are likely to have a owner manager and immediate family member influence which designates the final decision in every organisatiom aspects. This situation, where the enterpreneur or owner manager acts as dominant decision maker and facilitates innovative business process, is reflected in this study as SME's Owner Leadership construct.

d) Knowledge sharing culture is an environment where there is a willingness from each individual to disseminate information, on and off the job, across the organization, regardless of its size (Davenport, DeLong and Breers, 1998; Oliver and Kandadi, 2006). In the case of ERP system implementation in SMEs, creation of a knowledge sharing culture to support knowledge management initiatives in the project is highly important (Chan, 1999; Lin and Lee, 2005; Metaxiotis, 2009). The project team members must know what the other employees are doing, gather information from end-users about their business processes and, in return, inform the end-users and their managers about the new process being implemented. Exposure to knowledge and intention to share the knowledge provide employees with the opportunity to acquire new information and use them in practice. Therefore, developing a shared understanding between project team members through close collaboration can provide a potential knowledge-sharing experience. Knowledge sharing will help them understand what the adopting company's business requirements are and decide on how such issues might be resolved or actualised in their ERP systems (Jones et al., 2004; Nattawee and Siriluck, 2008; Noudoostbeni, Ismail, Jenatabadi and Yasin, 2011). In this study, Knowledge Sharing Culture variable is introduced to replace Co-worker and Supervisor Support variables because it covers interaction between employees' knowledge-sharing behaviours and company's knowledge-sharing strategies to measure organisations culture's effect on knowledge transfer process in the ERP system projects. .

e) In order to become competitive and flexible to adapt to challenging business environment, SMEs needs to obtain and use knowledge from internal and external sources. The ability to absorb knowledge was introduced and conceptualized as absorptive capacity by Cohen and Levinthal (1998), Zahra and George (2002) reconceptualized absorptive capacity by putting external knowledge sources and complementary external knowledge as important factors in a firm's absorptive capacity development. They further defined absorptive capacity as a capability pertaining to knowledge creation, acquisition, assimilation, transformation and utilization that enhances an organisation's innovation performance. In the context of ERP system projects, absorptive capacity refers to recipient ability to access to ERP basic knowledge and the

training on how to use ERP system (Park, Suh and Yang, 2007; Wang et al. 2007). Ko et al. (2005) studied knowledge transfer from ERP consultants to an organisation and found that the organisations' absorptive capacity and prior knowledge about ERP systems influence the knowledge transfer between their employees and consultants. Therefore, the concept of Absorptive Capacity is added to the KMS model and used to capture the SMEs employees' ability to value, assimilate and apply ERP knowledge in their daily job activities.

f) The D and M IS success model established a sufficient foundation for predicting the relationship between user's intentions and IS usage, but it does not include the perception of the user's confidence in the external partner chosen by the organisation to implement the system. Kulkarni et al. (2007)'s KMS model follows the path of D and M I success model and excludes consultant involvement in their model. Wong and Lu (2009) modified D and M IS success model by adding the factor of external IT experts to measure the success of computerisation in Taiwan's SMEs. They suggested that confidence towards external experts as the partner in the development of IT may affect the success rate of IS implementation. Many studies have underlined consultant involvement as one of the key determinants of successful implementation of ERP systems (Ifinedo 2008; Loh and Koh, 2004; Willcocks and Sykes, 2000). Therefore, this study needs to examine how SMEs' employees tend to use their knowledge to rate the credibility of their ERP consultants. In accordance with Ko et al. (2005), the present study contends that consultant or external source credibility relates to the extent to which their knowledge source is perceived to be reliable and knowledgeable. To examine the SMEs' management perception towards consultants' capability in delivering ERP system projects, a construct of Consultant Credibility is added to the KMS model.

g) Knowledge management practice will contribute anything to the organizations' goals only if it receives support from their own employees. Kulkarni et al. (2007) assert that the commitment of the management to provide both monetary and non-monetary rewards can improve employee efforts to share and reuse knowledge. Motivation factors or rewards are required to motivate employees to generate and contribute their knowledge to knowledge repositories in the organisation rather than hoard it for their individual benefit (Ko et al., 2005; Lam and Lambermont-Ford, 2010). In the context of ERP systems, many

studies of ERP projects have proved that rewards and incentives have a significant relation with employee participation to support the new system and reduce any resistance to the ERP project (Gargeya and Brady, 2005; Calvert and Seddon, 2006; da Silveira, Snider and Balakrishnan, 2009). To investigate how SMEs motivate employees to contribute to knowledge repositories and participate to support ERP projects, this study adds Incentives as a contruct to the KMS model.

h) Apart from these additions, the research model for this current study excludes the construct of system quality because the original study of Kulkarni et al. (2007) found that this variable is not a significant factor of knowledge transfer usefulness. They explain that system quality is more affected by the capabilities of the system programmers and developers, than by users' participation.

The research model which is developed as the foundation of the empirical tests is shown in Figure 3.7 below. In this research model, ellipses refer to the variables. Arrows show the causal relationships among the variables, and the path of the line refers to the direction of the relationships.
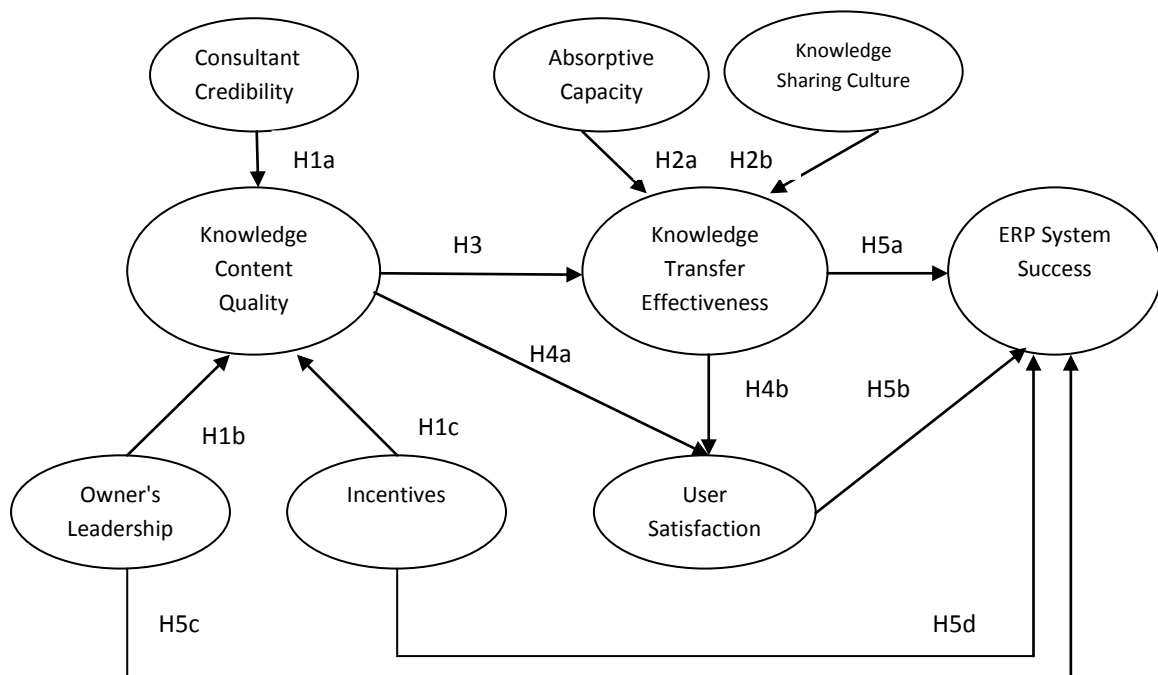
Figure 3-7 Initial Research Model

3.4 Research Model's Constructs and Hypotheses

By adopting an ensemble view of IS and KMS models, this study investigates not only knowledge transfer process but also the outcomes that generate ERP system usage and benefits as representation of ERP system success in Indonesian SMEs. As mentioned earlier, the model is primarily based on Kulkarni et al. (2007)'s KMS model and its pattern is basically the same. SMEs' owner leadership (Foster, 2004; Wong, 2005), Incentives (Ko et al., 2005; Kulkarni et al., 2007; Lam and Lambermont-Ford, 2010) and Consultant Credibility(Ko et al., 2005; Mische, 2000; Loh and Koh, 2004; Wang et al. 2007; Willcocks and Sykes, 2000) can have an impact on the Knowledge Content Quality. Direct impacts from Knowledge Quality (Haas and Hansen, 2005; Kulkarni et al.,2007; Tsai, 2008), Knowledge Sharing Culture (Jones et al., 2004; Metaxiotis, 2009) and Absorptive Capacity (Ko et al., 2005; Park et al., 2007) can lead to Knowledge Transfer Effectiveness and bring influence to User Satisfaction (Parolia, Goodman, Li and Jiang, 2007; Au, Ngai and Cheng, 2008). Ultimately, the responses towards the aforementioned factors of knowledge transfer as well as Incentives (Gargeya and Brady, 2005; Calvert and Seddon, 2006; Snider et al., 2009) and User Satisfaction (Armstrong et al., 2005; Wu and Wang, 2006; Satcioglu, 2009) are supposed to support the impacts on ERP system success for the adopting company. The next sections explain the background of all the variables and discuss the hypotheses aimed to be tested in Chapter 5.

3.4.1 Antecedents to knowledge content quality

Once the companies obtain the required knowledge, they need to maintain their knowledge content quality in order to better manage their ERP implementation projects. Organisations need to maintain their knowledge base by increasing knowledge quality submissions from their employees and experts. According to Eppler (2004), knowledge content quality refers to the quality of available documents explaining required procedures, policies, and evaluations as well as certain experiences during a project that are prepared by knowledge workers for other knowledge workers. The Knowledge content quality is, in fact, considered as an important factor for knowledge management system (Dunford 2000; Kulkarni 2007) and information systems success (DeLone and MacLean, 2003). In this study, knowledge content quality refers to the user's perceptions towards the level of accuracy, timeliness and relevance of knowledge provided in the knowledge base.

Parameters for defining, describing and assessing knowledge content quality have become topics of interest for various researchers (e.g. Nelson, Todd and Wixom, 2005; Wu and Wang, 2006). In order to properly reflect the nature of knowledge content quality, it is important to better understand the issues related to data and information quality. Nelson et al. (2005) noticed that some studies have used the definitions of information quality and data quality interchangeably, while Wu and Wang (2006) have observed that information quality and knowledge quality are often used interchangeably.

Data quality seeks to verify whether the data is of high quality and suitable for its intended usage (Juran 1999). Prior researchers have identified dimensions and measurements of data quality as important factors. Accuracy, currency, accessibility, relevance, timeliness, completeness, and consistency are dimensions that are said to characterise the properties of high data quality (Cappiello, Francalanci, Pernici, Plebani and Scannapieco 2003; Goodhue 1995). Based on the data user's perception, Wang and Strong (1996) developed a hierarchical structure of data quality that includes intrinsic, contextual, representational, and accessibility dimensions.

Information quality has been proposed as one of the six success factors of IS (DeLone and McLean 1992). According to Fulk, Heino, Flanagin, Monge and Bar (2004), an insufficient level of quality in information contributions can be attributed to minimal quality control and monitoring of knowledge contributions. Lee, Strong, Kahn, and Wang (2002) pointed out that information quality plays an important role in creating competitive advantage and handling rapid changes in the business environment. Therefore, it has become important for both researchers and practitioners to understand factors that determine information quality in various contexts. Rieh (2002) used dimensions of usefulness, goodness, currency, accuracy and trustworthiness to examine information quality. Fricke and Fallis (2004) identified a group of indicators to evaluate the accuracy of health information websites.

In their KMS model, Kulkarni et al. (2007) included knowledge content quality in lieu of information quality construct proposed by Seddon (1997) and Rai et al. (2002). This research follows previous studies that have used the construct of knowledge content quality as a single construct covering both data and information quality. In IS literature, researchers have recognized the important role of owners' leadership in shaping the

way knowledge content is obtained, presented and used in an organisation (Egbu, Hari, and Renukappa, 2005; Kulkarni et al., 2007; Wong, 2005). Rewards and incentives may also have causal relationship with knowledge content quality (Ba, Stallaert and Whinston, 2001; Lam and Lambermont-Ford, 2010; Kulkarni et al., 2007; Wong, 2005). However, several scholars posit that Consultant Credibility is an important factor to take into consideration (Ko et al., 2005; Wang et al. 2009). Therefore, this study proposes that there are three antecedents to knowledge content quality – consultant credibility, SME owner leadership and incentives – which will be explained in detail in the sub-sections below.
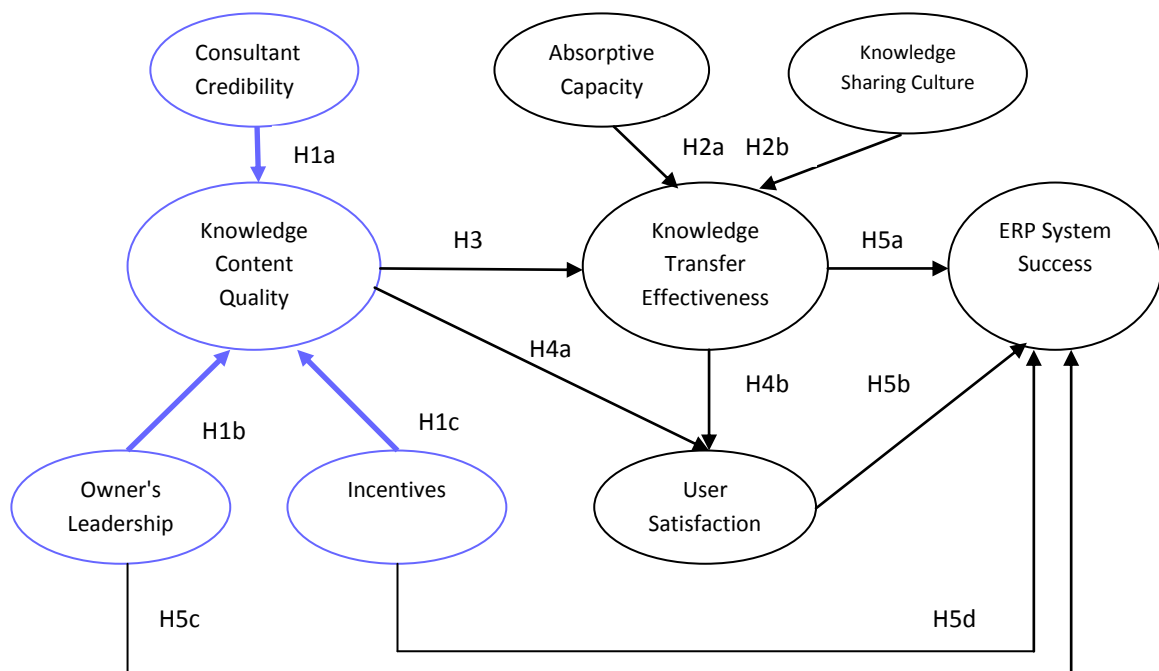
Figure 3-8 Antecedents to Knowledge Quality

3.4.1.1 Consultant credibility

Prior studies have underlined consultant involvement as one of the key determinants of successful implementation of ERP systems in workplaces. Willcocks and Sykes (2000) suggest that consultants may bring an external perspective to the project team and make a significant contribution to the success of ERP systems. Loh and Koh (2004) point out that consultants are vital in ERP implementation at small and medium-sized firms. In fact, Ifinedo (2008) found that external expertise plays a more significant role than management support in the ERP implementation in SMEs.

Many ERP implementations have not been successful even though consultants have been employed by the adopting organisations to assist them. Therefore, organisations

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need to carefully select the best external experts for their ERP system implementations. Several authors have discussed the required characteristics of IT consultants (Arnoudse, Ouellette and Whalen, 1989; Mische, 2000). Mische (2000) asserts that IT consultants must possess sufficient experience and familiarity with the obstacles in the implementation, as well as expertise with the system and the capability to determine the organisations' requirements. Arnoudse et al. (1989) advise that technical skills, human interaction skills, business context skills, and consulting framework skills are the requisite skills that lead to high quality IT consulting. There are similarities between IT and ERP consultants. For example, ERP consultants should have technical skills which refer to a broad knowledge of a variety IT technologies including ERP systems programming and business modules functionality. In addition, ERP consultants should exercise their consulting framework skills which refer to consultant's ability to perform analysis, develop a model and make appropriate recommendations which guide the adopting organization in their ERP implementation project.

These skills of ERP consultants can help adopting organizations to properly implement and configure their ERP system. Moreover, consultants can assist the organization to train users to understand ERP system technologies and help them to fully exploit ERP system functionality with knowledge inside the organization. From the adopting company's point of view, this means that the consultants must possess problem-solving capability, knowledge and skills to deliver ERP system functionalities and value to the company (Wang et al. 2007).

These attributes in ERP consultants impart them reliability and aptitude which gives them credibility. Consultant credibility relates to the extent to which the external knowledge source is perceived to be reliable and knowledgeable. Reliable and knowledgeable consultants can help the adopting organisations and the users to understand the requirements of both parties during the consultation process by providing quality information about ERP technology to fulfil the gap between business requirements and ERP system capabilities (Ko et al., 2005; Wang and Ramiller, 2009).

Nonaka (1994) asserts that more expertise enables individuals to gather their knowledge to support the learning process and to think critically and creatively about the potential problems they may encounter. As in the case of ERP system projects

implementation, the organisations' employees tend to use their knowledge to examine the credibility of the consultants and then decide whether they want to engage in developing the required knowledge repositories or be resistant to the whole implementation project (Davenport and Pruzak, 2000; Ko et al., 2005). Therefore, the construct of Consultant Credibility is added to examine the SMEs' management perception towards the implementation partners' capability in delivering ERP system functionalities into their organisations. It is proposed that Consultant Credibility might explain variance in the Knowledge Content Quality and might have an influence on the ERP system adoption. Therefore, the following hypothesis was put forward to be tested in this study:

H 1a: Consultant credibility improves knowledge content quality.

3.4.1.2 SME owner leadership

In this study, leadership behaviour refers to the style the leader uses to lead within his or her organisation. Northouse (2007) defines leadership as the ability of a person to influence a group of individuals and direct them to accomplish a common objective. The role of the effective leaders in being the main force behind the company's strive to the things at the first time is critical (Oakland and Porter 1995). Owner leadership plays a significant role in promoting a positive attitude to knowledge and motivating employees to engage in learning, creating, sharing, storing and utilising knowledge (Wong 2005). Many scholars have also found that an effective leader can influence employees' innovative behaviour (Basadur 2004; Jong and Hartog 2007), stimulate employees' motivation (Horner 1997; Webb 2007), and increase business performance (Antonakis 2000; Luthans 2000). Therefore, leadership plays a significant role in supporting the quality improvement in organisations (Foster 2004).

Sarosa (2007) points out that Indonesian SMEs have a centralistic management style where the owner managers make the final decision in every organisation's aspects with minimal or no input from their employees. This is in line with a study from Igbaria et al. (1998) who suggest that SMEs depend on the knowledge and experience of the owner have to facilitate their business processes because most of the small business decisions are made by the owner-manager. Within a small firm, the ultimate power rests in the hand of one figure. In most cases, the primary decision maker is the founder, the owner or the manager who is usually the same person (Filis, Johansson

and Wagner 2004). Therefore, the owner-manager has a strong reason to commit in any decision he or she has made for a change in the organisational culture or for the solution of a business problem.

From the perspective of innovation, small and medium businesses may have a distinctive advantage because small firms are more flexible and their owners are usually more directly involved in innovation efforts than their larger counterparts (Katrinli, Atabay, Gunay, Guneri, B and Aktan 2009). This is less likely to happen in a larger organisation as the CEO of a large organisation usually does not have a high degree of visibility or involvement in the mundane operations of the firm (Gallear 1995). Van Gils and Zwart (2004) assert that characteristics of SMEs owner/manager determine the process of knowledge acquisition and learning within the SMEs. Therefore, the role of owner-manager in SMEs is very important in developing an environment where people can share, assimilate and practice knowledge. They can direct employees to replenish the current knowledge content and maintain the quality of the KMS in addition to that of the knowledge within (Egbu et al. 2005). In particular, owner/manager involvement inside the small firms can encourage their employees to improve the quality of knowledge flows (Heavey, Simsek and Fox, 2015). This attribute is reflected in SME Owner Leadership construct which is hypothesised to influence the quality of knowledge content. Thus, the hypothesis is stated as:

H 1b: SME owner leadership improves knowledge content quality.

3.4.1.3 Incentives

People inside the organisations hold the main key of knowledge creation and knowledge sharing culture which facilitates knowledge-related activities. Lam and Lambermont-Ford (2010) argue that organisations can influence and reinforce their employees' motivational opinion towards knowledge sharing by creating a work environment that satisfies their needs of self-determination and self-esteem. Organisations may need to provide some kind of incentive in order to increase employees' participation in a project. According to Lane and Lubatkin (1998), when the adopting company rewards employees for better participation in the ERP implementation, this may positively influence employees working in that project. Ba et al. (2001) suggest that organisations must develop and implement a clever incentive system to encourage organisational members to share knowledge. Wong (2005) argued

that a proper incentive system can stimulate employees' intention to positively contribute in knowledge management initiative in SMEs.

While a number of studies highlight financial rewards as a vital motivation factor, many researchers also think rewards of a non-financial nature can also act as motivating factors (Calvert and Seddon, 2006; Sharma and Yetton, 2003). In fact, Bishop, Bouchlaghem, Glass and Matsumoto (2008) point out that non-financial incentive, such as the provision of learning opportunities and peer recognition, are a far better means for affecting employee behaviour in knowledge management practices than the provision of financial rewards.

In the proposed model, incentive refers to financial or non-financial factors that induce employees to share valuable knowledge. Lack of sufficient incentives may lead employees to hoard their knowledge and utilise it as their power source to block the knowledge sharing process. Kulkarni et al. (2007) assert that the commitment of the management to providing both monetary and non-monetary rewards can improve employee efforts to share and reuse knowledge. Therefore, incentives are required to motivate employees to generate and contribute their knowledge to knowledge repositories in the organisation rather than hoard it for their individual benefit. For that reason, the following hypothesis is proposed:

H 1c: Incentives improve knowledge content quality.

3.4.2   Antecedents to effective knowledge transfer

ERP systems require various types of knowledge, such as business, technical, product, company and project knowledge (Rosemann and Chan 2000). Although many organisations may have a knowledge management practice in place to motivate knowledge sharing and contributions to knowledge repositories, the knowledge management process will not be successful if the organisation's employees are not keen to retrieve and implement the knowledge in their daily work activities (Kulkarni et al. 2007). Ko et al. (2005) assert that knowledge can be said to be effectively transferred when the knowledge recipient has been able to comprehend and utilise the knowledge.

Based on the review of the literature, the present study identifies several factors that are important for facilitating the knowledge transfer process in an ERP system. The conceptualisation of perceptual determinants of Effective Knowledge Transfer

(EFKTR) followed the similar approach that was earlier used for the Knowledge Content Quality construct. The variables that are posited as antecedents to effective knowledge transfer include Absorptive Capacity (ABCAP) and Knowledge Sharing Culture (CULT). In addition, the dimension of Knowledge Content Quality developed in the last section is also though to lead to effective knowledge transfer. Based on the literature, the sections below explain the role of these various factors in transferring knowledge in the ERP project.
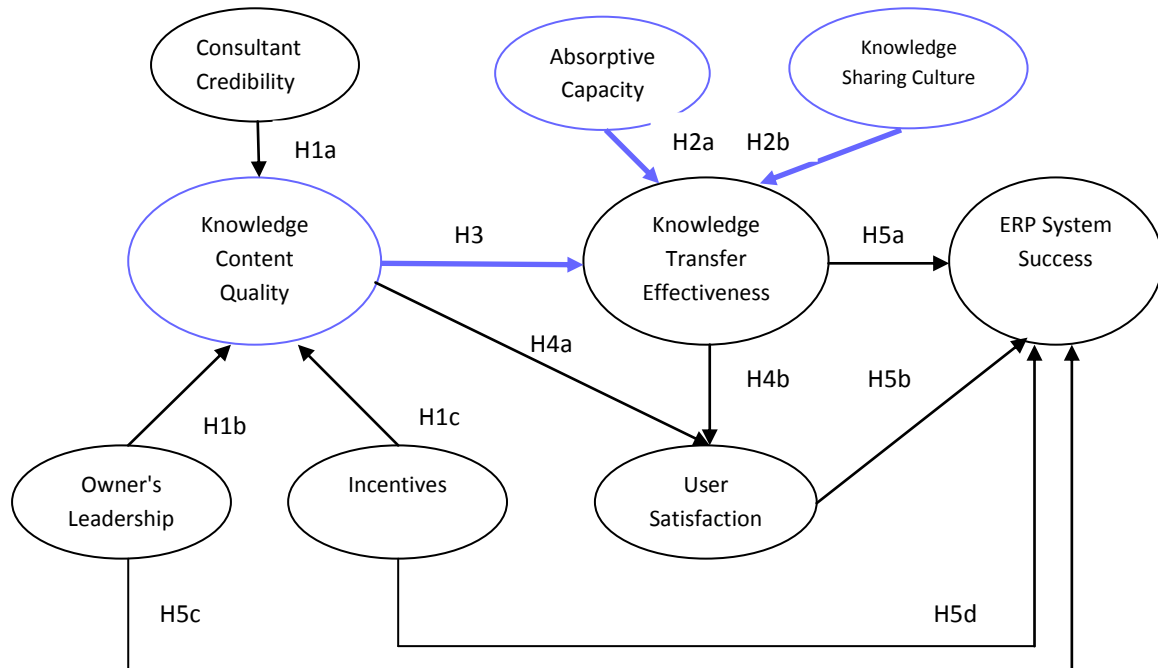
Figure 3-9Antecedents to Knowledge Transfer Effectiveness

3.4.2.1 Absorptive capacity

The effectiveness of knowledge transfer process is dependent on whether the firm has sufficient absorptive capacity before that ERP project is implemented. Therefore, it is necessary to define the term absorptive capacity to understand organisational innovation and best practices from a knowledge management perspective. The concept of absorptive capacity was explained in a theoretical framework developed by Cohen and Levinthal (1998, p. 128). They defined absorptive capacity as a firm's "ability to recognise the value of new information, assimilate it, and apply it to commercial ends". They examined the composition of absorptive capacity and observed its relationships with the firm's prior knowledge in related fields and background in undertaking a diversity of tasks. This seminal definition of the concept was drawn further by Zahra and George (2002, p. 196) to develop an extended model of absorptive capacity including external knowledge sources and complementary external knowledge as

important factors in a firm's absorptive capacity development. They further defined absorptive capacity as "a set of organisational routines and processes by which firms acquire, assimilate, transform and exploit knowledge to produce a dynamic organisational capability."

The importance of above studies in defining the elements of absorptive capacity has led other researchers to include absorptive capacity in their analysis of business efforts in the area of knowledge management (e.g. Ko et al., 2005; Park et al. 2007). Park et al. (2007) examined absorptive capacity at the level of ERP system users and found that absorptive capacity can influence user performance in a range of areas that include productivity, decision making effectiveness and quality. Ko et al. (2005) studied knowledge transfer from ERP consultants to an organisation and found that the organisations' absorptive capacity and prior knowledge about ERP systems influence the knowledge transfer between their employees and consultants.

In this study, Absorptive Capacity is regarded as the recipients' ability to value, assimilate and apply knowledge of ERP system in their business activities, which is then hypothesised to influence their perception towards knowledge transfer process in ERP system project. It is necessary for the adopting company to put their best employees on the ERP project team (Vandaie, 2008). By doing this, the adopting company selects employees with adequate prior knowledge and learning capacity to absorb the new knowledge which can ensure transfer of knowledge between ERP project team members to contribute to successful ERP system implementation. Therefore, the hypothesis is stated as follows:

H 2a: Absorptive capacity leads to effective knowledge transfer.

3.4.2.2 Knowledge sharing culture

ERP implementation project requires concerted efforts from a well-managed team of personnel with various skills recruited from inside and outside the organisation. Organisations need to constantly encourage knowledge development and exchange by their employees (Lin 2008). Knowledge sharing encompasses interaction processes between individuals wherein knowledge relating to organisational activities is exchanged (Fatt and Khin 2010). Gupta and Govindarajan (2000) assert that knowledge sharing is important for organisations because of their growing needs of intellectual

capital and better knowledge management practices to increase their competitive advantage. Employees may often be reluctant to share knowledge because of their desire to preserve or augment their power, the lack of rewards for sharing their knowledge and a perceived loss to their position from sharing knowledge (Garfield 2006).

Encouraging processes of knowledge sharing where people share and discuss their ideas, opinions and insights can enable them to develop new innovations in operations of their company. The culture of an organisation has an important role in shaping this condition. Karlsen and Gottschalk (2004) posit that organisational culture influences knowledge transfer as it shapes assumptions held by the employees in an organisation about knowledge worth exchanging. They further argue that organisational culture defines the relationship between knowledge source and recipients, develops social interaction where knowledge sharing can happen and shapes the process of knowledge creation and distribution in organisations. A knowledge sharing culture is an environment where there is a willingness from each individual to disseminate information across the organisation, regardless of its size. In the case of ERP system implementation, the team members must know what the others do, gather information from end-users about their business processes and, in return, inform the end-users and their managers about the new process being implemented. With the aim of fostering this culture, individuals must comply with the norms, values and beliefs that employees shaped and honed in the organisation. A defiance of these rules will cause bottlenecks in the knowledge-transfer and important information will not reach the intended audience.

Scholars have advocated the creation of a knowledge sharing culture to support knowledge management initiatives in ERP systems' implementation. Metaxiotis (2009) argues that a knowledge sharing culture in an organisation determines the success of effective knowledge management in ERP implementation projects. This is supported by Jones et al. (2004) who found that the role of change management in preparing the organisation for knowledge sharing and the willingness of the employees to share personal experiences are two dimensions of organisation culture that best facilitate knowledge transfer in an ERP implementation project. Having discussed the extent to which the knowledge sharing culture contributes to knowledge transfer in ERP projects, the following hypothesis is proposed:

H 2b: Knowledge sharing culture leads to effective knowledge transfer.

3.4.2.3 Knowledge content quality

Several research studies have identified knowledge content quality as an important factor in the knowledge transfer process. Methods of knowledge transfer are usually realised through formal training conducted directly by the tutor, the system documentation or users' help guide, and through interaction with the consultant during the implementation process (Lech 2011). During the implementation of any ERP system, knowledge on using the system in each phase of the project should be transferred from the external partner to the end-users (Lee and Lee 2000; Pan et al. 2006). This includes rules of ERP business practice and how its procedures operate.

Some studies have observed that questionable content quality will lead to ineffective knowledge or low levels of knowledge usage (Gray and Ducikova, 2005; Haas and Hansen, 2005). Other scholars indicate that the knowledge transfer process is determined by knowledge content quality provided by the implementation partners or consultants as they guide the company's project (Kulkarni 2007; Tsai 2008). Haas and Hansen (2005) found that questionable knowledge content quality leads to low levels of knowledge repositories usage and ineffective knowledge sharing between team members. Tsai (2008) suggests that achieving higher knowledge quality is a motivator to embrace knowledge transfer in KMS implementation. Kulkarni et al. (2007) found that effective knowledge transfer is more likely to occur when the knowledge quality is higher because accurate and complete information are required when users begin to engage in IS use. Based on these ideas, the following hypothesis is developed to illustrate the relationship between knowledge content quality and knowledge transfer process:

H 3: Knowledge content quality leads to effective knowledge transfer.

3.4.3 Effect of knowledge factors on user satisfaction

In the field of IS, user satisfaction is the assessment of the user's experience with the benefits of using the system as a whole and the individual's affective reaction after the using the system. User satisfaction has long been recognised as a fulfilment of user's expectations, or needs, derived from the actual use of the system (Seddon and Kiew 1994). Ward, Ruddy and Hill (2009) examined the factor of user satisfaction from D

and M IS success model on a study in knowledge management environment. Failure of the knowledge validation process, lack of understanding in what is happening and lack of contribution in the knowledge repositories usually lead to rejection of knowledge management initiatives from employees. Davenport and Prusak (1998) suggest that team members are keen to spend their time and energy to pursue knowledge only if they consider that knowledge is valuable and beneficial for them.
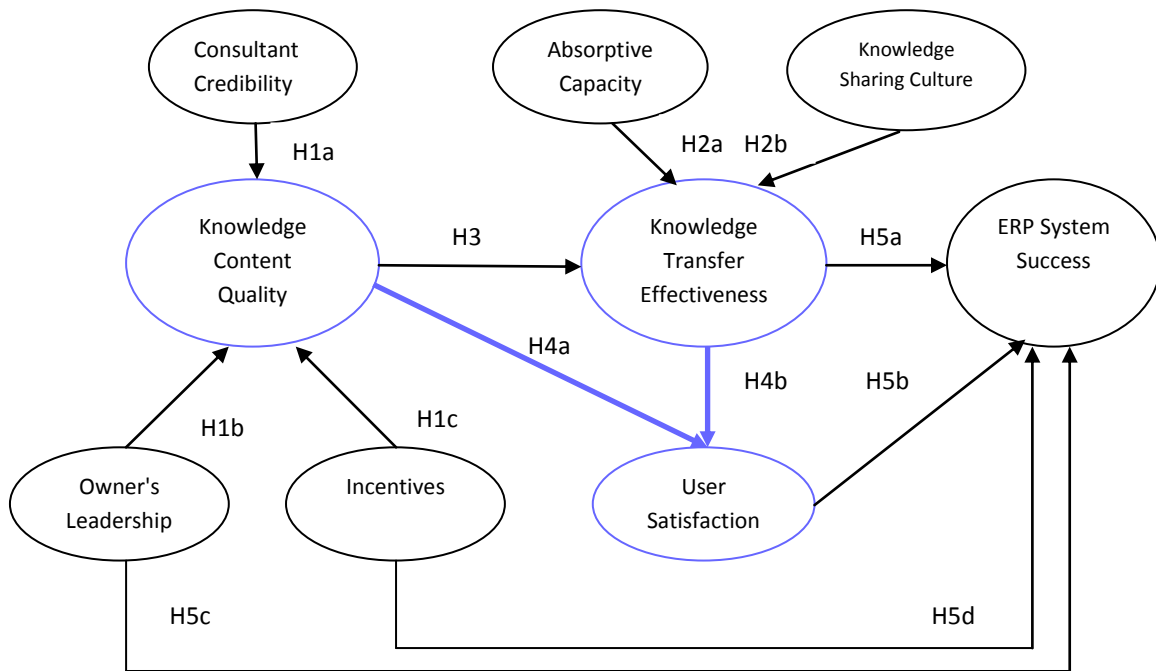
Figure 3-10 Antecedents to User Satisfaction

3.4.3.1 Knowledge content quality

When the knowledge needs of employees are fulfilled, they find it easy to use the system in their daily activities and can appreciate the benefit of the system being implemented. Accordingly, when employees are satisfied, they are likely to develop an intention to use the system regularly in the future. According to Kulkarni et al. (2007), knowledge content quality influences user satisfaction. Ali and Money (2005) conducted a study to determine the factors that affect users' acceptance and performance in project management system implementation. They found that the level of information quality has a dominant role in explaining users' satisfaction with Project Management software. These studies are in line with prior research conducted by Seddon and Kiew (1994) which suggest that information quality is positively related with user satisfaction. Seddon and Kiew (1994) found that information quality has an essential effect on user satisfaction and indicated that the positive relationship between

those variables is essential for the successful implementation of IS in an organisation. The hypothesis suggested is therefore as follows:

H 4a: Knowledge content quality increases the level of user satisfaction.

3.4.3.2 Effective knowledge transfer

Existing research has long considered effective knowledge transfer as a primary factor of user satisfaction with IT implementation. Effective exchange and assimilation of IT business knowledge contribute to formation of user satisfaction because effective knowledge sharing can help satisfy users' business requirements (Au et al. 2008). Davis, Kettinger and Kunev (2009) find that users with better knowledge of IT are more satisfied with enterprise system implementation because they are able to perceive the usefulness of system implementation correspondingly to IT personnel. The knowledge transfer process should be able to fulfil the knowledge needs of the parties involved in the ERP system project, while at the same time allowing the parties to feel 'satisfied' about sharing the knowledge. Parolia et al. (2007) suggest that companies should promote knowledge transfer during their IS implementation projects in order to improve user satisfaction. Exchange and integration of knowledge facilitates the realisation of users' needs and improves user satisfaction, thus, the following hypothesis is proposed:

H 4b: Effective knowledge transfer increases the level of user satisfaction.

3.4.4   Final effect on ERP system success

ERP system success measurement is a difficult task to perform as the success of an ERP project is multifaceted and difficult to assess. Bagchi, Kanungo and Dasgupta (2003) found that due to the nature of ERP system and its implementation, the dynamics of ERP system usage in their case studies demonstrate different levels of ERP system acceptance and adoption. Many researchers have attempted to measure ERP system success and their usefulness depends on whether the measurement result is applicable for actions which can improve the overall system performance (e.g. Armstrong, 2005; Chung et al. 2009; Gable et al., 2003). As presented in the research model in this study, the formation of the ERP system success construct (ESUCC) is based on combination of usage and perceived benefits of ERP. Since the primary objective of this study was to examine the influence of knowledge transfer on ERP

system success in the context of small firms, ESUCC was considered as a suitable indicator for ERP success.
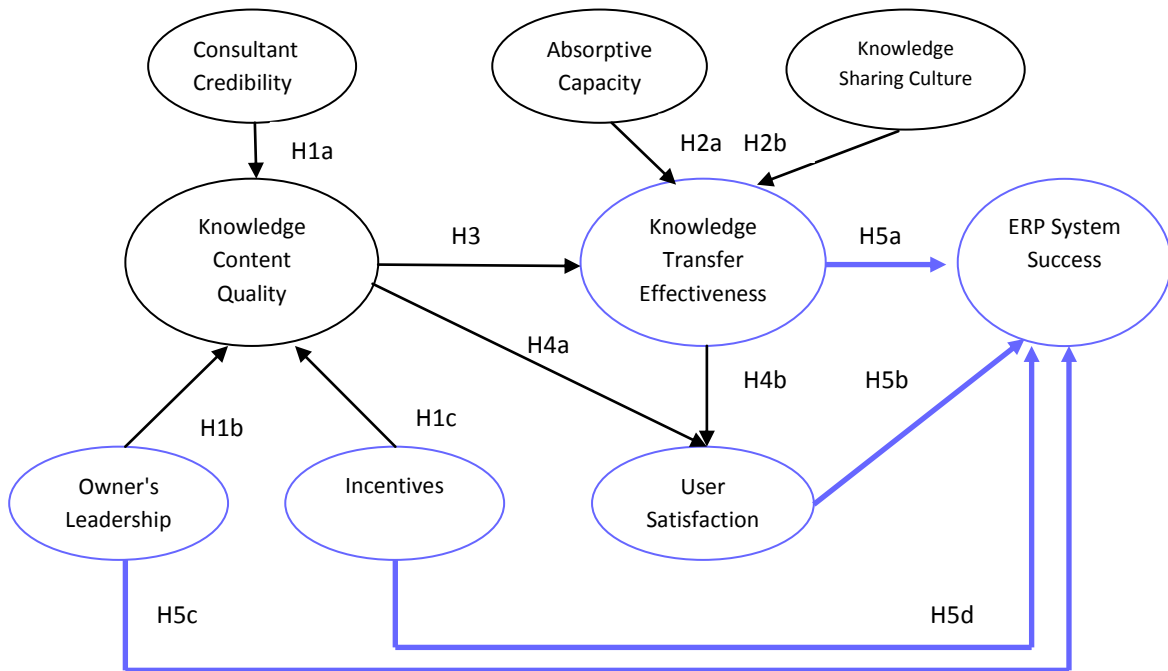
Figure 3-11 Final Effect on ERP System Success

3.4.4.1 Knowledge transfer effectiveness

In a knowledge management context, it has been shown that effective knowledge transfer may assist a company to better anticipate the value of the ERP leading to greater access to the benefits of ERP. Authors generally agree on the theory that an effective knowledge transfer facilitates corporate investment to adopt ERP system, in particular, to capture, elevate and retain ERP system knowledge among their employees (Albadri and Abdallah 2010; Gable et al. 1998; Heinze and Hake 2010; Skok and Legge 2002; Soja 2008).

Once the recipient has been able to comprehend and utilise the knowledge, then it can be said that knowledge has been effectively transferred (Ko et al. 2005). Park et al. (2007) find that effective knowledge transfer can enhance user performance in their ERP usage and motivate user to improve their ability in learning to use ERP systems. Similarly, if the ERP-related knowledge can be effectively learned and used by a company, then the project can be realised within the time frame fulfilling the

company's requirements and satisfactorily increasing the expected benefits from this investment (Lee and Lee 2000; Pan et al. 2006). Thus, the present study includes the following hypothesis on the role of effective knowledge transfer in leading to acceptance of the whole ERP system:

H 5a: Effective knowledge transfer increases the probability of ERP success

3.4.4.2 User satisfaction

Previous studies of IS evaluation has found that user satisfaction is related with IS usage and employed it as a measure for IS success (DeLone and McLean 1992; Gelderman 1998; Doll and Torkzadeh 1999). In the ERP system context, user satisfaction refers to how users perceive the accessibility of the ERP system to meet their needs. User satisfaction is a critical factor for ERP implementation success because a company's ERP project will be accepted when their employees realise the benefits of changing over to the new system (Ngai, Law and Wat, 2008). The ERP implementation can become very difficult to execute if there is lack of users' interest and positive attitude towards the ERP system.

Recent literature has emphasised the importance of user satisfaction in determining ERP projects' success. Armstrong et al. (2005) emphasise the significance of ERP system usage and user perceived benefits in increasing the success probability of ERP system implementation in SMEs. Satcioglu (2009) posits that user satisfaction is necessary for ERP system success since ERP success factors mostly rest on user acceptance. Wu and Wang (2006) found that user satisfaction is a major factor in ERP system implementation. After reviewing the above studies on this matter, the following hypothesis is proposed:

H 5b: User satisfaction increases the probability of ERP system success.

3.4.4.3 SME owner leadership

Prior studies suggest that leadership and project management issues have a more significant effect on implementation failures than the technology itself (Bingi, Sharma and Godla, 1999; Al Imtiaz and Kibria, 2012; Singh, Best, Bojilov and Blunt, 2013). Based on extensive literature review on ERP implementation, Nah, Lau and Kuang (2001) identified eleven critical factors of ERP implementation success and indicated the crucial role played by ERP teams and strong leadership as factors. The primary role

played by leadership in ERP project success underlines the need for analysing this human dimension of the ERP implementation process. Sarker and Lee (2003) found that successful ERP implementation usually utilise a traditional leader-centric approach where there is a formal designated leader in the ERP team. In the context of small and medium organisations, this is in line with a study from Igbaria et al. (1998) who suggest that SMEs depend on what knowledge and experience of the owner have in regards of establishing IT to facilitate their business processes because most of the small business decisions are made by the owner manager. This study assumed that while the technology usage is primarily voluntary, major managerial intervention is hypothesised to be a factor of the actual ERP system usage. Based on this argument, the following hypothesis is proposed:

H 5c: SME owner leadership increases the probability of ERP system success.

3.4.4.4 Incentives

The success of an ERP project entails interest and input from multiple cross-departmental teams corresponding to their core business functions. With the purpose of promoting employees' active participation in ERP systems implementation, executives in the adopting company need to establish suitable appraisal mechanisms and develop an incentive system. This can facilitate an organisational culture that encourages work coordination, efficiency and consistency, to support processes and functions of the new system and reduce any resistance to the ERP project.

The available studies of work behaviour have proved that rewards and incentives has significant relation with employee participation (Sharma and Yetton 2003; Umble, Haft and Umble, 2003). Gargeya and Brady (2005) suggest that ERP success is likely to occur when senior management exercise their authority to support the project by providing incentives and bonuses to team members. Calvert and Seddon (2006) posit that intrinsic or extrinsic incentives are required to motivate employees to appropriately use the ERP system. Snider et al. (2009) argue that employees may reject the use of ERP systems and undermine the implementation process when they perceive the system as a threat to their careers. Therefore, organisations embarking on ERP implementation need to encourage ERP use by implementing incentives to mitigate those risks. This discussion leads to the following hypothesis:

H 5d: Incentives increase the probability of ERP system success.

3.5 Measurement Scales

This present study proposes five exogenous and four endogenous latent constructs as variables that are to be examined for their interrelationships to answer the research questions of the study. Appropriate measurements and tests for the validity of these constructs are required before administering the survey to the respondents. This study derived measurement scales from existing research for the proposed constructs used in the research model (Armstrong, 2005; Doll and Torkzadeh, 1998; Gefen and Ragowsky, 2005; Ifinedo, 2008; Ives et al. 1983; Kulkarni et al., 2007; Ko et al., 2005; Liao, Fei and Chen, 2007) and made a few modifications to the original scales to suit context and purpose of the study.

The preparation of survey instruments involved a careful approach to determine rating scales that appropriately measure respondent's response to a statement. A five-point Likert scale was preferred over other scales because it was seen as very straightforward and might allow respondents to better understand what answer he or she should give to complete the survey. Using five-point Likert scales is also in accordance with research in IT and knowledge management studies (e.g. Igbaria et.al., 1998; Karlsen and Gottschalk 2004; Ko et.al., 2006; Kulkarni et.al., 2007; Wang et.al., 2007).

In the research model, perceptions of users towards certain attributes that are considered relevant for forming quality knowledge content (KNCONT) in ERP project are Consultant Credibility (CCRED), SMEs Owners' leadership (OLEAD), and Incentives (INV). As explained in the previous chapter, the present study also uses the constructs of Absorptive Capacity (ABCAP), Knowledge Sharing Culture (CULT) and Knowledge Content Quality (KNCONT) as the determinants of effective knowledge transfer in ERP project in Indonesian SMEs. Most of the elements explaining these constructs were derived from literature of IS users' behavioural intention, particularly from DeLone and McLean (2003), and Kulkarni et al. (2003). In addition, Perceived Effectiveness of Knowledge Transfer (EFKTR) has been proposed as an antecedent of ERP system success indicator that captures the perceived benefits and usage of ERP system in Indonesian SMEs. The following subsections discuss the measurements of KNCONT, CCRED, OLEAD, INV, ABCAP, CULT, EFKTR and ESUCC variables.
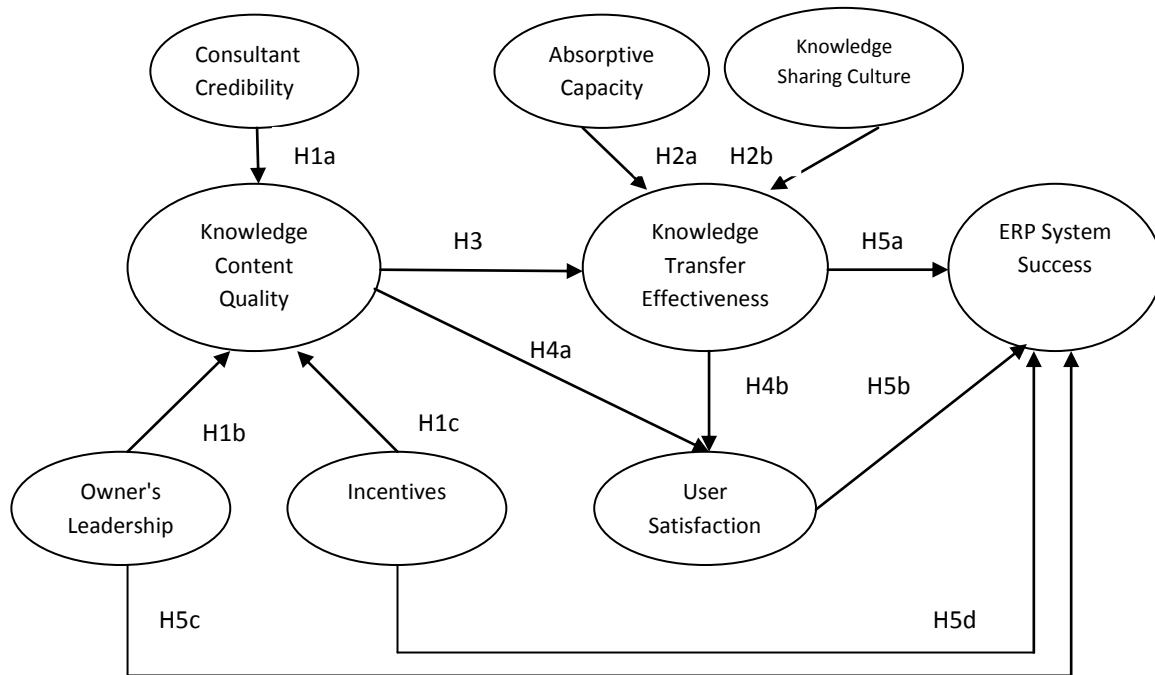
Figure 3-12 Initial Research Model

Knowledge Content Quality Berman and Katoma (2006) measure knowledge quality of KMS based on the ranking of knowledge item, the status of knowledge source and the popularity of knowledge item. Rao and Osei-Bryson (2007) developed a concept of knowledge item quality based on the dimensions of accuracy, consistency, currency, data interpretability, degree of context, degree of detail, degree of importance, sharing, usefulness, and volatility. Lee et al. (2002) adopted attributes of currency, relevance and complementarities as dimensions of knowledge quality in their research of on-line marketplace. In addition, Durcikova and Gray (2009) proposed variables of precision, meeting needs, and accuracy to measure knowledge quality. Taking everything into account, these researchers have revealed that knowledge content quality is a multidimensional construct and can be represented in relation to the quality of the aforementioned values.

Roses (2011) found that categories that measure how useful training materials received by employees to use ERP system and how well the content of ERP knowledge presented to employees for facilitating a better interaction with the system, were related to knowledge content quality of the ERP system projects. This is consistent with

Kulkarni et al. (2007) who proposed 'usefulness' and 'presentation' dimensions to measure knowledge content quality. Regarding timeliness of knowledge in ERP projects, Al-Busaidi, Olfman, Ryan and Leroy (2010) found that complete and updated database correlated with knowledge quality, and therefore encouraged knowledge users to use ERP systems. The present study proposes evaluative constructs of knowledge content quality drawn from these scholars. Previous studies have shown that knowledge quality can be measured from many dimensions and this study includes four dimensions to measure the quality of knowledge contained in the knowledge repositories of ERP system projects. These dimensions were mostly adopted from the study of Kulkarni et al. (2007) and following their suggestion, this study attempts to test these dimensions to assess user's perceptions towards the level of usefulness, presentation, and timeliness of knowledge provided in the knowledge base. The scale items used to measure the construct of Knowledge Content Quality are depicted in Table 3.1 below.

Table 3-1 Knowledge Content Quality Scale Items

Question Code	Knowledge Content Quality
KNCONT1	The knowledge provided by the ERP vendors/consultants during the ERP system implementation is correct
KNCONT2	The ERP system functionality and its content are logical and fits
KNCONT3	The knowledge provided by the ERP vendors/consultants during the ERP system implementation is meaningful.
KNCONT4	The knowledge provided by the ERP vendors/consultants during the ERP system implementation is understandable and practicable
KNCONT5	The knowledge provided by the ERP vendors/consultants during the ERP system implementation is available at a time suitable for its use

Consultant Credibility The first antecedent of knowledge quality is measured by three specific dimensions of the Consultant Credibility. Many organisations have limited skills and internal knowledge to implement an ERP system. Therefore, many may consider that they need to obtain external knowledge from consultants with a high commendation for credibility and knowledge, and to trust these consultants to transfer

their expertise and knowledge into the organisation. Prior studies have underlined that many organisations rely on consultants to improve the success probability of ERP projects since ERP systems are costly and difficult to implement (Ifinedo, 2008; Loh and Koh, 2004; Ko et al., 2005; Willcocks and Sykes, 2000).

These organisations need to build up relationships and trust with the consultants. Consultants are considered as group of experts who know how to run ERP system projects and achieve the organisations' objectives. However, the inability to appropriately monitor and control the consultants' actions during the projects, implies that choosing trustworthy consultants is one of the main aspects of successful ERP systems adoption (Gefen, 2000). Trustworthy consultants will supposedly support the organisations with relevant knowledge that add value to the ERP projects (Wang and Emurian, 2005). Further, trusted consultants will help the adopting organisations to set their knowledge transfer activities and place those activities into one of the ERP projects' objectives (Ko et al., 2005; Wang et al. 2009).

In ERP projects, knowledge recipients tend to assert whether the consultants have enough experience and/or whether the consultants are well-trained to provide accurate solutions in implementing and developing ERP systems. When consultants' experience is considered as useful in solving problems, a recipient will perceive the consultants' knowledge to be reliable and will absorb that knowledge. When consultants are considered as well-trained, the persuasive impact of the consultant is usually increased and their knowledge is perceived to be valuable (Ko et al., 2005; Wang and Ramiller, 2009).

In this study, the construct of Consultant Credibility is conceptualised to measure the degree to which the ERP system users consider that their source of ERP knowledge to be reliable and knowledgeable. The items measuring the Consultant Credibility in this study were adapted from Ifinedo (2007) and Ko et al. (2005). These items were included to reflect the fact that the users of the ERP system, especially in the context of developing countries like Indonesia, tend to rely on external knowledge source to guide them. Therefore, it is important to examine the users' perception of their consultants' knowledge and experience to examine consultants' credibility. Three items used to measure consultant credibility are presented in Table 3.2 below.

Table 3-2 Consultant Credibility Scale Items

Question Code	Consultant Credibility
CCRED1	I find that the ERP vendors/consultants is trustworthy
CCRED2	I believe that the ERP vendors/consultants is experienced
CCRED3	I believe that the ERP vendors/consultants is well-trained

SME Owner Leadership SME Owner Leadership plays a central role in the small business context, especially in Indonesia, where a centralistic management style is often the norm in organisations (Sarosa, 2007). It has been argued that SMEs owners influence the decisions regarding the implementation of ERP systems (Cereola, Wier and Norman, 2012; Ramdani and Kawalek, 2013). Previous research has found that SMEs owners' impressions and perception of integrated IS are originated from external pressure from their business partners (Iacovou and Benbasat, 2009; Ramdani and Kawalek, 2009). Given that SMEs usually have limited financial resources and lack of knowledge, SMEs owners must understand every aspect of their business functionalities before they decided to implement ERP systems.

Therefore, when looking into the implementation of ERP systems, SMEs owners should proceed with caution to enable them to fully understand what the impacts and consequences of ERP systems adoption will be (Ramdani and Kawalek, 2009). This reaction might then convince SMEs owners to express their commitment and support during the implementation process (Sarker and Lee, 2003; Kulkarni et al., 2007). Further, SMEs owners require to assess the progress of ERP systems for their organisations. In order to measure the progress of ERP systems project, SMEs owners can conduct periodic review of the implication of ERP implementation on the cost, time and effort. Bharathi and Parikh (2009) posit that periodic review conducted by SMEs owners serves as an important tool for monitoring and controlling ERP systems usage and resources utilisation during the ERP systems project.

This construct is used to measure whether ERP system users perceive their owner as having the requisite leadership capability to support and guide better acceptance of the ERP system. The criterion of good leadership from SME owner in this regard refers to their ability to provide technical and organisational support to cater to the needs of

employees and promote the ERP system in their workplace. This study assumes that better SME leadership will contribute to knowledge content quality and user perceptions, which in turn, will lead to ERP implementation success. The measurement items for SME Owner Leadership are adapted from Kulkarni et al. (2007) and Table 3.3 below presents these measures.

Table 3-3 Owners Leadership Scale Items

Question Code	SME Owner Leadership
OLEAD1	SME owners generally understand how ERP system is integrated into the business
OLEAD2	SME owners show their commitment and support with respect to ERP system activities, guidelines and policy
OLEAD3	The effectiveness of ERP system for the whole company is periodically reviewed by the SME owners

The construct of Incentives is a measure of the motivational factors and rewards that ERP system users receive for sharing their knowledge during the implementation project. In the current study, it is believed that incentives, either extrinsic or intrinsic, would significantly influence and strongly predict users' intention to contribute their knowledge and facilitate ERP system acceptance in Indonesian SMEs. It is assumed that the use of the ERP technology is widely implemented and employees would comply with their employers to use the system. However, understanding the degree to which an employee feels he or she was motivated to get involved in ERP system project would significantly contribute to the main objective of this study. This study measures the construct of Incentives by using the items based on the work of Kulkarni et al. (2007) presented in Table 3.4 below.

Table 3-4 Incentives Scale Items

Question Code	Incentives
INC1	The top management rewards my knowledge contribution to the ERP system implementation project
INC2	My knowledge contribution to the ERP system implementation project is well-recognised and well-respected by my peers

Effective Knowledge Transfer Literature review indicates that diverse forms of knowledge can be transferred between the consulting company and the adopting company. When organisation leaders or owners decide to invest in an ERP system, they need to establish an appropriate strategy to facilitate transfer of knowledge in ERP projects. According to Chan (1999), a company should possess certain types of knowledge, including business, technical and product knowledge, when adopting an ERP system. Davenport and Prusak (2000) suggested that effective knowledge transfer in ERP system projects requires absorption, use and transmission of knowledge transferred from the consultants to the adopting organisations. ERP-related knowledge transfer is believed to relate with the extent to which the adopting organisations can transform new knowledge into usable knowledge through the identification and filtering processes, assimilation of ERP module training materials into usable knowledge, and application of ERP knowledge for setting up the system (Ko et al., 2005; Kulkarni, et al., 2007). In accordance with these authors, this definition of effective knowledge transfer was selected because it encompasses the process by which ERP projects team members would go through in order to transform ERP-related knowledge into usable knowledge for their daily business activities.

As guided by the measures proposed in the work of Ko et al. (2005) and Kulkarni et al. (2007), this study employed items measuring the construct of effective knowledge transfer to reflect how ERP users in Indonesian SMEs were able to absorb and utilise ERP knowledge in their workplace. A total of five items measuring the construct are presented in the table below.

Table 3-5 Knowledge Transfe Effectiveness Scale Items

Question Code	Effective Knowledge Transfer
EFKTR1	My understanding of how ERP modules integrate with each other has increased
EFKTR2	My knowledge of ERP system has improved
EFKTR3	My knowledge about ERP system module's training documents for end-users has increased
EFKTR4	My knowledge about setting up the configuration that support the business process has improved

User Satisfaction In the context of this study, User Satisfaction is conceptualised as antecedent to ERP system success in Indonesian SMEs. Drawing on the meaning of the concept widely used in previous studies (Doll and Torkzadeh, 1998; Ives, Olson and Baroudi, 1983; Seddon, 1997), this study assumes that user satisfaction significantly influences behavioural intention to accept and use an IS technology. Ives et al. (1983) defined user satisfaction as the extent to which users believe that their information requirements are fulfilled by the available information systems. Doll and Torkzadeh (1998) defined user satisfaction as the affective attitude an individual has towards a specific computer application that he or she directly use.

In line with these scholars, the construct of User Satisfaction is used to measure whether an ERP system user perceives knowledge transfer process as fulfilling his or her needs of knowledge in operating the system in the organisation. For measuring the User Satisfaction construct, the present study adapts the scale items proposed in the works of Kulkarni et al. (2007) that derived the instrument for user satisfaction construct from Doll and Torkzadeh (1998) and Ives et al. (1983) instruments respectively. Table 3.6 presents all the USAT measures.

Table 3-6 User Satisfaction Scale Items

Question Code	User Satisfaction
USAT1	I find it easy to get the knowledge from the ERP system to do my job
USAT2	I find that the knowledge provided by the ERP system meets my needs adequately
USAT3	I am satisfied with the knowledge provided by the ERP system to do my job

Absorptive Capacity According to Dierickx and Cool (1989), absorptive capacity is mainly a function of pre-existing stock of knowledge within the adopting company and it is a determinant of the company's ability to value, assimilate and apply new knowledge. Cohen and Levinthal (1990) explained that the concept behind absorptive capacity is that an individual who has more skill and experience in a specific field, will quickly absorb and adopt new knowledge in the same field of expertise and be able to implement it. In line with Cohen and Levinthal (1990), Dixon, Zimmerman and Nearey

(1997) found that prior learning and acquired skills in procedures and tasks increase an individual's ability to learn new assignments that were given in similar field.

It has been argued that absorptive capacity has a major role in knowledge transfer activities. For example, Griffith, Sawyer and Neale (2003) and Zahra and George (2002) found that absorptive capacity is one of the important moderators of an individual's ability to transfer potential knowledge and make use of that knowledge. In accordance with these authors, Absorptive Capacity is used as a construct to measure the ability of employees to recognise and assimilate the value of new knowledge from using ERP system, and then apply the knowledge to their daily activities. The measurement scale of Absorptive Capacity in this study is adopted from Ko et al. (2005) with items to assess the degree to which an adopting company is able to exploit the knowledge transfer from the consultant company. In each case, the original items were modified to purposely measure the absorptive capacity for ERP system implementation. For instance, instead of evaluating 'general business knowledge seeking', the item more specifically assesses the degree to which employees in Indonesian SMEs sought knowledge regarding ERP system. Table below presents the items used to measure the construct.

Table 3-7 Absorptive Capacity Scale Items

Question Code	Absorptive Capacity
ABCAP1	There is a clear understanding of goals, tasks, and responsibilities of implementing the ERP System
ABCAP2	I have technical skill to understand the technical knowledge about ERP System
ABCAP3	I have the managerial skill to understand the business knowledge about ERP System
ABCAP4	I can help solve problems associated with the ERP System
ABCAP5	I have the necessary skills to implement the ERP System

Knowledge Sharing Culture Many authors have demonstrated that fostering knowledge sharing culture is important to facilitate knowledge transfer from the organisation to their employees and to obtain employees' distinctive knowledge integrated into the organisation's knowledge repositories (Fatt and Khin, 2010; Gupta and Govindarajan, 2000; Lin 2008). One way organisations attempt to establish a

knowledge-sharing culture is by implementing a team-based organisational structure as a knowledge-based entity (Liebeskind, 1996). Okhuysen and Eisenhardt (2002) suggested that organisation's norms and practices in general influence employee behaviours, which consequently control employee groups' interaction such as knowledge sharing among work colleagues or between departments across the organisation. Such a view leads to a focus on how knowledge sharing happens and shapes the process of knowledge creation and distribution in organisations.

This study interprets knowledge sharing culture as an independent variable which describes the interaction between employees' knowledge-sharing behaviours and company's knowledge-sharing strategies. The construct of Knowledge Sharing Culture was derived from the work by Liao et al. (2007), but the original measurement scale was modified to measure employees' perceptions of knowledge sharing behaviour and the degree to which the organisation members share different types of knowledge in Indonesian SMEs. Table 3.8 below presents the three items measuring the construct.

Table 3-8 Knowledge Sharing Culture Scale Items

Question Code	Knowledge Sharing Culture
CULT1	My colleagues like to share their experiences and ideas to work-related problems
CULT2	Knowledge sharing among my colleagues is regarded as regular activities in my company.
CULT3	Knowledge sharing between sections/divisions often occurs in my company.

ERP System Success In this study, the construct of ERP system success is developed to measure the perceived results of ERP system implementation in terms of usage and perceived benefits. Armstrong (2005) suggested that the probability of success of ERP system implementation in SMEs is reflected by the extent of ERP system usage and user's perceived benefits of ERP system. Chung, Skibniewski and Kwak (2009) found that subjective norm should be included as a predictor of usage because most of the time ERP system use is mandatory rather than voluntary. This is consistent with Venkatesh and Davis (2000) who consider that subjective norm, among other social influence processes, significantly contribute to user acceptance. Regarding perceived benefits, Gefen and Ragowsky (2005) found that the overall benefit from the ERP

system can be reflected by organisation characteristics. Therefore, these four dimensions were proposed to measure ERP system success in Indonesian SMEs. The degree of overall perceived results of ERP system project was also added in this construct. All of the five items are believed to be a more composite reflection of ERP system success in Indonesian SMEs and are presented in the table below.

Table 3-9 ERP System Success Scale Items

Question Code	ERP System Success
ESUCC1	The ERP system has provided useful information when needed
ESUCC2	Heavily use ERP system whenever I needed
ESUCC3	The departments within my company have gained benefits from system integration
ESUCC4	The ERP system significantly contribute to business functionalities to compete in the market
ESUCC5	The ERP system can be generally considered a success

The initial research model with the measurement of constructs is shown in figure 3.12 below. In this research model, ellipses refer to the variables and squares refer to the measurement constructs. Arrows show the causal relationships among the variables, and the path of the line refers to the direction of the relationships.
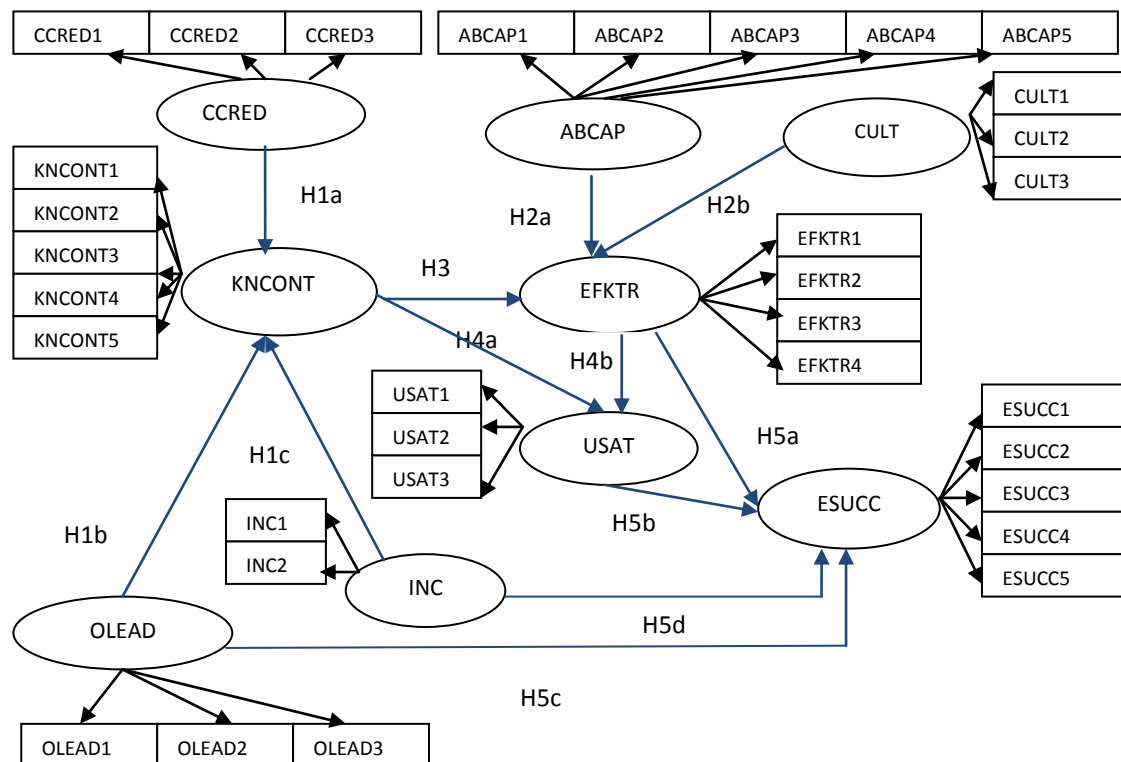
Figure 3-13 Initial Research Model with Measurement Constructs

3.6 Summary

The focus in this chapter was on developing a conceptual framework positing perceptual antecedents of knowledge transfer that are correlated with success of ERP system implementation in terms of usage and perceived benefits of the technology. The abovementioned literature review has established a foundation for developing a conceptual model that can be employed to analyse the effectiveness of knowledge transfer in ERP system implementation. The chapter illustrated the scope of DeLone and McLean IS success model in explaining the variance that occurs between behavioural intent, benefits and actual usage of IS in an organisation. Many studies have suggested that modifications may be made to the DeLone and McLean's (2003) IS success model to improve its predictive power and scope. Given the focus on knowledge transfer in ERP implementation, this study incorporated the modifications proposed by Kulkarni et al. (2007) to employ a knowledge management approach to ERP implementation. The KMS model helps explain the amount of variance in ERP implementation in Indonesian SMEs that not only focus on the perceptions of users or user satisfaction but organisational culture and external factors. Since most of the issues in this research are covered by both models, they are adopted in integration with several adjustments. The next chapter explains the research methodology for this study

including procedures to evaluate the model. It also contains a discussion of methods of data analysis and statistical procedures for testing the hypothetical model along with the survey administration procedures, sampling techniques, and procedures to protect the rights of the research object. Measurement scales development utilised existing measures and scales from existing literature wherever possible. Table 3.10 summarizes the measurements used in this study. All of the constructs' measures were modelled as reflective dimensions because causality was expected to flow from the constructs to these measures. In other words, the change in a dimension reflects the change in the correspondent latent construct (Coltman, Devinney, Midgley and Venaik, 2008; Diamantopoulos and Siguaw, 2006).

Table 3-10Summary of Constructs

Constructs	Operational Definition	No. of Items	Mode	Relevant Works
KNCONT	Perceived level of accuracy, timeliness and relevance of knowledge provided in the knowledge base	4	Reflective	Berman and Katoma (2006), Durcikova and Gray (2009), Kulkarni et al. (2007), Rao and Osei-Bryson (2007), Roses (2001)
CCRED	The degree by which the ERP system users consider that their source of ERP knowledge is perceived to be reliable and knowledgeable.	3	Reflective	Gefen (2000), Ifinedo (2007), Ko et al. (2005), Loh and Koh (2004), Wang et al. (2007), Wang and Emurian (2005), Wang and Ramiller, (2009)
OLEAD	Perceived level of the SMEs owner leadership which makes the acceptance of the ERP system possible.	3	Reflective	Bharathi and Parikh (2009), Cereola et al. (2012), Iacovou and Benbasat (2009), Igbaria et al. (1998), Kulkarni et al. (2007), Sarker and Lee (2003), Ramdani et al. (2013) Ramdani and Kawalek (2009)
INC	Perceived level of motivational factors and rewards during the implementation project	2	Reflective	Calvert and Seddon (2006), Gargeya and Brady (2005), Kulkarni et al. (2007), Snider et al. (2009), Wee (2000), Wong (2005).

Table 3.10 Summary of Constructs (Continued)

Constructs	Operational Definition	No. of Items	Mode	Relevant Works
EFKTR	The extent to which the ERP system users in Indonesian SMEs were able to absorb and utilise ERP related-knowledge in their workplace.	4	Reflective	Chan (1999), Davenport and Prusak (2000), Haas and Hansen (2005), Ko et al. (2005), Kulkarni et al. (2007), Tsai (2008).
ABCAP	Perceived ability of employees in recognising the value of knowledge, assimilate and then apply it to their daily activities	5	Reflective	Cohen and Levinthal (1998), Dierickx and Cool (1989), Dixon et al. (1997), Griffith et al. (2003), Ko et al. (2005), Park et al. (2007), Zahra and George (2002)
CULT	Perceived level of knowledge sharing behaviour to which the organisation members share different types of knowledge in Indonesian SMEs	3	Reflective	Fatt and Khin (2010), Gupta and Govindarajan (2000), Karlsen and Gottschalk (2004), Liao et al. (2007), Lin (2008), Liebeskind (1996), Okhuysen and Eisenhardt (2002), Metaxiotis (2009).
ESUCC	The perceived results of ERP system implementation in terms of usage and perceived benefits	5	Reflective	Armstrong (2005), Chung et al. (2009), DeLone and McLean (2003), Gable et al. (2003), Gefen and Ragowsky (2005), Ifinedo (2006). Venkatesh and Davis (2000).

Chapter 4 Research Methodology

4.1 Introduction

As a continuation of the research model, hypotheses and measurement scales development in previous chapter, this chapter explains the research approach, methodology, data collection and analysis methods applied in this research. The chapter begins with literature review on research paradigms and accompanying methods of research, particularly with regard to the field of IS, where three fundamental research paradigms, positivist, pragmatism, interpretive and critical studies, have been widely adopted. Following that the chapter provides the justifications of research paradigm and approaches selected to address the research problem. This research uses a mixed-method approach employing both quantitative and qualitative methods. This is done to test the hypothesis and to confirm research model. The next step is to conduct a reference interview to understand the issues in depth. The chapter provides an overview of the sample population, unit of analysis, data collection procedure and tools for data analysis used in both the qualitative and quantitative phase of this study. The final section explains the ethical considerations observed for the study.

4.2 Principal research paradigm

Any research endeavour is undertaken by following a certain research paradigm or particular set of assumptions (Yauch and Steudel 2003). Guba (1990) defines research paradigm as an interpretative framework guided by "a set of beliefs and feelings about the world and how it should be understood and studied." There are three main types of research paradigms commonly used in the field of IS: positivist, interpretive and critical (Myers 1997).

In general, researchers who see the world as a natural phenomenon and test universal laws underlying social phenomena tend to use a positivist approach. Positivist researchers position themselves as independent observers and use scientific methods, such as statistical analysis and other quantitative measures, to capture information about a variety of social reality, satisfaction, belief and behaviour. IS research using positivist paradigms typically involve quantitative measurement of a variable, identification of a population sample, hypothesis testing, and conclusion of formal propositions about the phenomenon under investigation (Klein and Myers 1999, p.69; Myers 1997). Drawing from the work of Hirschheim (1992), Kanellis and

Papadopoulos (2009) postulate that positivism in IS research is primarily based on hypothesis/antithesis testing process to find the causal relationships between identified variables. The positivist researcher is detached from the object being studied and deploys quantitative analysis to determine the causal relationship.

Interpretive studies attempt to explain a phenomenon on basis of the meaning of the phenomenon to the individuals who are the object of research (Klein and Myers 1999; Myers 1997). Interpretive research is focused on "social constructions such as language, consciousness, shared meanings, documents, tools, and other artifacts" (Klein and Myers 1999, p. 219). The data obtained are usually subjective and need to be interpreted for an understanding of the social context of the object studied. The ultimate goal of interpretive research is not to obtain the relationship between independent and dependent variables, but how the individuals under study experience the phenomenon. In the field of IS, this approach aims to understand the context of IS and its inter-influence process on the users (Walsham 1993). An interpretive researcher typically uses qualitative research methods to study managerial issues and perceptual attitudes in the implementation of IT.

On the other hand, a critical research approach aims to uncover the opposition, conflict and contradiction in the object under study (Klein and Myers 1999; Myers 1997). A critical researcher seeks to uncover the hidden agenda of the actions and persons under study and any biases to benefit a particular party. In terms of IS research, a critical research approach would seek to uncover the misuse of the IS and underlying reasons. Thus, the researcher would aspire to thwart the efforts of these groups and ultimately promote freedom and empowerment in the design and use of IS (Cecez-Kecmanovic 2001).

In view of the current challenges in computer science and IS disciplines, Jumadinova and Kazanchi (2010) argue that computer science researchers can use a scientific realist orientation in defining the methodological and psychological assumptions for their research efforts. The predominant approach in IS research is to develop observable relationships between processes, data structures, attitude, intention and satisfaction from empirical data. Walsham (1993) and Klein and Myers (1999) argue that in the context of IS research, it may be more appropriate to employ interpretative rather than critical or reflective approaches to understand user behaviour.

Burns (1997) suggests that research can be conducted with scientific empirical studies or naturalistic phenomenological approaches. These two research approaches are categorised as quantitative or qualitative, respectively (Creswell 2003; Neuman 2000). Positivist research paradigm typically uses a quantitative approach, whereas interpretive paradigm usually employs a qualitative approach. Yauch and Steudel (2003) explain that quantitative studies use survey methods or measurement techniques to yield data in the form of numbers, while quantitative researches use interview techniques, focus groups or participant observation to collect data in the form of words. However, another paradigm is available as an alternative. Besides positivism, quantitative research in IS can be conducted following a pragmatic paradigm.

Tashakkori and Teddlie (1998) posit that in order to develop an understanding of a phenomenon, researcher should understand the practical and empirical consequences, as well as consider the impacts of their study on the population. By using pragmatism, researchers can focus on quantitative versus qualitative data from the mix of subjective and objective approaches to answer their research questions. Furthermore, Tashakkori and Teddlie (1998) explained that pragmatic paradigm contains deductive and inductive approaches that aim to clarify the truth of a particular phenomenon. Johnson and Onwuegbuzie (2004) suggest that in pragmatism, answering the research questions is more essential than the research method that is employed.

With pragmatic paradigm, researchers have the freedom to choose procedures, methods and techniques of research that best suit their research requirements and objectives (Creswell, 2003). For example, quantitative researchers can freely use qualitative methods and qualitative researchers can freely use quantitative methods, as long as the methods used offer the best solutions to answer the problems and explain the study findings (Creswell, 2003; Johnson and Onwuegbuzie, 2004; Tashakkori and Teddlie, 1998). Therefore, the conflict of assumptions between qualitative and quantitative methods can be resolved by placing mixed methodology within the pragmatic paradigm. The pragmatism is classified as one of the appropriate research philosophies in research that employs combination of qualitative and quantitative approaches to investigate beliefs and attitudes (Creswell, 2003).

The following sections discuss the quantitative, qualitative and mixed approaches used at the different phase in this study, as well as example of researches in the field of IS associated with those approaches.

4.2.1 Quantitative approach

Pinsonneault and Kraemer (1993) state that quantitative research attempt to answer questions of 'what', 'how much' or 'how many'. Quantitative approach requires the collection of data or numerical objective that can be processed statistically to obtain a map, graph or tabulation as a basis for analysis. Quantitative research attempts to quantify the relationship between the variables of interest through statistical analysis to test hypotheses derived from general theories. The researchers need to understand the general theory on which a hypothesis is developed before making observations and draw conclusions from these observations. This process of reasoning is known as deductive reasoning as researchers draw from general statements in existing theories to arrive at specific conclusions about the data at hand. The opposite of this reasoning is inductive reasoning where researchers attempt to produce a new theory by building up from the available data without the influence of earlier theories.

Quantitative approach can provide a starting point for developing a field research design by identifying the organisation or individual that is suitable for subsequent qualitative case study analysis. According to Myers (1997), traditional quantitative techniques of data collection include methods, such as, questionnaire survey, administered by mail, face to face, and the internet for a random stratified sample or population, or other common techniques such as laboratory experiments, numerical methods, mathematical modeling, or formal methods such as econometrics. With the quantitative approach, researchers try to draw conclusions about the attributes of the target population. Therefore, the number of samples in quantitative studies should be large enough to represent the entire population, so that the results can be generalised, replicated or repeated elsewhere (Black 1999).

After the collection of data, researchers can use tools taken from the descriptive and inferential statistics to make some generalisations about the overall data. Descriptive statistics summarise the results of data in graphic illustrations or statistical values based on measures of central tendency and dispersion measures (Tashakkori and Teddlie, 2003). Measures of central tendency describe the distribution center with an

average value, such as mean, median and mode. Measures of dispersion, or variability, describe the spread of data around the distribution center or the difference of the mean and distribution, with a value range, variance, and standard deviation. Researchers use inferential statistics to determine whether the sample data obtained represent the population and to examine the differences between two or more sets of data. With inferential statistics, researchers can make a conclusion to accept or reject the proposed null hypothesis.

Sheskin (2003) explains that there are two types of inferential statistics, namely, non-parametric and parametric. The main difference between non-parametric tests and parametric tests lies in the shape of the distribution of observed data. Parametric tests such as t-test assumes that the data obtained has a normal distribution, while non-parametric tests make no assumptions about the population distribution. Non-parametric test or distribution-free test can be employed to examine all types of data including, nominal, ordinal, interval and ratio scaled.

4.2.2   Qualitative approach

Researches with a qualitative approach generaly concentrate on the subjective data and try to gather information from any opinions or experiences of individuals or groups in their own context. In other words, the qualitative approach objectives are to collect and analyse non-numeric data. Qualitative approaches usually involve small groups of people or organisations in order to obtain a full and rich understanding of complex phenomena being studied. Denzin and Lincoln (2011) explain that qualitative approach uses a variety of techniques including detailed interviews, observation and document analysis, to understand, explain and unravel social phenomena through interpretive and naturalistic methods. Management consulting and public policy makers use qualitative approach to help answer questions in various areas including strategic marketing, consumer decision making, customer satisfaction, communication, idea generation, product and concept development, and questionnaire formation (Ruyter and Scholl 1998).

In the field of IS research, quantitative survey-based approach is more widely used in the IS research community and studies using a qualitative approach only began to appear in leading IS journals in the 1990s (Newsted et. al., 1998; Trauth 2001). The application of IS technology has had a profound influence on the relationship between

the organisation and the people they serve. This has been acknowledged by scholars like Lee (2001) who argue that IS implementation not only deals with utilization of computers, but also involves a complex process of interactions between technology and users behaviours that resemble chemical equations acting in unpredictable manners to create compounds. The need for a flexible approach to investigate the dynamic nature and complexity of relationships between people, organisations and IT has encouraged the emergence of qualitative research from many IS researchers (eg, Avison and Myers 1995; Beynon-Davies 1997; Harvey and Myers 1995; Gable 1994; Orlikowski 1993). There are four qualitative research methodologies that can be used in IS research: ethnography, action research, grounded theory and case study.

Ethnographic research puts the researcher into the site of research where he/she will be conducting interviews, observing the culture and documenting events, feelings and actions of the object until a complete perspective of the phenomenon is acquired. The main goal of this method is to provide a thick description of the research object and to develop a theory. Beynon-Davies (1997) were one of the first scholars to suggest the use of ethnography for study of IS, IS development, evaluation or training of IS in organisations. However, because this method requires researchers to make observations without causing disruption or intrusion, ethnographic research often takes a lot of time to complete, usually months or even several years. In the field of IS, a number of researchers have employed ethnography to study IS development (e.g. Harvey and Myers 1995; Orlikowski 1991; Preston 1991).

In action research method, researchers are actively involved in solving the problem under investigation. Action research method combines various theories and practices to pursue some desired results on the actions taken and the research appears from reflective understanding of the actions. A researcher in action research applies relevant theories to real life situations so that feedback from the application of these theories can be obtained and necessary modification can be made and applied again to improve the situation (Avision et al 1999). There are not many studies in the field of IS that employ action research. A study by Vidgen (2002) on the development of e-commerce for SMEs in the UK is one of the few action research-based studies in the field.

The method of grounded theory uses both inductive and deductive approaches that aim to create a theory based on a systematic analysis of the raw data rather than depending

on the available thoretical frameworks in the literature. In this method, researchers begin with open-ended questions to collect data and then analyse this with theoretical sensitivity to gradually capture the common themes implicit in the data to develop a unified theory about the phenomenon. The use of grounded theory in the field of IS has been quite widely accepted and published in leading IS journals (e.g. Adams and Sasse 1999; Bryant 2002).

Case study is a technique used to examine theories in various types of cases experiencing a similar phenomenon within a real life context (Yin 2013). In the case study method, researchers collect their data from multiple sources applying knowledge already known from previous researches to derive specific conclusions about the case at hand (Yin 2013; Ellram 1996). Case studies may be used in different ways depending on the research paradigm taken by the researcher, that is, whether they take a critical, interpretivist or positivist approach (Cavaye 1996). According to Benbasat, Goldstein and Mead (1987), case study methodology has been found to be suitable for analyzing IS implementation where the focus of the study is on organisational rather than technical issues. Case study methodology is quite popular in IS research publications (Cavaye 1996; Gable 1994; Myers 1994). The case study approach is not without its drawbacks. Researchers that use these methods should note that research can take considerable amount of time and money (Merriam 2009) and the results are difficult to generalise (Simons 1996).

4.2.3   Mixed methods approach

The difference between quantitative and qualitative approaches has been subject of discussion among many researchers (Brewer and Hunter, 1989; Cooper and Schindler, 2003; Corbetta, 2003; Van Maanen, Dabbs and Faulkner, 1982). Cooper and Schindler (2003) noted that depending on the object of the study, researchers can use both quantitative and qualitative approaches as valid methods. In addition, Johnson and Gray (2010) suggested that researchers can mix quantitative and qualitative approaches according to the research objectives, as sometimes researches find both approaches are useful for effectively finding the answer of their research questions. By using a mixed methods approach, researchers can reduce the limitations and weaknesses of their research (Creswell and Clark, 2007; Miller and Brewer, 2003; Petter and Gallivan, 2004).

Johnson and Onwuegbuzie (2004) suggested that researchers can mix quantitative and qualitative approaches in one study in many different ways. They further stated that a mixed methods research design depends on two important decisions. Firstly, researchers must decide whether one approach is more dominant than the other and secondly, whether they employ those approaches sequentially or concurrently. For example, a quantitative phase might be followed sequentially by the qualitative phase, or both the qualitative and quantitative phases can be conducted concurrently in an equal way in order obtain more information about the phenomenon. Regardless of which research design is used, once the findings of both phases are interpreted, the researchers must integrate the findings at some stage.

Creswell and Clark (2007) outlined the advantages of mixed methods research in comparison to employing the qualitative or quantitative approach alone. First, mixed methods research can compensate the weakness of both qualitative and quantitative methods by using all the available types of data collection to obtain more evidence for studying a phenomenon. Second, mixed methods research enable researchers to answer a wider range of research questions by converging and corroborating the findings from the qualitative and quantitative datasets. Lastly, researchers may find that mixed methods research as being practical since they can adopt many possible methods to answer their research problems.

Mixed methods approach is not without its drawbacks. Johnson and Onwuegbuzie (2004) summarized weaknesses associated with the mixed methods approach. First, mixed methods approach is expensive and time consuming because researchers need to conduct both quantitative and qualitative studies to collect numerical and narrative types of data. Second, researchers are required to understand quantitative and qualitative approaches and learn to properly analyse the results of mixed methods research, in particular when the results from the two approaches are conflicting.

Despite the advantages, many scholars have acknowledged the importance of pragmatic paradigm and mixed methods to IS research (Barrett, 2010; Mingers, 2004; Venkatesh, et al., 2013; Zachariadis, Scott and Barrett, 2013). The ability of mixed methods research to help develop insights into various technical, contextual and situational needs within an organisation has garnered the recommendations from those scholars.

4.3 Justification of research paradigm and methods

The selection of research paradigm, research methodology, assumptions and analysis underlying the research needs to be performed carefully. Sarantakos (1998) provides a guideline for selecting a research design, beginning with a paradigm, approach, methodology and appropriate techniques for data collection and analysis. These steps are illustrated in the figure given below.

```
┌─────────────────┐
│ Paradigm        │
│ Pragmatic       │
└─────────────────┘
         │
         ▼
    ┌─────────────────────┐
    │ Approach            │
    │ Mixed Method:       │
    │ Quantitative and    │
    │ Qualitative         │
    └─────────────────────┘
                 │
                 ▼
         ┌─────────────────┐
         │ Methodology     │
         │ Survey          │
         │ Site Visits     │
         └─────────────────┘
                      │
                      ▼
             ┌──────────────────────┐
             │ Technique            │
             │ Questionnaire        │
             │ Statistical analysis │
             │ Interviews           │
             │ Observations         │
             └──────────────────────┘
```
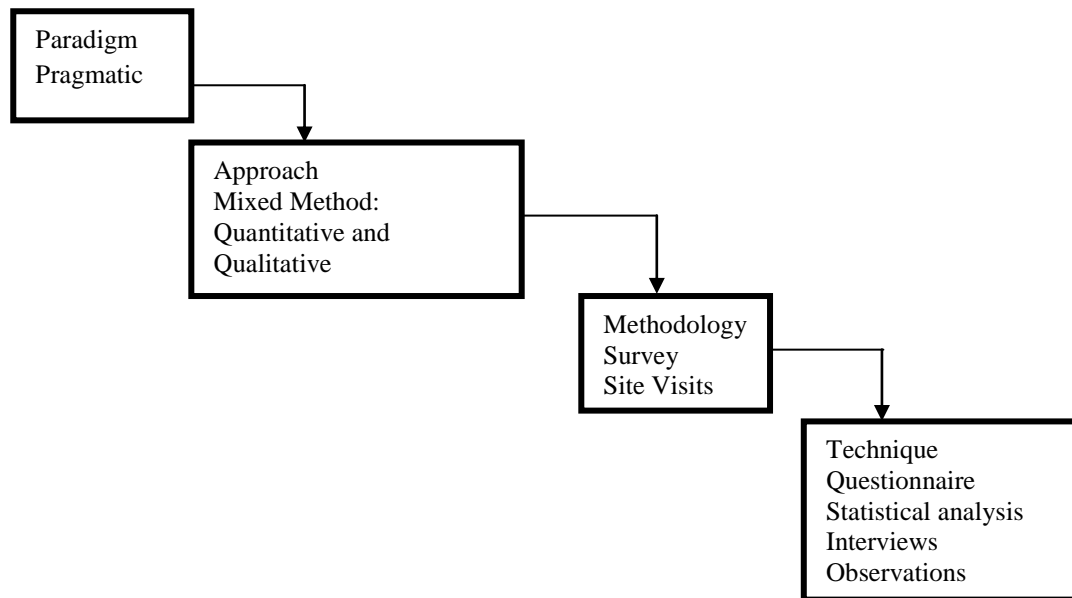
Figure 4-1 Research Design Adapted from Sarantakos (1998)

Based on the earlier discussion of the various research paradigms in previous section, this research finds the pragmatic approach to be most suited for the purposes of this research because its aim is to investigate the relationships between various factors influencing knowledge transfer. With this pragmatic approach, the purpose of the research is to model the process and test the hypotheses with data on factors affecting knowledge transfer in ERP adoption in Indonesian SMEs.

Since IS adoption process usually involves socio-technical systems (Kanellis and Papadopoulos 2009) the research also needs to focus on the interpretations of users involved in knowledge transfer processes. For a more nuanced understanding of IS adoption, information system researchers must view the adoption of IS not merely as a straightforward logistic process, but as a complex socio-technical process, that includes elements such as technology products, people, social relationships and environmental limitations. This means that researchers should examine social structures around the technological artefacts to study the phenomenon of information technology implementation in an organisation.

Given this situation, the traditional paradigms might not be fully adequate to answer the research questions. A more expansive paradigm that allows the researcher to obtain a deeper comprehension of the contexts and influences of the socio-technical process in Indonesia is required. Shanks and Parr (2007) suggested that IS researchers should consider a complimentary paradigm for positivism which is based on the premise that reality can never be perfectly knowable, and the relationship between concepts can only be approximated. Mingers (2001) suggested the need for a pluralist approach to IS research by applying methods derived from two different research paradigms. Easterby-Smith et al. (2012) suggested that by using a pragmatic paradigm, researchers can focus on their data to study a particular phenomenon and answer the research questions where the of mix qualitative and quantitative approaches is employed.

Therefore, the research design in this study is based on a pragmatic paradigm where it allows the utilisation of methods combination to match with the research questions. In pragmatic paradigm, researchers can choose about what question is important and what methods are appropriate for the study (Morgan, 2007). One of the central premises of the pragmatic philosophical reasoning in research is that the mixed of qualitative and quantitative methods would enable researchers to better understand the research problem than the use of either method alone in a study (Creswell and Clark, 2011; Tashakkori and Teddlie, 2003). This study is conducted using a sequential mixed method that includes sequential collection of both quantitative and qualitative data to provide answers to the research questions

One way to overcome the limitations of a particular research method is to combine it with other methods which will establish a complete and thorough triangulation of data for a more robust confirmation of findings. Petter and Gallivan (2004) advised researchers to follow a mixed approach between quantitative and qualitative methods in order to achieve a comprehensive understanding of IS implementation in an organisation. For example, a quantitative method can be performed through experiments or surveys, and once relationships between constructs have been captured, the research can proceed with qualitative methods by conducting an observation, interviews, or audio/visual documents collection. Research conducted by Kaplan and Duchon (1988) on the application of IT in hospital laboratories, and by Trauth and Jessup (2000) on the use of IT for group support systems are good examples of mixed method approach.

Creswell (2003) suggested that mixed research methods can be conducted sequentially or in a parallel manner, employing an approach that will provide additional clarification of the results obtained from the other one. The present study proceeded in a sequential manner using a quantitative and then a qualitative approach to collect empirical data. This study includes the application of a quantitative design method employing survey questionnaires, and qualitative methods, such as interviews and observations, as the primary instruments for data collection. A quantitative approach was employed to test the hypotheses about the phenomenon of knowledge transfer within ERP implementation projects. Then, the results of the interviews and observations were used to validate the results of statistical analysis through cross verification.

A survey questionnaire, developed from the research models was distributed to a sample frame drawn from State Ministry of Cooperative and SMEs database. The survey method was selected because it is a convenient and effective method to gather information about events or objects by collecting opinions and perceptions from a large sample. The survey contains questions that attempt to quantify user perceptions on constructs such as, user satisfaction, business owner's leadership and organisational culture. Appropriate statistical technique was employed to analyse these sample data to quantify the relationships between the proposed variables and validate the model.

In support of the quantitative data, a qualitative approach, including interviews and site observations, was used to acquire a deeper understanding of the socio-technical users and contexts of ERP systems within the selected organisations. For the interviews, questions were designed to be open and semi-structured to allow interviewees to answer to each of the core questions that subsequently lead to other questions. Literature review and the questionnaire data analysis provide information for the questions included in the semi-structured interviews. Semi-structured interviews were conducted with the ERP project team members from selected SMEs to provide a balanced illustration of ERP implementation cases. The users were asked to elaborate on their experience of the motives and barriers associated with the use of ERP systems in detail. The semi-structured interview was chosen because it allows the researcher to explore users' experiences of ERP system adoption by focusing on the main topics of interview and clarifying possible issues emerging from the interview. Content analysis was used to analyse and identify patterns and themes within the data. Consequently, the

findings from interviews and observations were used to elaborate and validate the findings from statistical analysis.

On-site observations were conducted in order to record particular circumstances and occurrences, such as how the SMEs employee would use ERP system in their daily business activities. Information collected from on-site observations provides additional insights for the in-depth interviews and consequent data analysis. The on-site observation technique also provides an approach to achieve a level of trust with the employees in order to promote the information of knowledge sharing and open response, particularly during the interview sessions. The observations were carried out during the four weeks visit to two selected SMEs where user behaviours and their office environment were surveyed.

In terms of user behaviour, observations were conducted to survey how SMEs employees and ERP project members use ERP system and the available knowledge-related materials their office. In particular, how the office environment setting facilitated or hindered with the knowledge transfer activities happening within it to obtain data about the chances and limitations that provided during the ERP system implementation projects. In term of ERP project environment, both SMEs offices were surveyed to understand what decisions the SMEs owners and ERP project teams made about their knowledge management initiatives, how ERP related books and materials were provided, how employees and ERP team members used it, how employees perceived the ERP projects and in general how knowledge management iniatives during ERP projects met the needs of its users. Mainly, the office environment where ERP projects took place were surveyed in order to generate possible concerns for further discussion during the interview sessions. The emphasis was to recognize what a knowledge transfer within ERP project setting might indicate and what implications might occur from it.

While the two methods employed in this study approach the research object differently, they are not in any conflict with each other, but instead facilitate validation of data through cross examination from different data sources and triangulation of analyses that increase the credibility and validity of the findings. As Cohen and Manion (2000, p. 112) explained, triangulation attempts "to map out, or explain more fully, the richness and complexity of human behaviour by studying it from more than one standpoint". By

comparing the results of statistical analysis and content analysis, factor influencing knowledge transfer in Indonesian SMEs' ERP system project can be identified.

This research process is illustrated in following figure:
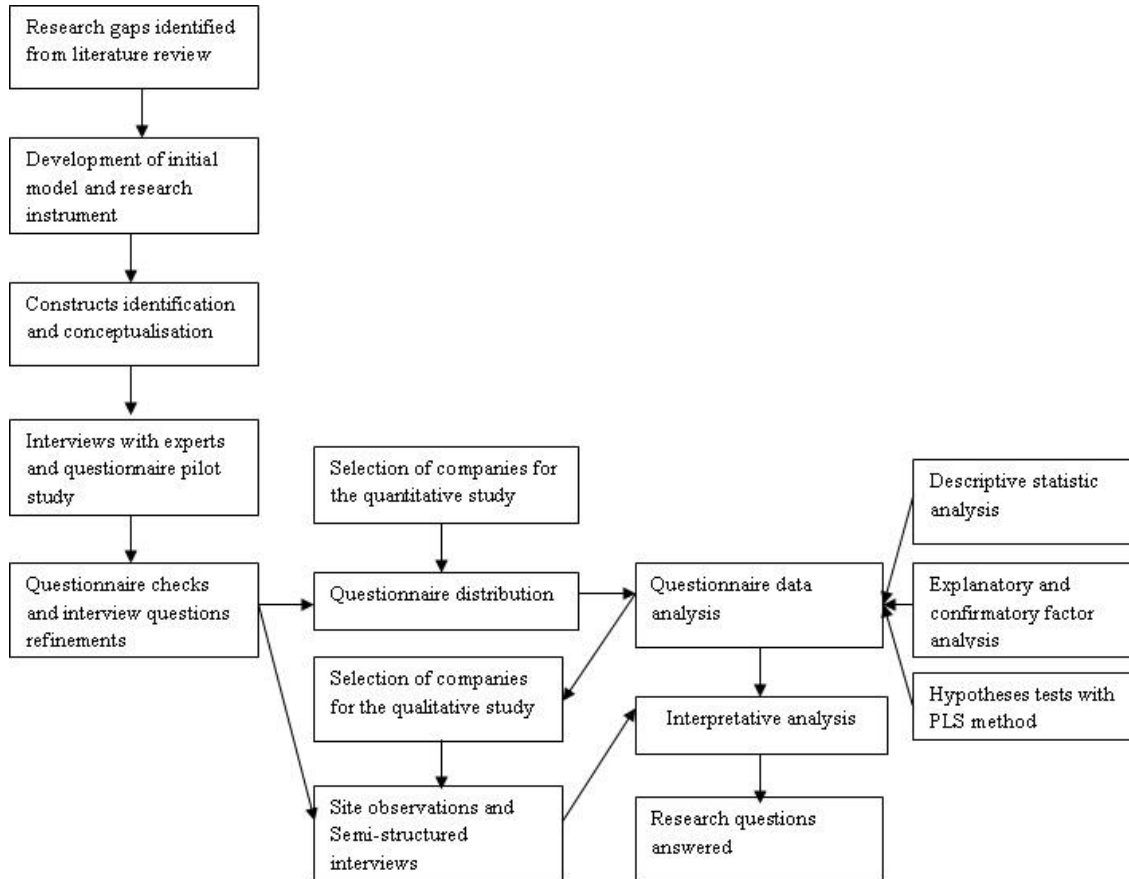
Figure 4-2 Research Process

4.4 Quantitative method

In the quantitative phase of the study, survey method was employed to examine the constructs proposed in the research model. The target population for this research was Indonesian SMEs which have implemented ERP systems, and the targeted respondents were managers or project team members from these SMEs. The population frame for this study was chosen from the Indonesian State Ministry of Cooperative and SMEs database and Indonesian ERP system user mailing list community, which contained postal and/or e-mail addresses of business organisations or people using ERP system technology. The Indonesian Ministry database was open for public access. In order to identify the intended participants from mailing list community, a permission to use the member directory had been requested from the mailing list owner. Since the

accessibility to the list of firms and ERP user community members has been secured, the list of potential participants for the study was obtained without difficulty.

The study used purposive sample technique to generate a list of target participants from the available member directories of the Indonesian Ministry and mailing list of ERP systems users community in which a membership and certain credentials are required to join. A purposive sample was developed based on two justifications. First, according to Zhao (2005) the researcher can obtain information-rich cases from purposive sampling. Second, purposive sampling is helpful to develop something or describe a phenomenon where only little is known (Kumar, 2005). According to Singleton and Straits (2005), purposive sampling occurs when the selection of representative unit of the population is selected based on a researcher judgment. Based on purposive sampling, the sample was chosen based on important characteristics, such as company size and type of IS implemented in the company. Therefore, the sample was selected to represent typical and representative of Indonesian SMEs that have implemented ERP systems. It is expected that this study obtained information from who can provide the best information to address an important goal of validating the research model and achieving the objectives of this study.

4.4.1 Unit of analysis

The unit of analysis in the present study was managerial employees of administrative, functional or technical department in Indonesian SMEs that have implemented ERP system to their organisations. These core survey participants were key users and have been considered as representative of their respective companies. As suggested by Mitchell (1994), the researcher assumed that the questionnaire was collected from the qualified person who shared interest in the study and has knowledge regarding the information sought.

As previously mentioned the survey participant was management professional who has involved and operated ERP systems in their workplace. Since the research was conducted in the context of SMEs, small or medium entrepreneurial firm managed by one or two managers, it was expected that the research information was attained from one respondent from each company. Warwick and Linger (1975) suggested that researchers can collect data from a portion of the population selected as representation of the whole population by using a sample survey as a data collection tool. Leedy and

Omrod (2005) agreed that researchers can use survey method to study an entire population by examining a small portion of that population. According to Mitchell (1994), managerial employees enabled standardisation of information and were considered reliable. In line with these authors, the survey participants selected for this study was either SME's manager or any other person within the organisation who involved in the ERP systems project.

4.4.2 Survey design

A survey is considered suitable to gather information from respondents about their perceptions and behavioural intentions. According to Warwick and Linger (1975), in the survey method, a researcher uses questionnaires or interviews and makes direct contact with the individuals, organisations or communities to obtain information about that population in a methodical way. Gable (1994) advised that the survey approach tends to produce only a snapshot of the larger events and give little information about the meaning of the events that occurred.

Positivist researchers have predominantly used the survey method because it is particularly effective for determining the real values of variables under research and to measure the strength of relationships between them (Newsted et al. 1998). Newsted et al. (1998) suggested that these values or numbers can be aggregated on basis of the trends in the data taken from the responses on every questions included in the survey. These values can then be analysed with appropriate statistical tools to examine the proposed hypotheses and validate the research model.

Questions were carefully designed to avoid response bias, reduce the amount of incomplete surveys and increase the response rates. The survey questionnaire includes a set of questions relevant to the assessment of the users' behaviours and perceptions about the results of ERP system technology and knowledge transfer process within their workplace. The demographic information was collected through the use of dichotomous, categorical or selection list response types. Most of measurement scales used in the study was adapted from previous studies with minor modification to comply with the research topic. Respondents were expected to answer all questions on a five-point Likert Scale with 1 denoting strongly disagree and 5 denoting strongly agree. Torkzadeh and van Dyke (2001) support the use of Likert type scales in survey research as it provides an easy and convenient way for respondents to report their

behaviour and perceptions. The preparation of survey instruments involved a careful approach to determine rating scales that appropriately measure respondent's response to a statement. A five-point Likert scale was preferred over other scales because it was seen as very straightforward and might allow respondents to better understand what answer he or she should give to complete the survey (Neuman, 1997; Spector, 1992). Using five-point Likert scales is also in accordance with research in IT and knowledge management studies (e.g. Igbaria et.al., 1998; Karlsen and Gottschalk 2004; Ko et.al., 2006; Kulkarni et.al., 2007; Wang et.al., 2007).

According to Saunders, Lewis and Thornhill (2000), researchers should obtain some assessment of the questions' validity of the data that will be collected and ensure whether the question and answer make sense. In order to validate the measurement and instrument used in this study, a pilot study was carried out. Saunders et al. (2000) suggested that the pilot test help researchers to refine the questionnaire so that their respondents will have no difficulties in answering the questions. The pilot study was conducted with a group of 5 postgraduate students at the School of Management and Information Systems of Victoria University, Melbourne, Australia. The objective of this pilot study were to ensure that the length of the time required to complete the survey was acceptable and, if necessary, to refine the instruments if they were unclear. Before the study was launched, the measures included in the survey questionnaire were consulted to two experts in the field of ERP system research to confirm that the measures aligned with the view of the principal theories and suited the researcher's objectives. Feedbacks and suggestions were received and generally, the survey questionnaire was considered to be reliable and valid. Based on the pilot study results and suggestions from the experts, minor modifications were made to the survey questionnaire. For example, on one of the demographic survey question about implemented ERP system, a couple of ERP software types were added. The pilot study result was also indicated that the time taken for answering all the questions was around 45 minutes which is less than a preferable length of time. Therefore, a few of measurement items were removed from the final survey to reduce the time required to complete the survey. The instrument survey was shortened without jeopardising the research model as most of the measurement in the final version still consists of more than three items. Some modifications on the questions structure were also made to improve the questionnaires' clarity. Efforts were made to detach the item questions

from social desirability in order to prevent respondents from giving incorrect answers to preserve their social prestige (Podsakoff, MacKenzie, Lee, and Podsakoff, 2003).

4.4.3 Data collection procedure

Participants could participate in the survey by answering the paper surveys sent by post or complete the survey on a designated website. Postal survey allows the researchers to reach a large sample of respondents in a wide geographic area at the same time and at a reasonable cost. Respondents will have time to think about answers without the influence of an interviewer, thus problems of bias can be diminished. Furthermore, researchers can request additional data and seek additional sources if verification is needed (Saunders et al., 2000).

In addition to this traditional method of paper surveys, email and internet-based surveys were also employed (Saunders et al., 2000). This study employs web survey provided by www.surveygizmo.com to meet respondents' convenience and to encourage completion of questionnaires. Web surveys are more convenient than paper-based surveys as they eliminate the need for researchers to manually validate, enter or process the data. Web surveys also allow users to anonymously approach the survey and complete the survey anywhere and anytime they want (Chang and Chen, 2008; Wang and Emurian, 2005).

Chin (1998) proposed the rule of 10 to determine the minimum requirement of sample size. This study followed this recommendation to ensure that the sample size required for Partial Least Square (PLS) analysis was at least 10 times the number of independent variables. In addition, Chin suggested that the sample size can be determined by counting the amount of arrows on the research model and multiplying the most incoming arrows on a construct by 10. In this study, ERP system Success has the most predictors. Thus, based on the rule of 10, the data analysis in this study sets a benchmark of 40 responses as the minimum sample size.

Since the sample was purposively chosen from a large database and mailing list of available Indonesian small and medium firms and ERP user members' directories, a sufficient response rate was expected. The invitation to participate in the study was then sent and it was expected that the sample would translate to achieve a minimal

response rate of 15 % of the intended respondents (Anseel, Lievens, Schollaert and Choragwicka 2010).

4.4.4 Survey Response

In this study, the survey questionnaires were distributed to respondents working in 150 Indonesian SMEs. Based on the rule of 10 (Chin 1998), a sample of 50 responses was set as the minimum requirement for conducting the appropriate PLS method analysis. Responses to the first invitation were expected back within the next four weeks, however, in the first month, only eight responses were received. The researcher was faced with a dilemma of how to motivate participants to voluntarily complete the survey to improve the number of responses. To achieve an acceptable response rate, the researcher disbursed the survey and invitation via e-mail to firms listed on the Indonesian ERP user community group. The researcher also took some action to proactively draw in more respondents by visiting companies drawn from the peer network of the researcher's colleagues.

Survey management and spread sheet software were used to extract and collate the data from the responses received during this study. This was done to determine the response rate and assess whether the total number of responses would achieve the minimum requirement of sample size within the allotted time frame of the survey. At the end of the survey period, the data were extracted from the received documents and the online survey tool into a Microsoft Excel file. The data from the returned questionaries and online survey tool were formatted into a workable document in Microsoft Excel format and analysed using Statistical Package for Social Science (SPSS) software version 17.0.1 for Windows. The SPSS package was chosen because it is relatively easy to use and is one of the most popular tools for statistical analysis. Because parts of the survey have textual answers instead of numeric ones, a numeric codification of the data was required. The responses for each item in the survey were given numeric values to aid the process of data analysis. This was done through manual codification for each case.

A total of 56 responses were received, producing 16 more than the minimum threshold of 40 responses. In terms of the proportion of the receive responses against the overall targeted sample, the response rate of 56 completed responses from 355 invitations made a response rate of 16%. According to Volsky Westbrook, T., and Poku (2002), the response rate for survey research in industrial studies typically fall between 15-

30%, so the response rate of this study is acceptable by those general norms. Even though the number of responses is significantly smaller than the overall number in the targeted sample, judging by the rules suggested by past researchers, the collected data is adequate for analysis. The primary goal of this study has been to confirm a proposed model rather than verify an already established model (e.g. Hua, Nock and Shin, 2004; Huang and Palvia, 2001; Ko et al., 2005; Lane and Lubatkin, 1998).

Prior to performing any analysis, the data were checked for incomplete responses. Visual scanning was conducted to find any missing values in the data file. The result of the manual scan showed that all survey responses contained complete answers generating the data required for the hypotheses testing. Since this study focuses on ERP system use in small and medium firms in Indonesia, any participant that did not satisfy these two criteria would be unsuitable for the present study and were removed. The survey includes a couple of inclusion/exclusion questions to determine if the respondent was suited to the study. Before proceeding on to the survey, the respondents were asked to confirm if they used ERP system in their workplace and the company's sales turnover were not worth more than $5 million.

4.4.5   Data analysis

Previous chapter has presented 9 latent variables contained in the research model which requires to be examined with an appropriate method. This study did not used standard regression analysis because the objective is to analyse causal relations and gather more information about possible structural relations between the constructs in the model. According to Savalei and Bentler (2007), standard regression analysis generally puts the combined scales of measured indicators into the respective latent variables or constructs; thus any information about the potential differential performance of a construct's dimensions over other constructs could be lost. Instead, latent variables are evaluated by multiple indicators that reflect or are an effect of the corresponding latent variables.

Structural equation modelling (SEM) has been acknowledged as a powerful statistical method for estimating regressions among continuous factors or latent variables of a model, especially variables that incorporate multiple dimensions, thus, allowing all structural relationship and measurement instruments to be observed (Kline 2005; Maruyama 1997). SEM offers advanced technique which contains and integrates factor

analysis and path analysis to analyse a model with multiple factors for each variable as well as hypothetical paths identified between the latent variables (Garson 2012). SEM has become a popular data analytic technique in marketing, medical and information systems research (Gefen et al. 2000). In IT research, the seminal work by Adams, Nelson and Todd (1992) used SEM to analyse latent variables of usefulness, ease of use and usage of IT.

An alternative approach of SEM which is increasingly used in social science and information systems researches, and employed in this study is Partial Least Squares (PLS) modelling. Partial Least Squares (PLS) path modelling is used to predict one or more dependent variables from a set of one or more independent variables and examine causal paths connecting the predictors as well as paths connecting the predictors to the dependent variables. The conceptual core of PLS is an iterative combination of principal component analysis relating latent variables to their manifest variables, and path analysis allowing the estimation regression coefficients for the latent variables and their corresponding indicators (Chin and Newsted 1999; Thompson, Higgins and J.M. Howell, 1995). Kulkarni et al. (2003) used the PLS method in the development of their KMS success model.

According to Fornell and Bookstein (1982), PLS is suitable for analysis when measurement scales are used for predictive and exploratory research, as in the current study, while SEM is more suitable for theory testing and theory development. Further, PLS requires fewer conventional assumptions on the data, such as measurement scales, sufficient sample size or normality in sample data distribution (Wold 1995). Chin and Newsted (1999) argue that PLS method is congruent with a research situation where the data conditions relating to large sample size and normal data distribution are not met. Since the responses gathered in this study were less than 200, the PLS path modelling is adequate to test the proposed research model. In order to facilitate analysis in this study, the SmartPLS software program (Ringle et al. 2005) was used.

4.5 Qualitative method

As mentioned previously, this study continued with qualitative case studies after the quantitative surveys were finished. Burns (1997) states that quantitative research methods tend to ignore the behaviour, attitudes and motivation of people. Here, qualitative research can overcome this gap by providing a more nuanced understanding

of how people think, interpret, explain and respond to their experiences. The case studies were conducted to explore the complexity of the phenomenon being studied and confirm the generalisations made through the quantitative data with individual user experiences.

The SMEs in the sample were selected based on the questionnaire answers whether ERP system implementation project's result in the company successful or not. The two participating firms for the case studies were selected to represent the most successful and unsuccessful examples. Interviews were conducted with different actors to capture the situation in each case and understand the factors at play.

4.5.1   Unit of analysis

Using the results of the questionnaire survey, the researcher selected one firm that had a successful experience with ERP implementation and one that had failed to do so. Based on the information provided in the consent form, two companies were identified. Two extreme cases in these companies would allow the researcher to explore the dynamics which led to success or failure in each case. The unit of analysis in this phase was the organisation, but the study was conducted at the level of individual. The unit of analysis was stipulated in the main question of the study. The problem statement and research questions regarding knowledge transfer process within ERP systems project entail the unit of analysis as an individual from the organisation who has been involved in the project. In reviewing prior literature in similar studies (Armstrong, 2005; Ko et al., 2005; Kulkarni et al., 2007), the researcher specifically selected SMEs managers and their team members for each case study.

Key respondents in the case studies were people with knowledge and experience about the ERP system implementation in their respective firms. Bernroider and Koch (2001) found that in SMEs, the average of ERP systems project team size is only 4.8 compared to 9.8 persons for larger firm. Therefore, it is expected that the case studies would have sample of 2 or 3 key employees as representative of the ERP systems project team. In this study, participants should have been actively involved in ERP project either part or full time and should have been a management member of Indonesian SMEs. Therefore, after obtaining the agreement of the owner/manager of the selected companies, several personnel involved in the ERP system implementation project were chosen. In Company 1, the manager and two supervisors from the company were interviewed. In

Company 2, the owner and the business manager from the company were interviewed. Semi-structured, face-to-face interviews for each of the interviewees were carried out during the period from October to December 2012.

The views expressed by these individuals are considered as reliable indicators of the reality behind the problems underlying knowledge transfer process in ERP system project in these SMEs. Moreover, key users are usually employed in study of ERP system implementation and responsible for getting the ERP system working (e.g. Haines and Goodhue 2003; Wu and Wang 2007).

4.5.2 Data collection procedure

Semi-structured interviews were conducted to gather information on the problems and causes related to knowledge transfer process during their organisations' ERP project. In particular, the respondents were asked to report on what happened in the projects and which were the factors they considered important in each case. These results were referred to the ones revealed in the literature and were compared with the statistical analysis results. As this thesis is written in English, there might be an issue regarding the use of Indonesian language in interviews. However, in order to maintain contextual meaning of the interviews, the transcript used in content analysis of this study is written in the original language. The participants then were asked to check and confirm the transcription results.

The interviews questionnaire has been prepared in two languages, English and Indonesian. The English version has been translated into Indonesian by the researcher and evaluated by an Indonesian Ph.D. student at Victoria University. As this thesis is written in English, there might be an issue regarding the use of Indonesian language in interviews. However, in order to maintain contextual meaning of the interviews, the transcript used in content analysis of this study is written in the original language. The participants then were asked to check and confirm the transcription results.

A qualified translator has been asked to translate the transcription results from Indonesian into English version and a Ph.D. student at Victoria University has been asked to review the English version. In order to make it easier for the English speaking readers to go through the data and make it accessible to Indonesian speaking readers as well, the interview transcripts were constructed in parallel translation format (Nikander,

2008). A sample of the interview transcript is attached in Appendix D. In addition, site observations were also conducted in the two selected case studies. These observations provided background information about the research object and allowed of the researcher to explore the organisational context within which the ERP systems were being implemented.

4.5.3 Data analysis

The relationships between variables are believed to be dynamic and complex. In this phase of the study, interview questions were developed to describe and identify any possible relationships. For that reason, respondents in the case studies were asked about the process of ERP system implementation in their organisation, as well as certain organisational or contextual factors that they perceived to be involved in the implementation project. The objectives of the case studies were to confirm the causal relationships described in statistical analysis results and to understand how the hypothesised factors actually played a role in ERP success in both cases. In other words, if the hypotheses were validated in the quantitative analysis, this part of the study aims to explain why the proposed variables are important in influencing the knowledge transfer process in ERP project. It explores the background stories and user experiences in the process of ERP system implementation to explore how these factors come into play in Indonesian SMEs.

An interpretative approach was used to analyse and present the data from the case studies. According to Brower, Abolafia and Carr, (2000), an interpretative approach requires deep knowledge of the context and requires an explanation of the characteristics of the phenomenon. There are different ways to develop an interpretative case study and to understand the social reality being studied. The data obtained from the quantitative phase in this study was analysed by summarising the common themes, comparing and contrasting between cases, explaining the validated causes of the phenomenon, and constructing theoretical model based on these findings.

4.6 Ethical considerations

Research involving data collection from human subjects must consider some important ethical issues. In compliance with the ethical considerations outlined by Neuman (2000), the present study acknowledges the probability of some risks in the course of the research. There are some areas in this research that might raise concerns about

physical and psychological harm, deception, possible informed consent and breach of privacy. For instance, the employees or managers participating in the survey may have wrongly assumed that this would bring some sort of benefit to their job assessment. Conversely, the employees may also have assumed that their employer would give unfavourable evaluation if they chose not to participate in the survey. In order to address this issue, the information sheet, informed consent form and the invitation sent to target participants provided explicit statements regarding the purpose of this survey. The consent form with the information sheet is attached in Appendix A at the end of thesis. When required, the firms' owners along with the researcher also explained and reminded the respondents that their participation in the study was voluntary. The possibility of physical harm occurring during the survey has also been reduced by the implementation of online survey. Since the survey can be completed anytime the respondents felt convenient to do it and it did not ask for any personal information from the participant. Employees who chose not to become respondents and complete the survey were not affected in anyway. Other than that, the researcher could not identify any other forms of legal or physical damage in this study.

To avoid perceived deception in the survey, the questionnaire added an introductory page which mentions the objective of the study, the researchers' identity and voluntary nature of participation. The purpose of the research and the procedures of data usage and storage were also clearly written in the invitation to complete survey via website. The respondents' identities were not disclosed and the confidentiality of their responses was guaranteed. Further explanation regarding these procedures was also included in the informed consent forms and given to the respondents during the interview phase. Prior to the questionnaire distribution, the proper administration of the survey was developed to comply with Victoria University research policy and to follow the university's formal procedure of research ethics.

The study was approved by the Victoria University Human Research Ethics Committee on December 6 2011. The approval number was HRETH 11/182 and expired on December, 6 2012. The fieldwork for the study was initiated on 20 December 2011, with dispatch of the invitation, consent form, and survey to 150 companies identified as the target population for this study. These companies were invited to participate in the survey and complete the questionnaire either in form of the copy provided with the package or via the web survey on the internet.

4.7 Summary

The research design approach used in this study has been discussed and justified in this chapter. Mixed research methodology is considered as appropriate approach to examine the phenomenon of knowledge management in ERP system implementation in Indonesian SMEs. First, a quantitative approach using traditional and web-based survey was employed to confirm the research model and test the proposed hypotheses. A qualitative approach using interviews was employed to support the findings of quantitative method and provide additional illustration of ERP system implementation in Indonesian SMEs. This chapter also included research procedure followed in data collection and data analysis to maintain its reliability and validity. Data analysis techniques involved in this phase include demographic analysis and SEM analysis method. A PLS path modelling was chosen to examine the research model and test the hypotheses because of its ability to sufficiently handle a small sample size and non-normal data distribution. The following chapters discuss the results of data analysis techniques employed in this study.

Chapter 5 Results: Quantitative Surveys

5.1 Introduction

This chapter is concerned with the quantitative data gathered from survey responses to verify and validate the research model. The chapter includes a detailed explanation of the results from the statistical analysis, including descriptive statistics, multivariate analysis and hypotheses testing. The chapter begins with explanation of descriptive statistics. Demographic information requested from the participants is presented in the descriptive statistics to illustrate the general profile of the respondents and their companies. Next, multivariate analysis, including validity and reliability tests, are conducted to refine the research model. The revised research model is illustrated with the changes incorporated to improve model fit with the sample data. The last part of the statistical analysis presents the results of the hypotheses testing.

5.2 Descriptive statistics

As mentioned in the last section, data from the inclusion/exclusion questions shows that there were 56 usable responses that were confirmed as belonging to Indonesian SMEs which had implemented ERP system. The descriptive phase of the data analysis was performed in the next step. In this step, the descriptive questions provided in the survey questionnaire were used to compute various descriptive statistics and gather information about the demographic characteristics of the sample data. The survey, included in Appendix B, contains questions about demographic characteristics of the respondents, as well as specific subjects associated with the variables included in the research model and the objective of the hypotheses tests. The questionnaire was kept private and anonymous for all participants. The results of the demographic questions are presented in the following sections with accompanying tables to illustrate the data.

5.2.1   Company profile

In the first three questions of the survey, respondents were requested to indicate their companies' business focus, number of employees, and annual sales turnover. The annual sales turnover and the number of employees of the participants' organisations as well as their business sector are presented in Table 5.1, 5.2 and 5.3 below.

Annual Sales Turnover

In annual sales turnover classification, over half of respondent companies had annual sales turnover less than $250,000, while slight less than 50% of the respondent had annual sales turnover between $250,000 and $5,000,000. Since the Indonesian Law on Small Enterprises of 2008 categorises a small enterprise as a business entity which either has maximum sales revenue of $250,000 or man power ranging between 5-19 people, it can be said that the respondent companies in this study tend to fall within the definition of Indonesian medium enterprises rather than that of small businesses. The researcher anticipated a greater volume of responses coming from medium sized companies than small companies and the results were in line with that prediction.

Table 5-1 Annual Sales Turnover

Value	N	Per cent %
Up to $ 30,000	2	3.57%
$ 30,000 - $ 250,000	26	46.43%
$ 250,000 - $ 5,000,000	28	50.00%
N = 56 companies		

Number of Employees

Indonesian SMEs size is determined by either employee numbers, or revenue. All of the respondent companies had no more than 500 employees. Almost 70% of the respondent companies employed 26-250 people, while just about 23% of the respondent had 250-500 employees.

Table 5-2Number of Employees

Employees	N	Per cent %
0-25	5	8.93%
26-100	25	44.64%
101-250	13	23.21%
250-500	13	23.21%
N = 56 companies		

Business Categories

The distribution of the business focus of the firms in the study is presented in the next table. The demographic statistics results show that SMEs in various industries in Indonesia has engaged in ERP system implementation. As expected, the respondents in this survey predominantly came from manufacturing/engineering and distribution categories. The respondent companies represented a broad range of industries and varied business sectors. The manufacturing and/or engineering industry represented the largest group of respondents (44%), followed by distribution (19%) and retail (10%).

Table 5-3 Business Categories

Categories	N	Per cent %
Manufacture/Engineering	25	44%
Distribution	10	19%
Retail	6	10%
Consulting	5	9%
Food Industry	5	9%
Contractor	4	7%
Warehousing	1	2%
N = 56 companies		

5.2.2   ERP type and module

The next question related to the type of ERP system used in Indonesian SMEs. The survey collected data on the type of ERP system and modules utilised in respondent companies. The result from the answers as reported by the participants is presented in Table 5.4 and 5.5.

Implemented ERP System

The researcher expected open source and in-house built type of ERP system would be the most commonly used type. With total share of over 70%, open source-based and in-house built type of ERP system seems to be the preferred choice for Indonesian SMEs. Compiere, and its modified version Adempiere[1], make up over one third of all ERP

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[1]ADempiere 2010, *Open Source ERP - Compiere Fork - ADempiere*, ADempiere ERP, viewed 28 August 2012, <http://www.adempiere.com/Open_Source_ERP_-_Compiere_Fork_-_ADempiere >

system implemented and 29% of respondent companies have adopted, implemented and used an ERP system from less-known software vendors. The preference for open source and in-house built type of software could be due to limited financial resources of SMEs as they may often be unable to afford packaged software from leading software companies. However, 15% of respondent companies installed SAP, and just over 10% named Microsoft Enterprise Solutions or Open Bravo ERP as their ERP system choice.

Table 5-4 Implemented ERP Systems

System	N	Per cent %
Compire/Adempiere	19	34%
Others	16	29%
SAP	8	15 %
Microsoft ERP	6	10%
Open Bravo ERP	6	10%
IFS	1	2%
N = 56 companies		

Implemented ERP Modules

The next part of the survey asked whether the firms' management decided to adopt certain types of modules from the ERP system for their business. There are a range of modules that can be customised and implemented selectively to suit the business needs of a firm. This question was posed in order to gather additional information related to the type of ERP software modules that were being implemented. Table 5.5 below contains the ERP system modules used in the participants' organisations, which shows that inventory module were used by the majority of the firms, followed by accounting/finance and purchasing. In terms of actual figures of the proportion, inventory module was installed in 88% of respondent companies. Accounting and purchasing modules were the second most popular modules and were implemented by 82% of respondent companies. The type of implemented ERP modules in the respondent companies corresponds to the profile of Indonesian SMEs. According to table 5.3, almost 80% of the firms in this study were in the fields of manufacturing, retail and distribution business sectors, it was not surprising that accounting, inventory and purchasing modules were the most preferred modules of ERP system.

Table 5-5 Implemented Modules

Module	N	Per cent %
Inventory	44	88%
Accounting/Finance	41	82%
Purchasing	36	72%
Production Planning	21	42%
Sales/Marketing	20	40%
Human Resource	8	16%
N = 56 companies		

5.2.3 Implementation process

In this section, a set of questions were formulated to identify difficulties caused during the implementation of ERP and determine whether the ERP system had been successfully implemented in the participants' organisations. The following tables present the results of these questions about ERP success in relation to budget realisation and time-frame.

ERP system implementation budget realisation

Perhaps, due to the required business process change management and complexity of implementations, 66% of ERP system implementation projects in the sample were over budgeted. Just over 41% spent up to 25% more than planned budget, and another 19% were 25%-50% over budget. These study findings are slightly worse than the ERP system survey report released in July 2012 by Panorama Consulting[2] which revealed that, based on 2,000 responses gathered from 61 countries, ERP projects in their respondent companies run over-budget 56% of the time. It seems safe to assume that Indonesian SMEs experienced cost overruns in their ERP system implementation

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[2]Panorama Consulting 2012 20*12 ERP Report*, Panorama Consulting Solutions, viewed 28 August 2012 <http://panorama-consulting.com/Documents/2012-ERP-Report.pdf>

project because of unexpected or underestimated fees, poor recruitment planning and/or technological issues.

Table 5-6 ERP system implementation budget realisation

Budget Realization	N	Per cent %
On budget	19	33.93%
1% -25% more than budget	23	41.07%
25% -50% more than budget	11	19.64%
more than 50%	3	5.36%
N = 56 companies		

ERP system implementation time of completion

The budget overruns situation faced by Indonesian SMEs participating in this study was also reflected in ERP system project completion time. Just over 70% of the respondent companies completed their ERP system implementation later than the proposed schedule. Roughly 40% of the project completion faced a delay that lasted between 1 month - 12 months, and 17% were finished more than a year late. Again, these figures are not as good as the Panorama Consulting survey results in which only 61% of their respondents said that their ERP system projects went over schedule. Therefore, this study supports the notion from the Panorama Consulting report that it has become a common norm for adopting companies to spend more money and time than what they had planned in their ERP system implementation projects. In fact, Indonesian SMEs seem to rate even lower than their global counterparts in time/budget realisation, thus, posing great challenges in their efforts to adopt ERP systems.

Table 5-7 ERP system implementation time of completion

Completion Time	N	Per cent %
On time	16	28.57%
1 month - 6 months late	22	39.29%
6 months - 1 year late	8	14.29%
more than a year late	10	17.86%
N = 56 companies		

5.2.4   ERP success and usage

This section was concerned with questions about the level of usage and success of implementation of ERP systems. While the success rate of ERP implementation needs to be objectively measured, user perceptions about this issue can also be a good indicator of the matter. The level of usage could be an indication of whether ERP has just been implemented for formality's sake or if it is actually being used by employees.

ERP system implementation result

According to Mabert, Soni and Venkataramanan (2001), besides effective use and operational benefits, companies often cited on-time and on/under-budget performance as success measures for their ERP system projects. In this study, 25% of the respondent claimed that their companies have successfully implemented their ERP systems. This data is in line with the above reports of ERP system implementation budget realisation and time of completion, where only 29% of the projects were finished in time and 34% on budget. However, 84% of all respondents in the sample perceived their ERP system implementation projects to be of, at least, a moderate or quite success rate. This could mean that ERP systems have been used and operated in their company, even though the ERP projects were over budget or late.   Furthermore, 16% of the companies in the sample had completely failed to adopt the enterprise system. According to this study, Indonesian SMEs, which are presumably characterised with less complex business process than their bigger counterparts, tend to have high probability of ERP system project success.

Table 5-8 ERP system implementation result

Result	N	Per cent %
Success	14	25%
Quite Successful	33	59%
Fail	9	16%
N = 56 companies		

ERP system usage period

The next question asked respondents how long ERP system has been implemented among the Indonesian SMEs studied. A break down for the period of ERP system usage in the participants' organisations is included in next table.

Table 5-9 ERP system usage period

Usage period	N	Per cent %
less than 6 months,	6	10.71%
6 month - 1 year,	11	19.64%
1 year - 2 years,	19	33.93%
2 years - 4 years	9	16.07%
More than 4 years	11	19.64%
N = 56 companies		

The respondents rate the success of their ERP implementation quite high, but the survey data shows that no matter what ERP software is used, the majority of implementation projects in the respondent companies end up taking longer and costing more money than what anticipated. The survey results may reflect the study of Sarosa (2007) who found that Indonesian SME's lack of ability to understand and document their business workflows prior to the ERP implementation significantly contribute to the project duration and budget overflows.

5.3 Validity and reliability

The measurement model was tested with a range of statistical measures to evaluate the validity and reliability of the model and the constructs. According to Singleton and Straits (2005), the quality of conceptualisation of an operational definition and its relevance for empirical examination is demonstrated with a valid and reliable measurement model. Data validity refers to how well a variable measures what it is intended to measure (Bollen 1989, p.184). Survey with good validity means that the questions included in the survey are able to measure the concepts they are supposed to measure. On the other hand, data reliability demonstrates the consistency and stability of the data collected. Data reliability is concerned with the question of whether the results of an experiment, test, or any measuring procedure are repeatable (Carmines and Zeller, 1979). In this study, the validity of indicators and correlations among and between the constructs were computed on the basis of the T values and the reliability of measurements was determined by the results of Cronbach's Alpha. Any unreliable or invalid indicators were dropped from the model after the validity and reliability tests

were performed. The sections below present the results for these tests for validity (comprising of convergent and discriminant validity) and reliability.

5.3.1 Convergent validity

Convergent validity measures the internal consistency of all the constructs being studied. According to Hair et al. (1998), a composite reliability (CR) value of at least 0.70 indicates that the manifest variable has a significant correlation with a particular construct being measured. Therefore, any indicator that exhibited CR value of at least 0.70 was considered valid and retained in the model. Table 5.10 below shows all the correlations of the indicator measures and the intended constructs.

Table 5-10 Variable Correlations

	ABCAP	CCRED	CULT	EFKTR	ESUCC	INC	KNCONT	OLEAD	USAT
ABCAP1	-0.007								
ABCAP2	0.750								
ABCAP3	0.748								
ABCAP4	0.848								
ABCAP5	0.903								
CCRED1		0.799							
CCRED2		0.736							
CCRED3		0.826							
CULT1			0.788						
CULT2			0.877						
CULT3			0.858						
EFKTR1				0.794					
EFKTR2				0.621					
EFKTR3				0.883					
EFKTR4				0.906					
ESUCC1					-0.113				
ESUCC2					0.897				
ESUCC3					0.920				
ESUCC4					0.901				
ESUCC5					0.241				
INC1						0.871			
INC2						0.946			
KNCONT1							0.860		
KNCONT2							0.619		
KNCONT3							0.888		
KNCONT4							0.055		
KNCONT5							0.805		
OLEAD1								0.956	
OLEAD2								0.953	
OLEAD3								0.269	
USAT1									0.785
USAT2									0.848
USAT3									0.903

The stipulated indicators ABCAP1, KNCONT2, KNCONT4, OLEAD3, EFKTR2, ESUCC1, and ESUCC5 had a correlation below 0.70 on the intended construct and did not pass the convergent validity testing. Therefore, these indicators were discarded from the model before proceeding to any further analysis.

In the next test of convergent validity, the T value for each manifest variables was calculated and compared to a critical $t = 1.6$ at $\alpha = .05$. Calculation of the T values of the proposed indicators was performed using statistical analysis featured in SmartPLS. Gefen and Straub (2005) suggested that the item can be considered valid if it has a T value above the critical t. The results are presented in the following table.

Table 5-11 T values of the manifest variables

Variables	T Statistics
ABCAP2 <- Absorptive Capacity	7.816
ABCAP3 <- Absorptive Capacity	7.598
ABCAP4 <- Absorptive Capacity	12.700
ABCAP5 <- Absorptive Capacity	14.766
CCRED1 <- Consultant Credibility	7.844
CCRED2 <- Consultant Credibility	5.103
CCRED3 <- Consultant Credibility	7.478
CULT1 <- Sharing Culture	10.054
CULT2 <- Sharing Culture	12.515
CULT3 <- Sharing Culture	12.968
EFKTR1 <- Knowledge Transfer Effectiveness	12.981
EFKTR3 <- Knowledge Transfer Effectiveness	15.190
EFKTR4 <- Knowledge Transfer Effectiveness	12.888
ESUCC2 <- ERP Success in SME	14.815
ESUCC3 <- ERP Success in SME	17.793
ESUCC4 <- ERP Success in SME	14.109
INC1 <- Incentive	3.755
INC2 <- Incentive	6.008
KNCONT1 <- Knowledge Content Quality	11.737
KNCONT3 <- Knowledge Content Quality	10.780
KNCONT5 <- Knowledge Content Quality	11.983
OLEAD1 <- Owner Leadership	18.310
OLEAD2 <- Owner Leadership	15.702
USAT1 <- User Satisfaction	8.096
USAT2 <- User Satisfaction	11.663
USAT3 <- User Satisfaction	10.001

As is evident from the table, all of the indicators were found to have T values well above the critical *t* at α=.05, so no further removal of the indicators was required.

5.3.2 Discriminant validity

Discriminant validity is a measure to ensure that the constructs in the model are each measuring a unique empirical content and their concepts are not overlapping. This ensures that the constructs are not repeated and the model is parsimonious. Singleton and Straits (2005) state that discriminant validity is demonstrated by a strong correlation between scale items and the unique construct they are intended to measure. In this study, discriminant validity of the measurement model was evaluated using two methods.

The first method for testing the discriminant validity of the model is to examine the loadings and cross-loadings between the proposed indicators and their respective constructs. The indicators should not show strong correlation with any constructs in the model except with the construct they are expected to measure. The value of within-constructs loadings are indicated by bold values. Straub (1989) suggests that these values should be above 0.70 and less than any other inter-construct loadings to exhibit acceptable discrimination among the indicators and the expected constructs.

The purpose of this study was to explore indicators that hinted on an evident variation in dependent variables. Since this study only employed reflective indicators in building the model with SmartPLS, all indicator variables were drawn as reflective variables of their respective constructs. Discriminant validity of the research model was determined by the loadings of the reflective indicators. Appendix C presents the results of the examination of cross loading. The test shows that all the indicators displayed the highest loading for their intended constructs, so the discriminant validity of the research model is acceptable.

The second method to check discriminant validity involves the calculation of the average variance extracted (AVE) for each construct. This is then compared with the correlations coefficient between the proposed indicators and their respective constructs. The table below shows the results of comparing the square root of the AVE for the constructs with the correlation coefficient among reflective constructs. The table provides evidence that the square roots of the AVE of the diagonal elements are higher

than the construct correlations on the off-diagonal elements. These results indicate that the constructs were well-discriminated and the scales used were measuring separate constructs. Consequently, these two methods demonstrate that the research model exhibits acceptable discriminant validity between the constructs.

Table 5-12 Square Root of the AVE and Constructs Correlations

	ABCAP	ESUCC	INC	KNCONT	EFKTR	OLEAD	CULT	CCRED	USAT
ABCAP	**0.81**								
ESUCC	0.64	**0.91**							
INC	0.13	0.30	**0.91**						
KNCONT	0.70	0.65	0.28	**0.86**					
EFKTR	0.80	0.59	0.18	0.82	**0.88**				
OLEAD	0.52	0.56	0.11	0.61	0.50	**0.96**			
CULT	0.77	0.51	0.22	0.77	0.83	0.53	**0.84**		
CCRED	0.51	0.60	0.18	0.66	0.57	0.49	0.48	**0.79**	
USAT	0.69	0.66	0.22	0.78	0.68	0.60	0.64	0.63	**0.85**

5.3.3 Construct reliability

Reliability test was employed for testing the data obtained from the questionnaires to identify the consistency of respondents' answers to all the questions in the study and measure the concepts in terms of their relationship with one another. Statistical function within SmartPLS software package was used to calculate the construct reliability of the model. The following table presents the values for the reliability of each construct using Cronbach's Alpha.

Table 5-13 Construct Reliability

Construct	Cronbach's Alpha
Absorptive Capacity	0.711
ERP Success in SME	0.886
Incentive	0.799
Knowledge Content Quality	0.828
Knowledge Transfer Effectiveness	0.818
Owner Leadership	0.907
Sharing Culture	0.795
Consultant Credibility	0.697
User Satisfaction	0.803

Nunnaly (1978) specifies a value of Cronbach's Alpha above 0.70 as indicative of reliability. In a later study, Straub (1989) also confirm that all constructs in the

measurement model should have a Cronbach's Alpha value above 0.70 to be considered reliable. All of the constructs in this study, except Consultant Credibility, exhibit high reliability with Cronbach's Alpha well above 0.70. But Consultant Capability fell short of the 0.70 mark by less than 0.003 which is a negligible difference, so the construct can be considered to be reliable.

5.4 Revised research model

Following the convergent validity, discriminant validity and reliability tests performed in the last section, no further modifications of the revised model were needed. Next step in the analysis procedure was the test of structural model to estimate loadings of the indicators and their path coefficients. This study employed Structural Equation Modeling (SEM) as the statistical technique for analysing a structural relationship of a model by using a confirmatory approach for estimating regressions among continuous factors or latent variables. SEM has been acknowledged as a powerful statistical method to analyse all structural relationship and latent variables of a model, especially variables that incorporate multiple dimensions (Kline, 2005; Maruyama, 1997). According to Kaplan (2009), SEM consists of two parts: a measurement part, which links observed variables to a latent variable through a confirmatory factor mode; and structural part which links latent variables to each other through simultaneous equations. Garson (2012) posits that the SEM methodology of integrating factor analysis and path analysis to analyse multiple factors for each variable as well as hypothetical paths identified in a model, has the advantage compared to a technique such as multiple regression analysis.

Within SEM, Partial Least Squares (PLS) path modelling is used to predict one or more dependent variables from a set of one or more independent variables and examine causal paths connecting the predictors as well as paths connecting the predictors to the dependent variables (Chin, 1998; Gefen et al., 2000). SmartPLS software was used to evaluate the relationships between constructs that were hypothesised in the research model. This procedure employed the PLS algorithm to calculate the coefficient of determinations and the statistical significance of all relational paths hypothesised in the model. According to Chin (1998), a bootstrapping procedure is required to test the strength of the structural model. So, the strength of the structural model was evaluated using a bootstrapping procedure with 500 re-samples. The following sub-sections present the results of the steps taken to recalibrate the model.

The last version was employed as the structural model build in SmartPLS and the steps of hypothesis testing can proceed. The revised model is presented in Figure 5.1 below. There are nine latent variables to be analysed with a suitable method that is able to estimate their respected scores in this study. In order to estimate the loadings for the indicators and their path coefficients, the PLS method algorithm was applied on the research model. The following subsections presents the PLS method results.
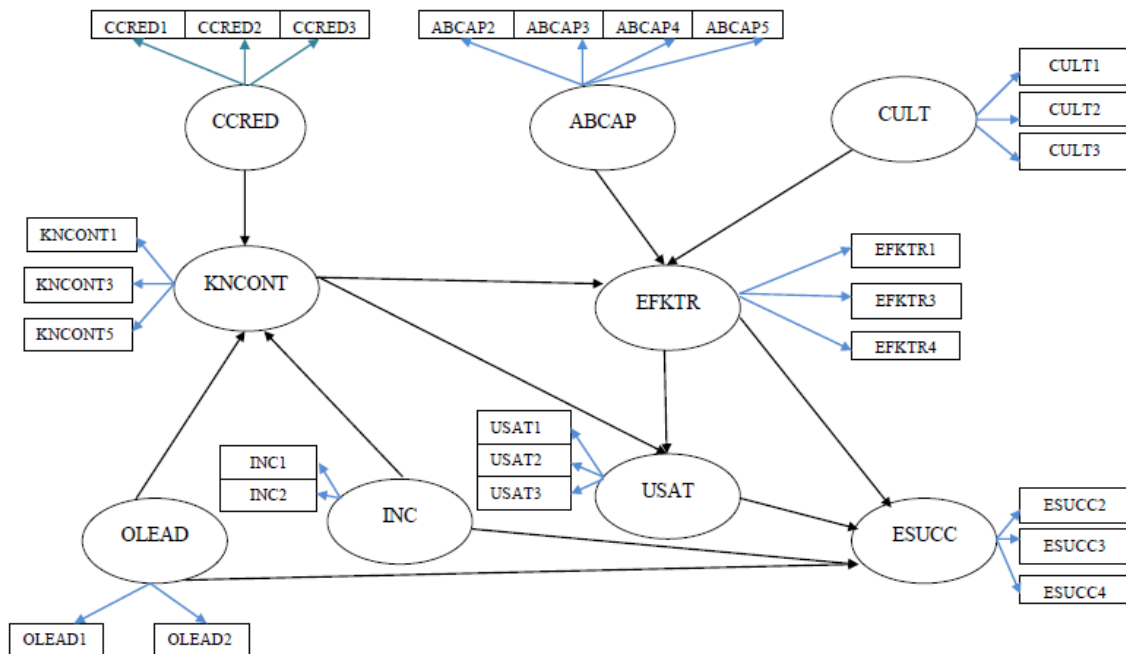
Figure 5-1 Revised research model

5.4.1 Structural (inner) model

The structural model is tested to evaluate the significance of the hypothesised paths between the different variables. In this study, the SmartPLS software package was used to analyse the hypotheses represented in the structural model. The structural model, including the associated raw data, was drawn and loaded with the tool provided in the SmartPLS software. Hypothesis testing procedure was performed using a bootstrapping procedure with 500 resamples to estimate T values which indicate that the paths are in accordance with the stipulated hypotheses in the model. According to Chin (1998), a minimum of 200 re-samples is required to minimise and stabilise standard errors.

The result of PLS algorithm for the research is shown in the figure below. According to t-value estimates from this bootstrapping process, paths of INC → ESUCC and EFKTR → USAT are not statistically significant. On the other hand, the paths of CCRED →

KNCONT, OLEAD → KNCONT, OLEAD → ECUCC, INC → KNCONT, KNCONT → EFKATR, CULT → EFKTR, ABCAP → EFKTR, USAT → ESUCC, EFKTR → ESUCC are 'significant' at the 5% level of significance. The results of the bootstrapping method with 500 re-samples are presented in the figure below.
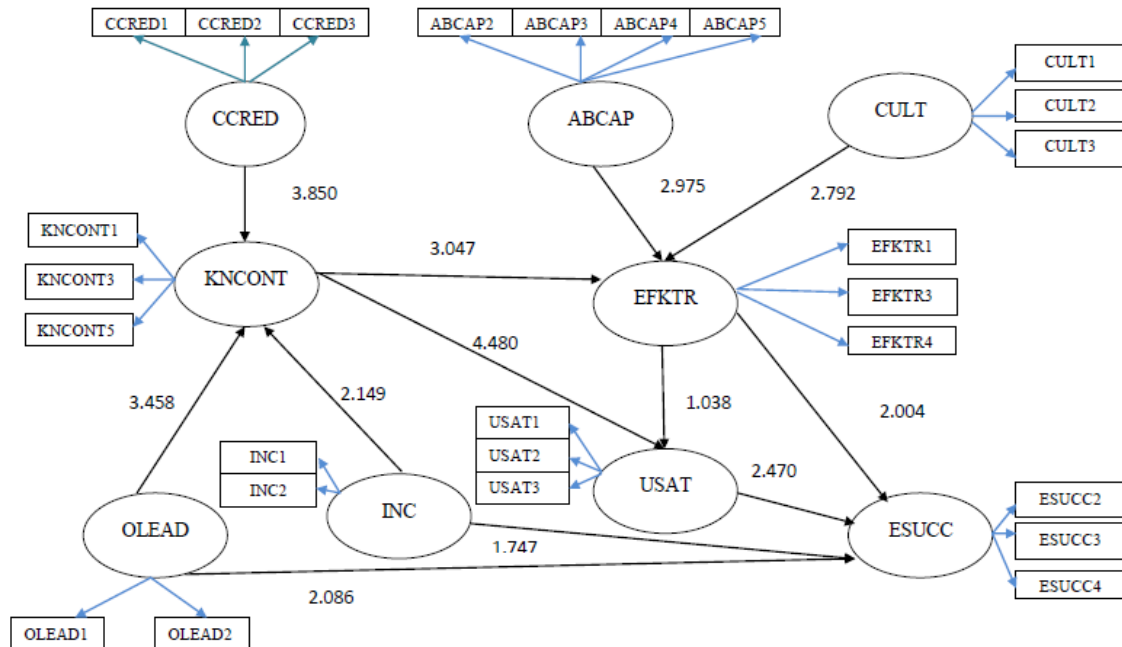
Figure 5-2 Results of the structural model

Having validated the hypothesised paths between the variables, the next step is to measure the actual strength of the effect on each path. R^2 value was used to determine the overall effect in the model. According to the thresholds of R^2 value devised by Hock and Ringle (2006), there are three points indicating the acceptability of the path. They suggest that the effect can be considered substantial, moderate, or weak when the R^2 value is above the cut-off points of 0.67, 0.33, or 0.19 respectively.
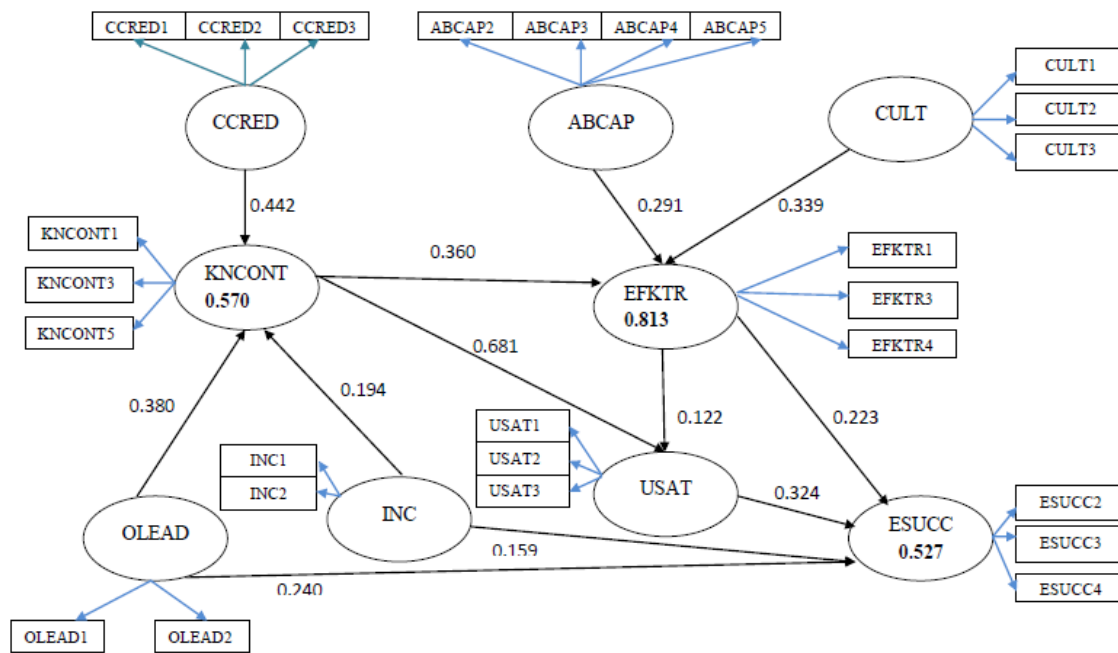
Figure 5-3 Results of PLS algorithm

Another measure of the significance of the effect is the capability of the antecedent variable to explain the variance in the dependent variable. As seen in the figure above, the research model of this study considerably explains 57% of variation in the KNCONT construct, with CCRED providing a stronger influence than OLEAD and INC. At a 5% level of significance, the results suggest that the direct effect of KNCONT on EFKTR is more significant than CULT and ABCAP. In addition, KNCONT was found as a singular factor affecting USAT as the influence of EFKTR towards USAT was hardly noticed. Taken as a whole, the research model shows moderate prediction of ESUCC variable as the effects of predictor variables of OLEAD, INC, USAT, and EFKTR were able to explain the 52.7% variation in ESUCC.

5.4.2 Model fit

Model fit is another important criterion to verify during the assessment of the measurement model. Since the structural model is built on theoretical concepts advanced by other scholars and modified models used in other empirical studies, the researcher needs to ensure that the model is suited to the specific empirical data of their study. In PLS path modelling, variance explained (R^2) has been widely employed to assess the fit of a research model. In addition to R^2, some authors also suggested predictive relevance using Stone-Geisser's Q2 and goodness of fit (GoF, cf. Tenenhaus

et al., 2005) as measures for assessment of model fit. Both these tests were conducted to ensure that the model fit was compatible with the data collected in this study.

The table below summarises the results of SmartPLS calculation for GOF criteria. The model is able to satisfactorily explain the variance of ESUCC (52.7%). Furthermore, the model fit assessment also proves its remaining endogenous latent variables to be substantial (KNCONT = 57%, EFKTR = 81.3%, USAT = 61.5%). Using 0.50 as cut-off point for AVE (Fornell and Larcker 1981) and the criterion set by Cohen (1988), GoF criteria for small, medium and large sample sizes should be 0.1, 0.25 and 0.36. In addition, Ringle et al. (2009) emphasise that a GoF value of around 0.50 can be deemed as being a 'moderate' fit. In light of this criterion, GoF of for the current model at 0.691 is significantly above the threshold value, which is adequate evidence to show that the model fits the data.

Table 5-14 Model Fit Statistics

	R Square	Communality	Redundancy
Absorptive Capacity		0.663876	
ERP Success in SME	0.527282	0.829411	0.057492
Incentive		0.826448	
Knowledge Content Quality	0.570040	0.744965	0.049526
Knowledge Transfer Effectiveness	0.813374	0.781860	0.299090
Owner Leadership		0.918726	
Sharing Culture		0.709375	
Consultant Credibility		0.622448	
User Satisfaction	0.614702	0.718094	0.430127
Average	0.63135	0.744781*	0.209059
Goodness of Fit[**]	0.685724		

*GoF equals $\sqrt{[(\text{average communality}) \times (\text{average } R^2)]}$.

In the next stage of model fit assessment, CV redundancy (Q2) method was run. A blindfolding procedure was run in SmartPLS to obtain the CV-redundancy (Q2). The results are shown in the table given below. Chin (1998) asserts that the model has predictive relevance if it has a Q2 value greater than zero. This condition has been met as the research model's Q2 of 0.6234 is considered is much higher than zero. The blindfolding procedure also provided the results for CV-communality (H2). Guenzi, Georges and Pardo, (2009) suggest that H2 value can be used to indicate the fit of the measurement model. All in all, the results in the table below show that the research

model exhibits acceptable fit and high predictive relevance as the research model exhibits good indicators for both the measurement model (H2 = 0.7480) and the structural model (Q2 = 0.6234).

Table 5-15 Additional Model Fit Criteria

Variables	CV Communality	CV Redundancy
Absorptive Capacity	0.663848	0.663848
ERP Success in SME	0.829188	0.377716
Incentive	0.825415	0.825415
Knowledge Content Quality	0.744964	0.424447
Knowledge Transfer Effectiveness	0.781716	0.633739
Owner Leadership	0.918654	0.918654
Sharing Culture	0.709367	0.709367
Consultant Credibility	0.622448	0.622448
User Satisfaction	0.717866	0.439803
Average	0.7480348	0.6239374

5.5 Results of hypotheses testing

The final part of the statistical analysis of the quantitative data is to examine the results in relation to the hypotheses. As explained in Chapter 3, the variables in this study are hypothesised on a two-level model of causal relationships, where certain attributes relating to ERP implementation are expected to have an effect on knowledge transfer effectiveness which will then lead to ERP success. At this first level, all of the reflective constructs of CCRED, OLEAD and INC were found to be significant antecedents of KNCONT. In turn, the construct of Knowledge Content Quality was found to have a positive effect on Effectiveness of Knowledge Transfer, and this effect of KNCONT on EFKTR carries over to the results of ERP system implementation projects. As immediate antecedents of Effectiveness of Knowledge Transfer, ABCAP and CULT constructs are significantly related to EFKTR. Finally, the results from the structural model affirm that the three constructs (EFKTR, USAT and OLEAD) have significant effects on ERP implementation in Indonesian SMEs, but it was found that INC was not significantly related to ESUCC. So, all the proposed hypotheses of Knowledge Transfer and ERP implementation in Indonesian SMEs were supported

except for the EFKTR – USAT and INC - ESUCC relationships. The table below summarises the results for the hypothesis testing from the quantitative data collected in the survey research conducted in the first part of this study.

Table 5-16 Results for hypotheses

Hypotheses	T Values	Results (Significant at p<0.05)
Consultant Credibility -> Knowledge Content Quality	3.876293	Supported
Owner Leadership -> Knowledge Content Quality	3.337894	Supported
Incentive -> Knowledge Content Quality	2.032232	Supported
Sharing Culture -> Knowledge Transfer Effectiveness	2.794353	Supported
Absorptive Capacity -> Knowledge Transfer Effectiveness	3.077432	Supported
Knowledge Content Quality -> Knowledge Transfer Effectiveness	3.192027	Supported
Knowledge Content Quality -> User Satisfaction	4.782542	Supported
Knowledge Transfer Effectiveness -> User Satisfaction	1.003294	Not Supported
Knowledge Transfer Effectiveness -> ERP Success in SME	2.004002	Supported
User Satisfaction -> ERP Success in SME	2.354923	Supported
Owner Leadership -> ERP Success in SME	2.127186	Supported
Incentive -> ERP Success in SME	1.650720	Not Supported

5.5.1 Antecedent hypotheses

i. H1: Antecedents to knowledge content quality

Knowledge content quality measures the level of accuracy, timeliness and relevance of knowledge provided in the knowledge base. The data showed significant effect of the Consultant Credibility on knowledge content quality, with t = 3.87. Owner Leadership exhibited strong correlation with knowledge content quality, with t=3.33. A significant influence of incentives on knowledge content quality was also supported, with t=2.02.

H1a: Consultant credibility improves knowledge content quality

The statistically significant positive coefficient in external source credibility is indicative of the importance of consultant credibility in implementing and managing ERP system initiatives in Indonesian SMEs.

H1b: SME owner leadership improves knowledge content quality

The SMEs' owner leadership effect hypothesis was accepted, indicating that project team members' expectation that their employers' guidance does improve the knowledge content quality.

H1c: Incentives improve knowledge content quality

Knowledge content quality is significantly predicted by incentives as hypothesised. This indicates that SMEs employee involved in ERP system implementation project expect certain benefits for their contribution of knowledge.

ii. H2: Antecedents to knowledge transfer effectiveness

Knowledge transfer encompasses knowledge exchange and its application that follows between knowledge source and its recipient. Knowledge transfer effectiveness is a measure of how the recipient has been able to comprehend and utilise the knowledge in the daily practice of ERP system.

Absorptive capacity exhibited a significant correlation with knowledge transfer process with a high value of t= 3.07 in the whole model, thus showing widespread support for this hypothesis. Also, knowledge sharing culture and knowledge content quality succeeded in demonstrating a significant direct relationship with knowledge transfer process, with $t = 2.79$ and t = 3.19 at α = .05 respectively.

H2a: Absorptive capacity leads to effective knowledge transfer

Absorptive capacity refers to the recipient's ability to value, assimilate and apply ERP knowledge in their business activities. The support of this hypothesis indicated that the ERP system project members feel that the staff's ability in assimilating and applying ERP knowledge has a positive effect on knowledge transfer process.

H2b: Knowledge sharing culture leads to effective knowledge transfer

Knowledge sharing culture measured cultural factors in the organisation and the willingness of the employees to share their knowledge. The study results support the hypothesis that knowledge sharing culture has a significant effect on knowledge transfer effectiveness.

H3: Knowledge content quality leads to effective knowledge transfer

This indicates that there is significant relationship between knowledge content quality and knowledge transfer effectiveness. This means that employees value knowledge content that includes enough materials to address their questions and assist them in solving their problems.

    iii. H4: Effect of knowledge factors on user satisfaction with ERP

In this study, user satisfaction examines whether the user feels satisfied with the knowledge provided during the ERP system implementation. The questions intended to determine whether the knowledge given in training programs and manuals was able to address the users' needs and the organisation's business requirements for successfully operating the ERP system.

Hypothesis of effect of knowledge content quality on user satisfaction was accepted, with t=4.78 at α = .05. The hypothesis was accepted, indicating that there is a relationship between knowledge content qualities as measured in the study with ERP system project team members' satisfaction. On the other hand, a different result with a lower effect is demonstrated for knowledge transfer effectiveness effect on user satisfaction. The correlation was in the weak range which exhibits statistically insignificant t-value at α = .05.

H4a: Knowledge content quality increases the level of user satisfaction

The research model proposed that a high level of knowledge content quality translates to a high level of user satisfaction. When the quality of the knowledge content is high, it enhances user ability to negotiate and operate the system, thus delivering them greater better benefits which could translate into user satisfaction with ERP systems.

H4b: Effective knowledge transfer increases the level of user satisfaction

The finding from the data also shows that knowledge transfer effectiveness did not have a noticeable effect on user satisfaction. So this hypothesis was rejected. The result of this analysis indicates that in Indonesian SMEs context, knowledge transfer effectiveness during the project alone does not necessarily lead to team members' satisfaction towards the whole the ERP system implementation project. However, since the role of knowledge content quality is present in influencing the project team members' satisfaction and there is a strong correlation between user satisfaction and

ERP system project results, this still supports the inclusion of user satisfaction variable in the context of ERP system implementation project in Indonesian SMEs.

5.5.2   Final effect on ERP success hypotheses

H5: Final effect on ERP success

The knowledge transfer process was revealed to be a significant predictor of perceived ERP success with t=2.00, significant at $\alpha = .05$. User satisfaction was also shown to have a significant direct relationship with perceived ERP success with data showing a t-value of 2.35. Owner Leadership also significantly influenced the perceived ERP system results, with a t-value of 2.12 at $\alpha = .05$. However, the result did not show significant effect of incentives on perceived results of ERP system.

H5a: Effective knowledge transfer increases the probability of ERP success

The results of this study indicate that there is a significant relationship between knowledge transfer effectiveness and results of ERP system implementation project in Indonesian SMEs. This positive support for one of the main hypotheses of the study validates the use of the KMS model from Kulkarni et al. (2007) which had initially proposed knowledge transfer effectiveness as a factor of ERP success.

H5b: User satisfaction increases the probability of ERP system success

The hypothesis of user satisfaction effect on ERP system success was accepted. The strong correlation between user satisfaction and ERP system success suggests that user satisfaction can be used for determining project success in Indonesian SMEs. This justifies the claim that Indonesian SME owners who wish to maintain ERP system user satisfaction should concern themselves with the overall satisfaction of their employees from using the ERP system. An ERP system project with user satisfaction is likely to invite more extensive usage and produce beneficial results for users.

H5c: SME owner leadership increases the probability of ERP system success

The KMS model also proposed that owner leadership may have a significant effect in creating ERP project success and the hypothesis was validated by the data in this study. This is indicative of the fact that owner leadership plays a critical role in the operations of SMEs, especially in the Indonesian context.

H5d: Incentives increase the probability of ERP system success

The statistical analysis results shows that the effect of incentives on ERP system success is not significant, even though the impact of this factor on knowledge content quality is important. From the statistical results discussed in this study, it appears that this factor explains only a fraction of the variances in the outcome variable and there are other factors more important than incentives.

5.6 Summary

This chapter has presented the results from the various tests of statistical analysis that have been conducted on the quantitative data to illustrate the sample demographics and test the research model. Before submitting the model to test the hypotheses, the validity and reliability tests were performed to refine the research model in two steps. The first step involved purifying and validating the measurement items through EFA and CFA. Following these analyses, the research model was adjusted and the structural analysis phase of PLS was used to build and evaluate the strength of the structural model. After that, the PLS algorithm was employed to analyse the model and measure the paths between the variables to validate the hypotheses.

In short, the results of this study indicate that the proposed model is able to explain the phenomenon of knowledge transfer in ERP system project in Indonesian SMEs. This is consistent with earlier findings examining the effect of knowledge transfer towards IS implementation projects. Moderate results are seen in the predictive power of the model when modest variations in the ERP system success in Indonesian SMEs are observed from using the model. In particular, the statistical tests for the hypotheses show that except for incentives, all the immediate factors affecting ERP success, including user satisfaction, knowledge transfer effectiveness and SME owner leadership, were validated. These findings validate the effect of most of the proposed variables in the research model, and the qualitative case studies conducted in the next part will explore the nature of the effect and user experience with those variables.

Chapter 6 Results: Qualitative Case Studies

6.1 Introduction

Two case studies were conducted in the second part of this study after the validation of the research model and the hypotheses in the quantitative analysis. Owners of C1 and C2 were concerned about the state of the company's business process and saw the need for computer technology to support their operations. These concerns demonstrate the underlying value of the decision to undertake the ERP adoption in the first place. The objective of these case studies was to explore the actual experiences and perceptions of ERP users in Indonesian SMEs in depth in a manner that could not be achieved with the short answers of the survey. The case studies obtain information about phenomena being studied based on the model developed through a quantitative survey. In order to understand the composition and dynamics of each company's ERP project, in depth interviews were conducted with 5 employees positioned as project team members or managers who had involved in the ERP system implementation projects.

6.2 Study administration

Since it was expected that there would be complex relationships among all variables, interviews and on-site observations looked for certain answers to capture variables illustrated by organisational and contextual determinants, as well as the existence of the knowledge transfer as the enacted process. This study mainly used information obtained from semi structured interviews. The unit of analysis was the company, and observations were performed at the personal level. For each case study, some key project members were expected to participate. These key project members were people with deep understanding about the ERP system project, the company's organisation and the environment around the project. Interviewees include project managers and business process owners. Their experience and direct involvement in ERP implementation could help identify the company's ERP project characteristics in general, and particularly the knowledge transfer process within the ERP project.

During the quantitative phase, the survey responses showed that this study's respondents had recorded different ERP system project outcomes, where some respondents experienced successful ERP adoption in their workplace, while the other respondents reported that ERP system projects in their workplace had been unsuccessful. The companies involved in the case studies were selected on basis of

their overall results of ERP system implementation in the questionnaire. Using the questionnaire survey results, the researcher selected one firm that had a successful experience with ERP implementation and one that had failed to do so.

Based on the information provided in the consent form, two companies were identified. Two extreme cases in these companies would allow the researcher to explore the dynamics which led to success or failure in each case. In addition, their eagerness to participate in the research was considered and their location was also taken into account to identify companies that could be conveniently accessed by the researcher, two companies, C1 and C2, were selected. Case studies exploring the situation in each company would enable the researcher to explore the factors that had led to the considerable differences in ERP system usage. As Pettigrew (1990) and Orlikowski (1993) suggested, using two cases representing extreme scenarios of a single phenomenon provides a strong foundation for case comparison. Comparison of phenomenon across different cases also enriches contextual understanding of the research model (Robey, Ross and Boudreau, 2002). The contrasting situation of the two companies would provide material for a comparative analysis of the two companies.

While the quantitative studies had given evidence of the effect of each variable on knowledge transfer in ERP implementation, the case studies would enable the researcher to explore how that knowledge transfer transpired in the actual experience of the two companies. Exploring the lived experience and perception of the respondents in detail would throw more light on how the causal relationships between knowledge transfer process and ERP system project actually worked in these companies. Drawing on the significant difference in the experiences of the two companies, the comparative analysis could illustrate how and which variables influence and determine the process of knowledge transfer in ERP system implementation in Indonesian SMEs.

Key respondents in the case studies were people with knowledge and experience about the ERP system implementation in their respective firms. Bernroider and Koch (2001) found that in SMEs, the average of ERP systems project team size is 4.8 compared to 9.8 persons for larger firm. Therefore, it is expected that the case studies would have sample of 2 or 3 key employees as representative of the ERP systems project team. The case studies used a purposive sampling method to select key project members from the available pool of employees. In this study, participants should have been actively

involved in ERP project either part or full time and should have been a management member of the company.

Some phone calls were made to appropriate managers and an email was sent to inform them of the study and request permission to conduct research in companies C1 and C2. After obtaining the agreement of the manager of C1 and the owner of C2, several personnel involved in the ERP system implementation project were chosen. Most of the interviewees either had work experience in IT or basic educational backgrounds in business management or information systems development.

Before the interviews were conducted, the interviewees were given an introduction letter explaining the purpose of the study, the identity of the researchers and the voluntary nature of participation, along with consent forms to complete. In order to avoid perceived deception in the study, confidentiality was ensured to each interviewee. The interviews were transcribed in such a way that it would be difficult for a reader to identify any association between a specific person and a single answer.

In semi-structured interviews, the researcher asked the respondent to express their views and opinions on the questions while remaining with the constraint of the identified themes of the interview. The respondent was probed to elaborate their views on situations and issues related to the study, but manoeuvre them in a manner that the interview did not stray away from the topic at hand. The questions included in the semi-structured interviews were worded and arranged to maintain this balance. Semi-structured, face-to-face interviews for each of the interviewees were carried out using the same set of structured questions. Their content met the research priorities of the project.

In conjunction with the interviews, a site observation was also conducted in the two selected companies. This would provide a deeper understanding of ERP system users' behaviors and perceptions in their natural settings to shed some light on the state of ERP system project. During these visits, the researcher observed things happening around the companies' ERP system projects.

6.3 Company 1

Company 1 (C1) is a woodworking/furniture manufacturing SME located in East Java, Indonesia, specialising in factory direct and custom made furniture. C1 began their

furniture production in a manufacturing facility built near Surabaya. C1 provides a whole array of furniture products ranging from bedroom, living room furniture in the household sector to office furniture. C1 made a decision to focus on exporting their products to the international market to explore opportunities for growth in the growing global market for furniture. During this period, C1 decided to implement ERP system to support their business expansion and improve their production process by utilising IT support. SAP was selected as the ERP vendor, and SAP Business One with Financial Accounting, Sales, Warehouse and Production Planning modules were selected for implementation. The process began in 2009 and the ERP system went live in 2011.

In C1, the manager and two supervisors from the company were interviewed. The firm and respondent profiles of key respondents of C1 are summarised in Table 6.1.

Table 6-1 Interviewed Case, Interviewees and Job Positions of the Interviewees

Interviewed Case	Company Type	Interviewees	Job Positions of the Interviewees
C1	Woodworking/furniture manufacturing SME	M1	Production Manager
		E1	Production Supervisor
		E2	Inventory Control and Logistics Supervisor

6.3.1   Background to ERP implementation

The idea of bringing in change in business processes had been the focal point in most managerial meetings at C1 for several years, but were not realised or implemented. The most compelling reason for considering change in their existent processes came from the drastic growth of the company in a short period of time. The resulting increase in employees, customer demand and manufacturing diversity made the owners realise that process optimization was indispensable for the company and implementing a computer system in the company's administrative structure was essential for the company to thrive. In the beginning, C1 implemented a variety of business software, mainly in the area of finance, accounting and warehousing, but they were not integrated into a unified

system. The owners felt an urgency to implement an integrated system that could provide better coordination between the different activities and conduct business processes at the highest level of efficiency.

The previous business process employed at C1 had a few significant drawbacks. As the system was not computerised, too much paperwork to keep track of information, with jobs sheets being lost regularly and no control over information flow between the materials ordered and the job for which it was ordered. Production was haphazard with material reassignment, material reordering and poor delivery performance occurring as stock on hand and work in progress were untraceable and uncontrollable. This prompted the C1 owners to embrace ERP system to review their existing business policies and to improve their business processes.

C1 progressed to implement its ERP system by adopting these particular steps. The C1 owners invited several companies to find suitable vendors and consultants to initiate the implementation process. A local consultant company holding an ERP system certified partner was appointed after this selection process. The C1 owners identified that the financial, supply chain, and marketing areas were areas of importance that were to be targeted by the installed ERP system and assigned the Business Administration Manager as the project leader. The managers then picked four staff members from the departments of finance, accounting, logistics and production to form an ERP project team along with six specialists from the consultant company.

The ERP project team developed a documentation known as "project blueprint" cataloguing all the business requirements of the company. This would be given to the consultants to make the ERP vendor aware of the expectations and needs within the company. The project managers initially planned to implement the standard ERP system version with minimum customization. During the course of the project, the team decided to shift to a customised version due to requests from key users and needs in specific activities in the organisation, especially in the area of finance and production. The customisation was entirely handled by the IT specialists from the consultant company. The consultant company also provided training to help the key users understand and familiarise themselves with the new functionalities before they start using the system in the daily transactions.

6.3.2 Experience with ERP system

C1 owners view the project as a necessary investment for their organisation to survive and adapt to the market, but apparently their employees had inadequate skill to operate the ERP system. One of the team members explicitly pointed out that the employees were actually not ready to use the ERP system. Anticipating this problem, the ERP project managers in C1 included a period in which prototypes were developed and presented to staff and management. The aim of this activity was to introduce the idea to the managers as well as ease the process of transition for all involved.

However, due to the lack of IT skills among the employees, it took weeks of explaining before they could generally comprehend the system being employed. For example, during this period, the lack of skill among production department supervisors in using the new system caused many issues, such as, duplicate job printings, incorrect production receipt and wrong raw/semi-processed materials storage. But rather than realising this as a result of their mistake, most of the supervisors blamed the new system as being unreliable and failing to provide necessary information when it was mostly needed.

For example, the production supervisor stated

> *"The system is too slow and it takes a long time to finish entering a single transaction, let alone producing a production floor status"*
> (Interviewee E1, October 2012).

Furthermore, the logistic supervisor echoed a complaint from the purchasing department stating

> *"The situation is worse than before. We now need to perform our job with more effort and time. The report takes too long to print. It is very frustrating especially when our managers need accurate information to make a purchasing decision"* (Interviewee E2, October 2012).

The case of C1 supervisors demonstrates that applying knowledge management to this case provides an important insight into why the very first issue identified earlier may have arisen. For instance, the employees' ability to value, assimilate and apply ERP knowledge in their business activities was fairly low. Wang et al. (2007) refer to this ability as organisations' absorptive capacity and found that absorptive capacity

predicated on prior knowledge about ERP systems influence the efficacy of knowledge transfer between employees and ERP consultants. This is exacerbated because, the old business process, which were based on meeting specific business goals at the time, had been carved so strongly into the minds of the employees that they were unable to move beyond that way of operating. They were so used to the old routine that they were unable to appreciate the potential of the new system to meet their requirements or improve existing processes.

The C1 owners were aware of these issues and they recruited additional staff with adequate IT skills to help the supervisors in running the ERP system in their department. The ERP project team also added more servers and improved the network bandwidth as required. Nevertheless, despite the resolution of these IT related problems, receipting still ran into hiccups because of its reliance on shop floor demands for timely job printouts. The production supervisor echoed his subordinates' complaints on the issue

> *"Why is the computer in control of what we are supposed to do? Why can't I tell them what to make, when to make, like I have been doing all this time? Do you know how much stress this has caused us? There's no job on the floor"* (Interviewee E1, October 2012).

According to Zhang et al. (2003), since an ERP system consists of several integrated business modules, inaccurate data input in one ERP module can create adverse impacts on the operations of other related modules. There is a common proverb of "garbage in garbage out", which means that inputting inaccurate data during ERP implementation process will yield misleading information. This was certainly the situation in C1 because the employees were careless when performing their data entry process. The production manager complained

> *"When an error occurs in our report or transaction record, we need to trace and correct each mistake. Sometimes it is because the employees were not being careful when entering data into the system"* (Interviewee M1, November 2012).

The quality of report produced by the ERP system is another problem mentioned by the interviewees at company C1. For example, the production supervisor complained

> *"We cannot get the same kind of production reports that we always bring during the production plan meeting. The content and format of ERP system reports are totally different from the old ones"* (Interviewee E1, October 2012).

Elaborating this issue further, the project team member identified the consultants' inability to understand the actual needs from the production floor as the root cause of the problem. According to Loh and Koh (2004), small and medium firms' owners heavily rely on the external consultants' expertise to successfully implement ERP system in their company. However, the supervisor's requests were not met because the external consultants for C1 ERP Project failed to acknowledge or comply with these requirements. The interviewees then pointed out that they had now found a roundabout way to resolve the problem by developing small converter software to transform the ERP system reports into the old format and content as required by the managers.

They believed that the system was partly operative and not fully integrated to bridge any gaps that exist between the project's blueprint and current implementation realities. One example of this was where the production manager in C1 got intimidated by the level of complexity of the new process as he would be required to use the ERP system for the first time. In another example, the production staffs were reluctant because they failed to adopt the ERP in their day to day activities. Regarding these issues, one of the interviewees commented:

> *"The employees here still favour the old system more than the new one and think that the new system restricts them from doing the things they usually did with the old system"*(Interviewee E1, October 2012).

However, the interviewees acknowledged that the finance and accounting part of the ERP system were performing pretty well. The ERP system might produce different reports of financial results because of data inaccuracy, but the reports could usually be fixed after reconciling information transfer between the old accounting system and the ERP system. Observation and interview indicated that only the Warehouse and Finance departments were actually using the ERP system in C1, mainly for the purpose of recording logistics transactions, creating financial reports and preparing tax information. Production department employees were relying on the data conversion software to prepare their production status reports.

Most of the responses from interviewees were unequivocally negative about the change and described the ERP system implementation in C1 as useless. These situations were certainly far from ideal and the interviewees clearly express their dissatisfaction with the ERP system implementation in C1. These examples from the C1 company exhibit how problems occurred from employees who are unable to absorb the knowledge and cannot "buy in" to the needs of organisation in general. In this category are those, such as the production managers and staffs from the company, with "if it ain't broke, don't fix it" attitudes. But given that the finance department seems to be willing to initiate, perhaps there are some inherent deficiencies with the program as it was adapted and communicated by the consultants. Thus, it creates a substantial impediment to transfer the ERP system knowledge that is heavily reliant on integrated business process and computer usage. These cases certainly fit that assertion and, as described above, the project result was far below the expectations of C1 owners.

6.3.3 Knowledge transfer in C1's ERP implementation project

Knowledge transfer is of great importance during ERP implementation project in order to enable the end-users to understand the rules and the procedures of the business process inherited in the new system (Lee and Lee 2000; Pan et al. 2006). Initially, the consultant company provided C1 with information about the ERP system in the form of formal training, printed books and manuals made available from the company's database server. The training was conducted on different levels, including managerial and functional, with the intent to introduce and teach key-users in each department about the business process mechanisms behind the ERP system. The interviewees emphasised that ERP project would be a challenge for C1 because of the lack of skills and knowledge in ERP system. Therefore, they expected that the consultant company could deliver their training materials or demonstrate ERP system transactions using C1's cases during the training session.

In C1, ERP project team was formed between the consultants and selected employees to ensure sufficient communication and cooperation and for the project development. The ERP project team also identified key-users that could lead to bidirectional flow of information between C1's business process owners and the consultants, driving the team members closer to the actual users of the system. The consultants then conducted interviews with these key-users to understand the business requirements in each

department that could then be used to configure the system and provide relevant business transactions. Even though it looks like that knowledge transfer process in C1 ERP project had occurred in both directions, the interviewees reported that the consultants often worked on their own and did not involve the users to participate in a more active manner in the implementation process. One of the interviewees stated:

> *"The project team members from C1 were not given significant role in the project apart from supplying the consultants with information for the development of master data"* (Interviewee E1, October 2012).

The interviewees further added that the interaction between the project team members, the consultants and other employees who could involve knowledge creating, sharing and learning, were minimal. As a consequence, the knowledge transfer process, which allows better opportunity for an effective ERP system implementation, was barely realised.

Although the consultant company was able to install and run ERP system in C1, they did not adopt a strategy of proactive knowledge transfer.

The ERP system only operated in finance and warehouse department. The situation in C1 began to worsen when most of the project team members, including the Administration Manager, left the company, subsequently, causing serious impact on the operational level of the ERP system. After experiencing all of the troubles caused by unsatisfactory results of ERP system implementation, the C1 owners decided to recruit new employees to develop their own software based on the open-source ERP software code. The interviewees stated that once the development of the new software was finished, the ERP system would be discarded and the hardware would be sold to other companies.

C1 started an effort to integrate their business softwares and improve their business processes. At that time, C1 already had financial resources and established modern infrastructure to implement ERP system. However, lacks of leadership and human resources capability have cost the ERP project its success. C1 took care to hire a consultant company and initiate a proper ERP system, but after seeing minimal results, it has mostly been abandoned. Of all the purchased modules, finance and warehousing modules were the only modules regularly used by the related departments. Production

department used ERP system functions to generate Production Order number and accommodate the Finance department's request to record purchase requests and production time tickets for each production order.

Because C1's ERP system is unable to deliver Production department requirements, C1 decided to develop new software in order to record and track production orders. Production data handling was undertaken by the new information system, with finance-related data re-entered into the ERP system at the end of each working day. According to interviewees, the ERP system implementation was meaningless and only added workload to the employees. Therefore, C1's project to implement ERP systems in their workplace is certainly not a success.

6.3.4   Main factors behind knowledge transfer in C1

Having examined the motive and experience in implementing the ERP system at C1, the researcher reviewed the transcripts from the interviews to identify user perceptions on each of the variables validated in the quantitative study. This section summarises the factors indicated by the interviewees as affecting knowledge transfer in C1's ERP Project. The factors are presented according to their occurrence in interviewees' responses. In C1's case, the factors considered to be important for knowledge transfer by interviewees were owner leadership, absorptive capacity, knowledge sharing culture, consultant ability, knowledge content quality, and incentives.

Knowledge Content Quality Knowledge content quality was identified as an important factor since it is closely related to knowledge transfer process. C1's ERP project required certain skills and knowledge in business process that were not readily available from the C1 workforce. The interviewees mentioned that C1 employees could neither learn the new procedures on the ERP to do their daily activities nor appreciate the ERP system capability because they had not received sufficient and suitable training materials from the consultants. All the manual guides and project documentation was stored in the database but they had not been properly explained by the consultants and were now rarely accessed by the employees.

Consultants Credibility As evident from the last section, the knowledge issue is significantly allied with the consultants. Consultant ability was considered an important factor because C1 relied on the consultants to implement the ERP system. This factor

referred to the consultants' experience and knowledge in implementing the system to target the specific requirements and unique characteristics of C1's operations as a wood working company. As the interviewees mentioned earlier, the quality of the information and services provided was not up to the mark and this reflected negatively on the consultants' expertise. During the course of project, it turned out that the consultant company actually did not have past experience in implementing ERP, particularly the production system module, in SME furniture manufacturers.

Knowledge Sharing Culture Respondents mentioned that organisational culture surrounding practices and attitudes to knowledge sharing had a very important influence on the ERP system implementation. Organisations that emphasise teamwork, encourage leaders to train their subordinates and enable information flow between people will motivate people to share their knowledge with others rather than hoard it for their personal gain. An organisational culture conducive to knowledge sharing could significantly inspire knowledge transfer process and ultimately change the result of the project. C1 owners, however, noted that while they had the intention to change their business processes, their message was not delivered effectively to the management and operational levels of the company. Every department in C1 was too occupied with their business and often neglected the importance of knowledge sharing process.

Absorptive Capacity Absorptive capacity of the human capital in the firm to integrate and utilise new knowledge is an important factor because IT initiatives in general and implementation of ERP system in particular rely on the employees' capability. Particularly, the organisational and technical capabilities of the employees have an impact on the process of knowledge transfer and ERP system implementation in C1. However, some key users in the production department failed to cope with the new methods of conducting business with ERP and reverted back to their old methods. In addition, the interviewees mentioned that C1 owners were too ambitious and ignored the reality that most of their department supervisors and assistant manager were not even able to competently operate a computer. Yet, these employees, as the intended ERP system key-users, rarely attended the training session provided by the ERP project team. The lack of IT skills as well as recalcitrance towards training themselves both contributed to a low level of absorptive capacity which then led to lower success rate in the company's ERP project.

Incentives Incentives in terms of financial rewards and appreciation were mentioned as something desirable and useful for encouraging employees' involvement in C1's knowledge management effort to establish ERP. But in C1, no special incentives were given to team members during the project implementation. Also, a key member of the project left the organisation. While another competent person could be recruited to his place, his in-depth knowledge and experience with C1's ERP project needs and shortcomings would be irreplaceable. This could have been prevented by giving the manager some incentives to reward him for his contribution to the project and motivate him to stay on in the company to work towards better completion of the project. However, the interviewees noted that a fair amount of recognition was just recently given by co-workers to the computer programmer team working on the new system.

Owner Leadership From the interviews, all respondents admitted that the owners in C1 was so busy that most of the times the ERP team members had to work on their own to coordinate with the consultants and learn ERP-related knowledge from them during the project. However, low level of involvement and interaction between the owners, the consultants and the ERP team members undermined the process of knowledge transfer and ERP system implementation in C1. Most of the respondents stated that their desire to better understand the ERP system was often neglected by the consultants.

6.3.5   Main factors behind ERP project results in C1

This section summarises the responses from the interviewees in thematic categories based on the main factors affecting project results in C1's ERP implementation project.

Knowledge Transfer Effectiveness At interview, the respondents of C1 recognised the benefit of knowledge sharing to gather and analyse information in support of proposed milestones, business cases and blueprints developments throughout the project. This benefit may result from the project knowledge database which holds form of formal training, printed books, manuals and information from the business requirements interviews. Unfortunately, the knowledge transfer process in C1 ERP project did not occur in both directions very well. The ERP team members were not able to promote knowledge transfer process to meet the business blueprint requirements that would lead to successful ERP system implementation. The interviewees stated that despite their efforts to support and provide information to both the consultants and some key-users,

knowledge transfer process in C1 was ineffective due to the various issues mentioned above that were associated with this company's situation.

User Satisfaction The respondents of C1 stated that key users in many departments, especially Production and Inventory Control, were not satisfied with the new procedure and report process that entail throughout the ERP system project. Furthermore, the ERP project team were considered fail to deliver ERP technology that can provide a complete production data as well as a reliable data of actual stock level of raw material and work-in-progress inventory. As a result, key-users in those departments became more reluctant to use the ERP system.

Incentives The interview results support the argument that provision of financial rewards and top management's recognition could improve C1 employees' motivation to engage in many different project phases in order to bridge the gaps between C1's business process and ERP system functionalities. However, the interviewees agreed that adding this strategy may not directly improve the probability of ERP systems implementation success.

Owner Leadership The management's willingness to accept and utilise ERP system implementation in their department is important. From the very beginning, the managers need to build a cohesive strategy and pursue that same vision. They must be aware of the responsibilities and expectations within their departments to provide the required resources and sanctions to assist the ERP project team. In many cases, the leadership and decision making for such projects in small and medium business is entirely at the discretion of the business owner. Unfortunately for C1, the owners' vision was not communicated and delivered through to the management. The owners were too busy with their other business priorities and did not spend enough time to show their support to the ERP project team.

To conclude, there was failure at every level of the organisational structure to take cognizance of the knowledge needs in ERP implementation and act accordingly to those requirements. The interviewees agreed that the owners' lack of leadership had caused some problems in C1's ERP system implementation project. Managers were not committed to the new system and business process inherited in it. Users in the affected departments thought that the implementation brought additional workload which was inconvenient and a complete waste of time. Knowledge transfer process remained a

major concern, as the C1 owners put the burden of the ERP project solely on the project team members, leading most of the managers to detach from the project and neglect invitations to attend the ERP project meeting where knowledge exchange between departments and the ERP project team could happen. Ultimately, these reasons led the implementation in C1 to stutter and stall.

6.4 Company 2

Company 2 (C2) is a supplier and manufacturer of a wide variety of heat transfer equipment, located in Central Java, Indonesia. The company was founded in 2010 and established as a specialist/general contractor rendering construction services, mainly in the area of petrochemical refinery and gas processing industries. Because of strong competition from similar companies, C2 decided to computerise their business processes to improve their efficiency in all fields. In particular, given the need to provide quick quotations and complete information on project component breakdown, the company decided to implement a comprehensive IT system. Compiere was selected as the ERP vendor and Adempiere with Financial, Purchasing and Project Management modules were selected for implementation. The process began in 2010 and the ERP system went live in 2011.

In C2, the owner and the business manager from the company were interviewed. The firm and respondent profiles of key respondents of C1 are summarised in table below.

Table 6-2 Interviewed Case, Interviewees and Job Positions of the Interviewees

Interviewed Case	Company Type	Interviewees	Job Positions of the Interviewees
C2	Heat Transfer Equipment Manufacturing SME	O2	Owner
		B2	Business Manager

6.4.1   Background to ERP implementation

The owner at C2 got the idea of implementing ERP system from an IT seminar he once attended in a computer exhibition event in his city. He then sought further advice from his colleagues and they convinced him that the system will improve his business. C2 had implemented an off-the-shelf accounting software from one of leading vendors on

the market. The software was able to fulfill C2's business requirements in accounting, such as, managing account receivable, account payable and payroll. While the software met the basic accounting needs of C2, it did not have the ability to perform cost accounting per project or to create, record and track the progress of bill of materials in the production of a project.

C2's business process required the departments to prepare various documents, including: purchasing/purchase orders, sales order entry, inventory tracking and control, materials requirements planning (MRP), bill of materials (BOM) and job orders. In order to maintain consistent and concurrent information across departments, the Production and Purchasing departments were using Excel spreadsheets and Access databases linked to the accounting software through a double entry system. The C2 owner recognised that the old way of keeping track of project proposals, parts purchases, and financial documentation was not sufficient to keep up with the competitive market and the demand of its customers. Considering the fact that the existent softwares were not sophisticated enough to tackle the wide array of works and their way of managing accounts was slowing down work, the owner strove to find a better solution. Having seen a preview of the functionalities of ERP at the exhibhition, the owner decided to go ahead with the implementation with the expection that ERP system would meet most the C2's business needs and deliver measurable benefits to the company.

Several consultant companies were invited to present their proposals for the ERP project, but none of them were accepted at the time. There were reasons behind the decision to delay ERP system implementation project in C2. Although C2 employees were considered to be capable enough to learn the business processes on the new system, the owner felt that the cost of the proposed projects were over the strict budget constraints set by the company. As a former director of a large manufacturing company, the owner had experience in ERP software implementation in his previous organisation. While recognising the usefulness of the modular version of ERP for his small firm, the C2 owner wanted to exercise caution on the financial front to prevent ongoing implementation or maintenance costs for any major modification or customisation of the ERP system.

After a lot of deliberation, the type of ERP system and its vendor were selected after the owner attended a public seminar in a computer exhibition. The ERP system had a significantly lower price than the prices offered by the previous ERP vendors. The C2 owner was convinced that the system would meet many of the requirements needed for their business process system and immediately appointed the vendor to become his implementation partner. Once the decision to implement ERP system was made, a small ERP project team was formed comprising two department representatives from C2 and three consultants from the vendor company.

Before the project was started, C2 owner invited the vendor to demonstrate the system's functionalities and capabilities. Concurrently, the ERP project team worked on gathering information on the business requirements of C2 for the ERP implementation. The inspection document collected requests and guidelines from all departments, described the current business processes in C2, and captured the ERP requirements according to the C2 owner's perception. The vendor company then turned to customising the ERP system to match its functionalities with the characteristics of existing business processes.

6.4.2   Experience with ERP system

Considering the scope and requirements of the company, Finance, Procurement and Project Management modules were selected for adoption. The first test runs did not go as smoothly as the project team planned. The system was not able to create correct balance sheet and profit-loss statement for a particular project that had to include quotation and purchase requisition in different currencies. The finance manager further noticed that the system had not incorporated local accounting practices and Indonesian taxation laws. Regarding this issue, the owner explained:

> *"The products in this company are manufactured according to the demand in the project tender and customer order. Our pricing policies are determined according to the particular project. But the standard function of the ERP system has not been properly configured to support this"* (Interviewee O2, November 2012).

The production supervisors were experiencing long delay in work order processing and overwhelmed by the new procedures in ERP required to complete a cycle of purchase

requisition, work order, purchase order, project proposal, purchase receipt and final payment. Again, similar to C1, the main reason behind these complaints was the managers' reluctance to change to a new unfamiliar system and their desire to keep their existing business processes. The business manager reported:

> *"The managers asked if the ERP system could be implemented to suit our processes instead of changing our processes to comply with it. They did not want a software that forces them to follow their so-called best practice solution"* (Interviewee B2, November 2012).

The C2 owner treated these complaints from the managers patiently as he understood that a new unfamiliar system would take some time to be accepted and believed that other companies would need to deal with the same problems when in the middle of business process innovation.

Because C2 had full support from the vendor company since the beginning, the ERP project team members from C2 had the opportunity to engage in prolonged interaction with the consultants. Most of the time, the vendor company helped the employees to understand the basic software functionalities. The ERP project team members worked together to interpret and implement best methods for organising the master data to reach desired standards for performance. This step was proved to be beneficial for C2 since the ERP project team needed to capture valuable business information and use the knowledge to construct the data and configure the system in a way that met company requirements.

While the ERP system met the basic requirements, the ERP project team was struggling to maintain the linkage between customer, vendors, and item numbers, and sychronise the invoices. The accounting department needed to regularly remind the production department to input their work progress using the ERP system to create an accurate cost accounting report for each projects. In an effort to control and resolve the situation, the C2 owner asked accounting and production managers to work together while using the ERP system to keep track of the projects and changes in the bill of materials.

One of the interviewees described C2 owner as a person with significant power and knowledge to insist on his decisions and opinions. With his formidable experience and leadership, the owner was almost singe-handedly managing the company, and the

business manager described C2 as a business organisation of more or less one man. This case not only shows his strong leadership skill, but is characteristic of small or medium firms where the owners decide and supervise all the operations of their business (Wong and Aspinwall 2004). In such a situation, if the owners decide that the organisation must use and support the ERP system, their decision is taken as a non-negotiable goal. Consequently, the C2 owner extensively influenced any decision made during the ERP system project. Within weeks of implementation, the production manager agreed that the ERP system was adequate to accommodate their requirements and asked his staff to learn and use the new project management system.

The ERP implementation project had a rough start at C2, mainly because the employees didn't expect to suddenly change their business process. The system itself still required some modifications to produce information and data in a presentable format. However, C2 has experienced a real impact of the ERP system because the integrated modules help the management to obtain required financial information with ease through one integrated system without having to scan through many types of software. This has a positive effect on the owner's decisions, as he now can know how much he would earn or lost from a manufacturing project.

Regarding the impact on organisational efficiency, the interviewees described that the ERP system was widely used in the company and it had brought positive impact on the daily activities and work in related departments. Each department has designated a person who is responsible for operating the ERP system. Generally speaking, the interviewees underlined the ERP system's favourable impact on the problems of fragmented business process and inter-departmental inefficiencies.

6.4.3   Knowledge transfer in C2's ERP implementation project

Once the ERP system adoption decision was made, the C2 owner used the informal approach to sell the idea of change to his employees apart from the formal training held by the consultants. He felt it was necessary to look at the scope of the project, identify the key staff affected by the change and determine the extent of effect. The leader used brainstorming sessions in order to help reinforce information about new activities to the employees and give his employees the opportunity to raise any issues or point out better alternatives to current solutions.

However, the brainstorming sessions didn't go as planned because he noticed that his employees were holding back information during the sessions and were quite uncomfortable with his idea of the new business process. Hiding information implies that people resist sharing their knowledge or have some hesitation in revealing their work to others. One of the interviewees explained the situation as such,

> *"They followed all the training sessions, but of course they didn't want to look incompetent in front of their boss by asking too many questions. They thought they would easily deal with their problems on their own once the system got fully implemented"* (Interviewee B2, November 2012).

Furthermore, the production manager failed to make his subordinates aware of the change and initiate them into the new way of conducting the operations within the department. As a result, the production staff continued to work according to the old method where they directly approached him for purchase order confirmation and production order, even though they could obtain those documents directly from the computer. With the aim of increasing the awareness of the C2 employees and changing their perspective towards the ERP system, the owner and the ERP project team bought some reference books and popular business magazines, and put them in the company's common room. According to the manager

> *"Now with plenty of reading materials available around the office, the employees have developed some interest in ERP system and it has now become easier to get them involved with the ERP project team"* (Interviewee B2, November 2012).

Overall, C2 has adopted different techniques to transfer valuable knowledge assets within the organisation. In the brainstorming sessions, the ERP project team and the managers meet with the owner to report the progress of the project to manage the tacit knowledge held by the members of the organisation. The vendor company provided training to the employees to improve their technical and management skills. When the project was completed, C2 owner asked the consultants to allow the employees to communicate and share their knowledge and experience via telephone or online chat. With these techniques, C2 was able to support the ERP implementation as well as ease the impact of losing the knowledge asset if team members left the company. All in all,

these knowledge management initiatives allowed C2 to perform better in their ERP system implementation project.

6.4.4 Main factors behind knowledge transfer in C2

This section summarises the responses from the interviewees in thematic categories based on the main factors affecting knowledge transfer in C2's ERP implementation project. As in the case of C1's ERP project, the factors are presented according to their order of occurrence in interviewees' responses. Some of the important factors identified by interviewees in C2 were owner leadership, knowledge sharing culture, consultant ability, and knowledge content quality.

Consultant Credibility Initially, the C2 employees were not convinced that the vendor company had the competency to successfully deliver the project. But their doubts were alleviated when the consultants worked quickly to engage the employees in the process and effectively communicated the necessary steps of the project to the company. To the interviewees, the consultants appeared to be well-informed not only about the technical functionalities of ERP but about C2's business processes and the reasons why C2 owner opted to adopt the ERP system. The consultants were quite knowledgeable and well-prepared with all the implementation methods needed to install the system. With the help of the consultants, C2 employees were able to develop a business blueprint to develop a clear strategy of what the company wanted to get out of the system. The interviewee noticed that C2 employees appreciate the richness of knowledge content when such content comes from a credible source. Put differently, these employees view knowledge content by its suitability and perceive that the consultants need to establish their credibility to present knowledge content to become suitable with the company's requirements.

Owner Leadership C2 is a small company owned by one man, and the owner oversaw every aspect of the business. The interviewees understood the importance of the owner's leadership in the ERP project and the need for continued support from the owner. They felt that along with all the other factors, what was really important for a successful realisation of the ERP project was having owner's support. They were of the opinion that the company owner was thoroughly involved in the project and invested the necessary effort to monitor the progress of the project and provide meaningful feedback. For instance, C2's owner often came to the project meetings and asked if the

team had experienced any problem. He encouraged them to propose their ideas for improving the system to the consultants, if necessary. In addition, the owner bought most of the reference books for the team, and asked them to read the books to prepare for a discussion in the following days. This shows that owner had not only initiated the ERP project and provided requisite resources to install the system, but he was also taking measures to update employee skills and monitor their progress.

Knowledge Sharing Culture Organisation culture has an influence on the attitudes of employees toward knowledge transfer and expectations in ERP project. For example, when the ERP team found difficulties in understanding the purchasing process, the purchasing department would come to explain and ensure the transaction is correctly calculated. The interviewee clearly identified this factor:

> "*Support from our colleagues is required to ensure the project runs successfully. The more those employees are going to be involved and try to learn things from the system, the more opportunity there is for the project to improve the company*" (Interviewee B2, November 2012).

Knowledge Content Quality Suitable knowledge content for the ERP project team is an important factor in C2. Knowledge content availability helps in addressing employees' questions and finding the best possible answer in accordance with the company's requirements. The consultants assisted C2 employees to organise and present ERP modules reading materials in a structured way so the employees can easily understand them. Implementation guides and users manuals were provided since the beginning of the project. Training program for the employees conducted in formal and informal ways. In addition, the consultants were opened to communicate and would update the ERP users in C2 with new information about their ERP system if required.

6.4.5 Main factors behind ERP project results in C2

This section summarises the responses from the interviewees in thematic categories based on the main factors affecting project results in C2's ERP implementation project.

Knowledge Transfer Effectiveness The interview results indicate a positive and significant relationship between knowledge transfer effectiveness and successful ERP system implementation. During the interviews, all respondents explained their high dependence on manuals, training materials and business blueprints, either provided by

the owner, ERP consultants, or the employees. The ERP project team required knowledge about C2's business requirements and ERP system capabilities to implement best methods for organising the master data and configuring the system. Lack of information and ineffective knowledge sharing on these factors can interrupt the team's operations in its effort to deliver the system and provide the best business process for the company. Hence, all the respondents believed that effective transfer of knowledge has been a solution to solve these problems.

User Satisfaction The interviews support the argument that user satisfaction was associated with ERP system project results. Despite some initial difficulties, all the interviewees confirmed that key-users in all departments were satisfied with their ERP system and the system's usage rate has significantly improved. They stated that this system was useful to accelerate information delivery and bring positive impact on the problems of fragmented business process and inter-departmental inefficiencies.

Incentives In the case of C2, the interviewees stated that they were aware of the benefits of incentives, however they did not consider incentives as an important factor that influences the ERP system project results.

Owner Leadership An interpretation of the results is that owner leadership assisted the ERP project team in conducting actions in order to execute their project tasks. The knowledge of the owner's needs and preferences were essential for the team in order to be able to cater the right software package. The interviewees also emphasised the importance of owner leadership as a means to keep the project stay on track and remain strategic to the business. Therefore, owner leadership became crucial in achieving project milestones, leading to a successful ERP system implementation project.

6.5 Summary

This chapter has presented the results from the content analysis of the responses from the interviews conducted at the two Indonesian companies. These case studies aimed to describe how knowledge transfer process can facilitate ERP adoption in Indonesian SMEs and how these two firms had significantly different experiences depending on the level of knowledge transfer. Within the context of the knowledge management framework, the case studies show that leadership of SMEs and in particular the SMEs owners' initiative to push the adoption process is crucial. In addition, the absorptive

capacity of their employees and the knowledge sharing culture of the organisation also plays a major role in the transformation.

Table 6.3 below summarises the findings from the two companies in a matrix comparing the result for each factor across the two companies. The results from these case studies can be insightful to understand whether the proposed model could explain the phenomenon being studied. Understanding these factors can facilitate knowledge transfer activities and support resources for the ERP system implementation in Indonesian SMEs. With the aim of pursuing this objective, the following chapter compares and discusses the main findings from the statistical analysis and the case studies.

Table 6-3 Comparison of findings from case studies

Topics	C1	C2
Implementation of ERP	- Purpose: To perform business processes at the highest level of efficiency by integrating finance, accounting, manufacturing and warehousing functionalities. - ERP Project Team: Experienced employees from related departments plus six consultants. - Preparation: The ERP project team developed a document which represents the business requirements. The customisation was entirely handled by the IT specialists from the consulting company.	- Purpose: To improve its business by integrating the functionalities of cost accounting and project management. - ERP Project Team: Representatives from accounting and purchasing and three consultants. - Preparation: Requests from all departments and the C2 owner were mapped into the ERP system configuration. The vendor company customised the ERP system to match it with characteristics of existing business processes.
Experience with ERP System	- The ERP system was labelled as being unreliable and failed to provide necessary information. - The data entry process was marred by human error. - The consultants did not really capture the actual needs from the production managers. - ERP system only worked in the finance and accounting department. Production department needed to use data conversion software to fetch their production status reports to the ERP system.	- The ERP system had difficulty to implement local accounting practices and Indonesian taxation laws. The production supervisors were experiencing long delay in work order processing. - Under C2 owner's supervision, the ERP team and the managers worked together to solve the problem faced in the ERP system project.

Table 6-3 Comparison of findings from case studies (continued)

Topics	C1	C2
Knowledge Transfer in ERP Implementation Project	- Standard training, printed books and operation manuals were available in the company database server. - Interaction between the project team members and managers were minimal. - Most of the project team members had left the company causing serious impact on the operational level of the ERP system	- There was regular brainstorming sessions to discuss issues and point out alternatives to the situations. - Reference books and popular business magazines were easily found and accessible. - There was constant communication between the consultants and C2 employees via telephone or online chat.
Main factors of the Knowledge Transfer Process	- The training materials were insufficient and considered unsuitable for the company. - The consultants did not have experience in implementing the production system module in furniture manufacturer. - Every department in C1 was too occupied with their business and often neglected the importance of knowledge sharing process. - Most of C1's department supervisors and assistant managers were not able to operate computers. - No special incentives were given to team members during the project implementation. - The owners were too busy with their other business priorities and did not spend enough time to show their support to the ERP project team.	- The consultants appeared to be well-informed about C2's business processes and the reasons why C2 owner opted to use ERP system. - C2 owner often came to ERP team meeting to monitor the progress of the project and to provide suggestions. - ERP team received support from their colleagues to ensure the project runs. - The consultants provided implementation guides and users manuals for the employees. They also ran training programs to help employee acquire the skills needed. - The consultants were approachable. They would communicate new information about their ERP system if required and update any changes.

Table 6.3 Comparison of findings from case studies (continued)

Topics	C1	C2
ERP project results	- C1's ERP system was implemented but it has now been abandoned. - C1's ERP system project is certainly not a success since most of its function is overtaken by new information system developed by C1's own IT department.	- Implementing ERP system has had a positive impact on C2 owner's business strategies, especially regarding financial decisions. - ERP system has solved the problems of fragmented business process and inter-departmental inefficiencies
Main factors behind ERP project results	- The ERP team members were not able to promote knowledge transfer process to meet the business blueprint requirements that would lead to successful ERP implementation. - Key users in many departments, especially Production and Inventory Control, were not satisfied with the new procedure and report process that entail throughout the ERP system project. - The owners' vision was not communicated and delivered through to the management. The owners were too busy with their other business priorities and did not spend enough time to show their support to the ERP project team.	- The ERP project team was able to utilise knowledge provided from the owner, ERP consultants, or the employees about C2's business requirements and ERP system capabilities to organise the master data and configure the system. - Key-users in all departments were satisfied with their ERP system and the system's usage rate has significantly improved. - C2's owner assisted the ERP project team in conducting actions in order to execute their project tasks and achieve project milestones.

Chapter 7 Discussion

7.1 Introduction

The main purpose of this study has been to develop a knowledge transfer model in the context of ERP system implementation projects and evaluate the effect of those factors in the empirical context of Indonesian SMEs. Prominent theories in IS usage and adoption were used to develop a research model and resolve the proposed research questions. The objective of this chapter is to critically review the results of this study and reflect on the implications of the findings. The chapter begins by an overview of the research accomplished in this study. This is followed by a critical discussion of the findings from the quantitative and the qualitative phases of the study.

7.2 Overview of the study

ERP systems can make a significant contribution in modernising business practices at Indonesian SMEs. But research on IT usage in Indonesia, especially ERP usage in SMEs, has not been widely published. The main objective of this study was to develop a comprehensive understanding of users' behaviours and perceptions regarding the effectiveness of knowledge transfer process in ERP system implementation projects in Indonesian SMEs. Here, the goal was to examine whether knowledge transfer process is able to meet the needs of ERP system users and, if so, how this translates into their perceptions towards the results of ERP implementation project. Therefore, this study uses descriptive and exploratory methods to discover the extent to which Indonesian SMEs have adopted their ERP systems and to explain the knowledge management process during the process of adoption.

A list of Indonesian SMEs with ERP system implemented in their workplaces was compiled from the related Indonesia Ministry and ERP system user community database. The potential companies were identified and invited to participate in the survey. The unit of analysis was derived from ERP system project members or their managers who had direct involvement in the project. A total of 150 invitations were sent using traditional postal survey to Indonesian SMEs, then another 205 prospective participants from ERP user community e-mailing list were also invited using the online version of the same survey. From all the invitations sent out, 30 responses were received from the postal survey and 26 responses were received via the internet, in total, the 56 responses made a 16 % response rate.

Employing both quantitative and qualitative studies this study examines the hypothetical model and the interrelationships between the different variables. This mixed method approach was adopted to address the limitations within each method and allow triangulation of findings for a more robust confirmation of the results. Quantitative survey with a large sample of respondents from the study was used to examine the causal relationships between variables and confirm the external validity of the hypothesised model for this study. In the quantitative phase of this study, described in Chapter 5, validity and reliability tests were performed, and the research model was revised after the exploratory factor analysis of the measurement items. The revised model was applied to determine the relationships between constructs from which the hypotheses were tested and conclusions drawn. This study uses a PLS path modelling analysis to validate the research model and test the proposed hypotheses. Next, qualitative case studies using interviews and site observations were conducted to confirm those results and to know what and why these relationships exist in the first place. The interviews attempted to capture individual members' perceptions and experiences with the ERP project in two selected Indonesian SMEs. The researcher then conducted content analyses to the qualitative data to draw out the main themes of the responses in relation to the factors of knowledge transfer that could answer the main research questions and validate the proposed research model.

The findings of this study were able to answer the research questions addressed in Chapter 1. Here, it is worthwhile reviewing the research questions addressed in this study:

Question 1: What are the factors influencing the knowledge transfer process during ERP implementation projects in Indonesian SMEs?

Question 2: How can the parties involved in the ERP implementation project in Indonesian SMEs utilise knowledge transfer to facilitate and achieve successful outcomes?

The first step in addressing the research questions of this study was to identify key antecedents to successful knowledge transfer in the process of implementing ERP systems at Indonesian SMEs. The research model was based on a modification of D and M IS proposed by DeLone and McLean (2003) and the KMS Success model proposed by Kulkarni et al. (2007) to incorporate the knowledge transfer and

organisational support variables to assess IS project success. The hypothetical model presented in Chapter 3 shows the relevant constructs compiled from the literature as factors influencing the knowledge transfer process in ERP system project in SMEs. These theories guided the development of the research model hypothesising predictive power of knowledge content quality, organisational culture, and facilitating conditions on knowledge transfer effectiveness to affect ERP system project results. The first research question required the validation of these identified factors within the empirical context of Indonesian SMEs to verify which of these factors actually had an influence on ERP implementation success.

In analysing the 56 responses from survey participants, the main findings in this research support that the role of Knowledge Content Quality (KNCONT) along with other factors that are positively related to the process of knowledge transfer. The Effective Knowledge Transfer (EFKTR) model moderately predicts the perceived results of ERP system project within Indonesian SMEs. The implication of these results is that, in the context of Indonesian SMEs, the application of the research model has reasonably answered the principal questions of the present study.

In order to achieve the goal of successful implementation, the involved parties within the ERP system project must put more emphasis on knowledge transfer. With improved knowledge sharing, Indonesian SMEs can form integrated networks of their employees to leverage their knowledge capabilities by leveraging common business procedures, standardising job classification, and eliminating organisation silo inside the firms that hinder enterprise-wide IS implementation. Moreover, by leveraging knowledge capabilities during the ERP projects, project team members will likely understand what is happening with the system and contribute to the project that could lead to wide acceptance of the system from the rest of the employees and the successful implementation of ERP systems.

7.3 Discussion of Results

This section presents a discussion of the results from the quantitative and qualitative phases of the study. First, descriptive statistics was conducted to explore the demographic characteristics of the respondents. Descriptive statistics were then computed to summarise and analyse patterns in the response of people in the sample. This study employed Structural Equation Modeling (SEM) as the statistical technique

for analysing a structural relationship of a model by using a confirmatory approach for estimating regressions among continuous factors or latent variables. According to Kaplan (2009), SEM consists of two parts: a measurement part, which links observed variables to a latent variable through a confirmatory factor mode; and structural part which links latent variables to each other through simultaneous equations. Within SEM, Partial Least Squares (PLS) path modelling is used to predict one or more dependent variables from a set of one or more independent variables and examine causal paths connecting the predictors as well as paths connecting the predictors to the dependent variables (Chin, 1998; Gefen et al., 2000). Confirmatory factor analysis was used for examining the research model's validity and reliability. Several adjustments were made because several variables were not associating with their intended model construct. In order to arrive at a final model that could be considered valid and reliable, the measurement model was revised by discarding the invalid manifest variables. The model evaluation then proceeded with the structural analysis phase of PLS using this final revised mode. Then, the PLS method was applied to evaluate the research model and the hypotheses in the structural model.

The strength of the structural model was then evaluated using a bootstrapping procedure included in SmartPLS software. The final model were analysed and evaluated based on the associated R2, path coefficients (β) and goodness of fit values. The results exhibits a strong effect of the predictor variables on knowledge transfer process, with R2 = 0.813. The overall result for the factors being evaluated indicates a moderate effect on perceived results of ERP system success, with R2 = 0.527. Goodness of fit calculation at 0.685 shows that the model fits quite well with the observed data. The CV communality and CV redundancy of the research model also exhibits that it has a favourable predictive relevance.

The research model (Figure 3.6) explains 57%, 81.3% and 52.7% variations of Knowledge Content Quality (KNCONT), Perceived Knowledge Transfer Effectiveness (EFKTR) and ERP system project success in Indonesian SMEs (ESUCC), respectively.

- As hypothesised, owner leadership (OLEAD), incentive (INC) and consultant credibility (CCRED) explain 57 % variation in the KNCONT as dependent variable. The results suggest that the extension of the original model with the addition of an additional effect path from the project members' perception

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towards the ERP system implementation partners (e.g. consultants, vendors) to the outcome of content quality is valid.

- In connection with the predictive power of the research model, the proposed constructs strongly predict the perceived knowledge transfer effectiveness in Indonesian SMEs. Note that the research model replaced 'Co-worker and Supervisor variable' in the original KMS model with Knowledge Sharing Culture (CULT) variable and added Absorptive Capacity (ABCAP). Together with Knowledge Content Quality (KNCONT), CULT and ABCAP, as the joint determinants of EFKTR explain 81.3 % variation in the dependent variable. The results also show that one can view KNCONT as more effective in nature than CULT and ABCAP in affecting the EFKTR.

- Furthermore, the quantitative analysis contends that EFKTR, User Satisfaction (USAT) and OLEAD moderately explain about 53 % variation in the perceptions of ERP system results. This suggests that D and M IS model, which has been used in the knowledge management context when assessing the effectiveness of knowledge management system, can also be applied in the ERP system phenomenon as a tool in leveraging transfer of knowledge in ERP system implementation project.

A mixed-method approach was then employed in this study to understand whether the case studies would be able to explain and provide support for the proposed research model, as well as answer the second research question of this study. A comparison between the case studies and the main findings from the statistical analysis is presented in next table. There are similarities between both case studies:

1) The ERP system was implemented in a small or medium company;

2) The ERP system was initiated by the firm owners,

3) Both companies adopted similar ERP system modules.

However, their overall situations tell different stories as the results of ERP system project in one case is considered more successful than in the other. C1 and C2 both used an ERP implementation project to integrate their business process. However the ERP system in C1 failed to meet the expectations and, even worse, C1 management considered scrapping the ERP system and developing their own system. By contrast, C2 were able to direct their ERP system initiative to better manage their business process and improve their efficiencies.

Table 7-1 Comparison of Findings about Factor of Knowledge Transfer in Indonesian SMEs' ERP System Project

Proposed Factors	PLS Analysis	C1	C2
Consultant Credibility	*	*	*
SME Owner Leadership	*	*	*
Knowledge Content Quality	*	*	*
Incentives	*	*	-
Absorptive Capacity	*	*	*
Knowledge Sharing Culture	*	*	*

Note: For the PLS Analysis column * means that the proposed factor has significant loading on its relationship, directly or indirectly, with knowledge transfer process. For the C1 and C2 columns, * means that respondents mentioned the subject matter as important factor and - means the factor was not implicitly mentioned by the respondents.

The following sections discuss the results to answer the research questions, arranged according to the order of their effect in the research model. The study hypothesised relationships between variables based on the factors in the D and M IS and KMS models. Accordingly, these sections discuss the relevance of the variables to support or reject the hypotheses, as well as the relationships through which different factors exercise an influence on the phenomenon being studied. Generally, the analysis of hypotheses tests and personal interviews show that most of hypotheses proposed in this research study were accepted.

7.3.1 Antecedents to Effective Knowledge Transfer in ERP implementation Projects in Indonesian SMEs

Knowledge transfer encompasses knowledge exchange and its application that follows between knowledge source and its recipient. Knowledge transfer effectiveness is a measure of how the recipient has been able to comprehend and utilise the knowledge in the daily practice of ERP system. The main hypothesis in this study examined how variables of absorptive capacity, knowledge sharing culture and knowledge content quality acted as antecedents to effective knowledge transfer during ERP implementation projects in Indonesian SMEs.

Absorptive capacity

The PLS method results presented in table 5.16 in Chapter 5 indicate that absorptive capacity exhibited a significant correlation with knowledge transfer process and was found to positively associated, succeeding to support the hypothesis. It was expected that absorptive capacity would be a significant antecedent of better knowledge transfer. If the personnel in the firm have prior knowledge and experience with IS platforms like ERP, they will be more able to absorb the new business processes and IT skills required in ERP. Employees may be shunning the ERP system not because of their opposition or recalcitrance towards change but because they do not have the adequate skill to operate it. Support and willingness to enhance the existing knowledge and skill base of the employees can go long way in this situation.

The PLS method result is further supported by information obtained through the personal interviews with the respondents of C1 and C2. Absorptive capacity of the employees was recognised as a significant factor in both cases. Respondents from both companies acknowledged that organisational and, in particular, technical skills are very important in context of ERP system knowledge. For example, in C1, the key users were responsible for most of the implementation of ERP modules related to their assigned departments. Due to their lack of knowledge in new business concepts embedded in the system, some key users often decide to disregard certain procedures required for the system to work in its full functionality. In ERP system implementation, basic computer skills are important. In C1, specialised training in ERP system to support the implementation project was lacking, so many of the intended key users do not have sufficient computer skills to transfer from those old technologies to the ERP system. In contrast, for C2 the ERP project team and the related department supervisors and managers were considered capable and ready to absorb ERP system knowledge and therefore support the implementation of ERP system in their organisation. For C2, the capability of their employees is important to assess the feasibility of ERP system project. C2's ERP project team was able to manage and process most of the transactions through the ERP system. These efforts are one of the main reasons for strong support for the C2's ERP project team, and consequently ERP system implementation. It was welcomed by the employees across all departments in C2's organisation.

The results of this study consistent with an earlier study by Ko et al. (2005) that found a significant relationship between absorptive capacity and knowledge transfer effectiveness in ERP system implementations. Further, Park et al. (2007) revealed that ERP users' capacity to absorb ERP knowledge influenced its performance by their knowledge assimilation and application process. However, these researchers focused their studies on the large firms, which characteristics are different from SMEs. The current study validates these studies' results by using samples from Indonesian SMEs.

Knowledge Sharing Culture

Table 5.16 in Chapter 5 indicates that knowledge sharing culture demonstrated a significant direct relationship with knowledge transfer process effectiveness, with $t = 2.79$ at $\alpha = .05$. Knowledge sharing culture in a company that encourages employees to help their counterparts and contribute to the common pool of knowledge in the company will also lead to effective knowledge transfer. Employees could sometimes be more receptive to informal knowledge exchange with their cohorts then formal training programs or manuals. This suggests that organisation culture that encourages better communication and knowledge exchange between the users plays a significant role in ensuring effective knowledge transfer.

The interviews results found a positive and significant relationship between knowledge sharing culture and knowledge transfer in ERP system implementation project. Respondents at C1 identified the importance of a conducive culture in the organisation for practices that foster knowledge sharing and facilitate knowledge transfer process. However, lack of knowledge sharing cultures between C1's business units exacerbated the knowledge transfer process between ERP project team and the related departments, and significantly affected the progress of the ERP system implementation project. In C1, the ERP system project team members seemed to work on their own turf as managers only focus on their daily job targets and consultants were busy customising the system to adhere with C1's unique business requirements. The lack of communication and partnership was manifested in one instance where C1's management decided to develop their own software to convert ERP system reports to a more acceptable format and content. In C2, the ERP system project team and the heads of departments worked together to manage the implementation of the new system into the organisation. The role of the heads of departments and the company's owner has helped the ERP project team to perform their job. For example, the owner, heads of

departments, operational staff and the ERP project team have regular meetings to discuss progress and ways in which they can improve the ERP system to be more suitable for the organisation. Even though, most of the implementation procedures were performed by the ERP project team, respondents said that knowledge sharing culture in the company is particularly vital.

The results of the current study extend Karlsen and Gottschalk's (2004) study by providing statistical evidence that there is a direct relationship between knowledge sharing culture and effective knowledge transfer in IT projects. This study's results confirm a previous study by Jones et al. (2004) who found that the role of change management in preparing the organisation for knowledge sharing and the willingness of the employees to share personal experiences are two dimensions of organisation culture that best facilitate knowledge transfer in an ERP implementation project. Further, this current study's results also provides empirical evidence for a previous study by Metaxiotis (2009) who argued that knowledge transfer process in ERP projects in SME requires a knowledge sharing culture to be effective.

Knowledge Content Quality

The results presented in Table 5.16 in Chapter 5 show that knowledge content quality was positively and significantly associated with knowledge transfer effectiveness. The KMS model specifies that knowledge content quality affects perceived effectiveness of the knowledge transfer (Kulkarni et al. 2007). In this study, the statistical results are consistent with that statement because the knowledge content quality effect hypothesis was accepted. In addition, employees also need to show positive reaction towards the suitability aspects of the knowledge provided by the ERP project team. As expected, knowledge content quality was also shown to be a significant antecedent to effective knowledge transfer. This implies that when the content of the knowledge is seen as being relevant and high-quality, the employees become keen to acquire that knowledge. On the other hand, when the training manuals or programs are not of the requisite standard, the intended transfer of knowledge will not occur as employees may not take them seriously.

The results of personal interviews in both C1 and C2 also indicate that knowledge content was deemed as an important factor by the respondents, even though there was a big difference between their situations regarding the actual implementation of this

factor. C1 did not utilise the knowledge provided by the ERP project team very much. Respondents thought that the firm had overlooked those manuals because the training materials were not suitable and sufficient to answer C1 problems. Another respondent believed that this was a failing not just of the consultant but the company and C1 should update and promote the knowledge content much more comprehensively so that employees could learn how to use the ERP system. In contrast, C2 not only considers knowledge content to be extremely important, but has taken adequate steps to follow through that conviction. In C2, the ERP project team recognised that they need to attract employees to actually read the manuals and attend the training programs in order to support their implementation project. Promoting the new knowledge was therefore a major component of C2's overall approach. Even though customisation and implementation of the system were mostly done by the consultants, the ERP project team was able to generate awareness and knowledge of the system and new business process being implemented through open and continuous communication.

The current study supports remarks by Gray and Durcikova (2005) and Haas and Hansen (2005) that knowledge content quality is essential to assist managers in developing effective knowledge transfer, leading to high levels of knowledge usage. While these researchers conducted their studies in service-oriented organisations, the current study extends these two studies by providing empirical evidence from product-oriented as well as service-oriented SMEs. Likewise, the results of this study also extend Kulkarni et. al.'s (2007) study by providing statistical evidence and using sample from SMEs to support the argument that effective knowledge transfer is more likely to occur when the knowledge quality is higher.

Therefore, these findings are significant for the Indonesian SMEs implementing ERP system, indication being that knowledge content quality, absorptive capacity and organisational culture are required to improve the overall knowledge transfer process during the project.

Antecedents to Knowledge Content Quality
Knowledge content quality measures the level of accuracy, timeliness and relevance of knowledge provided in the knowledge base. The data showed significant effect of the consultant credibility on knowledge content quality, with t=3.87. Owner leadership

exhibited strong correlation with knowledge content quality, with t=3.34. A significant influence of incentives on knowledge content quality was also supported, with t=2.03.

The impact of outside knowledge source's credibility hypothesis was accepted, indicating that the consultants are expected to possess adequate level of problem-solving capability, knowledge and skills to deliver an acceptable knowledge content quality. This might partly be due to Indonesian SMEs' dependence on their ERP system consultants or vendors as their implementation partner to maximise the capabilities of the technology for an immediate effect on their business performance.

External expertise or knowledge source credibility was considered as an essential factor in both case studies. Both C1 and C2 assembled their ERP project teams consisting of external consultants and managers, or experienced employees, from inside of the company. In both cases, the ERP system was mostly developed and implemented by the consultants and most master data and business process blueprint were prepared and maintained by the company's employees.

 In C1 and C2, major parts of ERP system implementation project were done by consultants, as both companies needed to acquire knowledge of the new system and seek guidance from the consultants to understand the functionality and the business process attached to the system. However, for C1, some members of the ERP project team found that their consultants did not have adequate experience to manage and implement the system in the context of a manufacturing firm. In C1, the consultants failed to meet the users' expectations in delivering quality information and services required by the company. In contrast, a well-established partnership in C2's ERP project team was evident. For C2, the consultants realised their responsibility to transfer their knowledge and maintain necessary knowledge transfer activities in this organisation. In C2's case, the consultants were able demonstrate their expertise and skill in not only implementing the system and providing up-to-date information and troubleshooting support for the company. Finally, in C2, the consultants consciously took measures to remain connected to the users and employees to anticipate problems and demands in the implementation process.

This study suggests that owner's leadership strongly determines the results of ERP system implementation project in Indonesian SMEs and influences knowledge transfer process through knowledge content quality. For example, the owners' eagerness to get

involved in problem solving discussions and monitoring his employees can help him anticipate the knowledge needs of the employees. If the owner is sensitised to any deficits in those areas, they will be more attentive to delivering proper training and guides to employees leading to better quality in knowledge content.

The significant effect of incentive on knowledge content quality, suggests that in Indonesian SMEs context, project team members who are given recognition for their knowledge contribution will take steps to enrich the knowledge pool in the company. The results of the case studies also indicate that ERP system project team members in Indonesian SMEs received some sort of appreciation, either from their employers or colleagues.

Overall the main evident is that the findings from the current study were able to reveal the relationships between consultant credibility, owner leadership, incentives and knowledge content quality. The findings support previous research which links knowledge content quality to consultant credibility (Ko et al., 2005; Wang and Ramiller, 2009), owner leadership (Egbu et al., 2005; Heavey et al., 2015) and incentives (Ba et al., 2001; Lam and Lambermont-Ford, 2010).

7.3.2 Knowledge-related Factors as Antecedents to Results of ERP System in Indonesian SMEs

The final hypothesis examined the actual effect of the selected variables on the success of ERP implementation. Effective knowledge transfer, which was expected to be a significant predictor of perceived ERP system results, was validated with t=2.00, significant at $\alpha = .05$. User satisfaction was demonstrated to have a significant direct relationship with perceived ERP system results, with a t-value of 2.35. Owner Leadership also significantly influenced the perceived ERP system results, with a t-value of 2.12 at $\alpha = .05$. However, the result did not show significant effect of incentives on perceived results of ERP system.

Knowledge Transfer Effectiveness

Effective knowledge transfer is a composite variable which has been predicated on the prior variables of knowledge content quality, absorptive capacity and incentives, the hypothesis test results demonstrated that perceived knowledge transfer effectiveness can predict the results of Indonesian SMEs' attempts to implement ERP system in the future.

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The in-depth interview results from C1 and C2 validate theoretical arguments and show some insights into knowledge transfer process in their ERP system projects. In C1, The ERP team members were not able to promote knowledge transfer process and the knowledge transfer process between consultants and C1's employees was hardly apparent. Thus, this situation created a substantial impediment to transfer the ERP system knowledge and the project results were far below the expectations of C1 owners. On the contrary, a different situation happened in C2 where knowledge transfer process initiated by C2's owner and the ERP project team, allowed C2 to perform better in their ERP system implementation project.

The results at both the companies were quite different and their actual practices in tackling the various aspects of knowledge transfer were shown to have led to these differences. C1 failed to successfully incorporate the ERP system into their work process and was even contemplating scrapping the system. On the other hand, C2 had not only managed to implement the system but was using it for a range of business activities in the firm. Respondents in C1 mentioned that in many cases lack of knowledge exchange between consultant and the users had delayed the progress on certain modules implementation. These contrasting conditions indicated the influence of knowledge transfer effectiveness on perceived results of ERP success in C1 and C2.

The results of the current study are consistent with Lee and Lee's (2000) case study, which argued that transferred knowledge, which are incorporated in an ERP system, influence the probability of ERP success in an organisation. The results and analysis also lend support to Pan et.al.'s (2006) argument that ERP implementation projects are heavily dependent on knowledge sharing and integration to meet the different knowledge management challenges. Overall, the results of this study extend these researchers' case studies by using statistical and providing empirical evidence to reveal that the positive effect of knowledge transfer as a key variable in ERP implementation projects is proven.

Owner Leadership
The results presented in Table 5.16 in Chapter 5 reveal that owner leadership had positive and significant relationship with ERP system projects results. Given the critical role played by owners in the small business context, SME owner leadership was found to be a main driver behind successful implementation of ERP.

In line with a study by Igbaria et al. (1998), there are significant differences in the owners' involvement that have an influence on the knowledge transfer process and ultimately affect the outcomes of C1 and C2 ERP system project. In the case of C1, most of implementation efforts and strategies came from the ERP project team's initiative and only minor things in relation to the ERP system were the concerns of the owners and the managers. Most of the proposed business processes were procedures developed by the ERP project team but hardly ever implemented by the related departments. Lack of communication between owners and ERP project team, and having insufficient support from the owners seem to hamper the progress of knowledge transfer in C1. In the case of C2, the ERP system implementation and the project team were well supported by the owner. From the very start, C2's owner gave full attention towards the ERP project team's effort and was involved in problem solving activities to overcome impending obstacles. For example, production managers were required to record their transaction into the system and follow certain requirements stated in the business blueprints. In companies that have continuous support from the owner and commitment from the management like C2, many of the knowledge transfer activities occur during the ERP system project duration, which improve the employees' awareness of the new business process and acceptance towards using the system as their main as the primary engine for integrating their business operations.

The findings in the current study are consistent with the results of other studies which suggest that leadership and project management issues have a more significant effect on implementation failures than the technology itself (Bingi et al., 1999; Al Imtiaz and Kibria, 2012; Singh et al., 2013). The findings extend Nah et al.'s (2001) study by providing empirical evidence regarding the primary role played by SMEs' owner leadership in ERP project success. The results of the current study also support Sarker and Lee's (2003) study which found that successful ERP implementation usually utilise a traditional leader-centric approach.

Incentives

However, the results of the structural analysis reveal an insignificant effect of incentive on ERP System Project. It is unlikely that respondents would ignore incentives as a motivating factor to adopt ERP systems. An interpretation of these results is that the ERP project team members may not concern with formal incentive system to reward ERP usage by employees when they pursue the project delivery. This situation is

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expected, since Indonesian SMEs are considered to have limited financial resources to apply their business strategies.

The results for an insignificant effect of incentive on ERP system project are further supported by information obtained through the personal interviews with the respondents of C1 and C2. The results provided no evidence to suggest that the companies' incentive policy, particularly in the form of financial rewards, was positively and significantly associated with ERP project results. The interview results did not support the argument that Indonesian SMEs without incentive policies are more likely to experience some difficulties in their ERP projects, and vice versa.

Generally, the findings in this study showed no significant relationship between incentives provided by Indonesian SMEs and the results of their ERP adoption projects. Njenga's (2014) work is supportive of this study's results regarding a non significant impact of incentives on ERP system implementation results. Even though no significant impact was found between the sample of Indonesian SMEs, regarding the relationship on both constructs, one would expect that suitable appraisal mechanisms are relatively important to motivate employees to accept the ERP system in their workplace since this has been indicated in studies by Gargeya and Brady (2005) and Calvert and Seddon (2006).

User Satisfaction

Table 5.6 in Chapter 5 shows that the PLS output for the path between user satisfaction and ERP project results is significant. This result specifies that the more satisfy the key users with the system, the more the probability of success in ERP project results in Indonesian SMEs. If users are unsatisfied with their ERP systems and do not see the value brought by the change to their business process, they will not embrace the shift to ERP.

The interview results in C1 and C2 provide evidence that user satisfaction was positively and significantly associated with the ERP system project results. In the case of C1, The key users in C1 were not satisfied with the new procedure and report process that entail throughout the ERP system project, because the ERP project team were considered fail to deliver ERP technology. Conversely, C2's owner and the ERP project team acted pro-actively to resolve any complaint from key-users and ensure that the system was able to accommodate the key-users requirements. As a result, the ERP

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system was now widely accepted and used in C2 to support the company's business activities.

In this study, it was shown that user satisfaction increases the probability of ERP system success. This finding is consistent with Saatcioglu (2009) and Wu and Wang (2006) who posit that user satisfaction is necessary for ERP system success since ERP success factors mostly rest on user acceptance. Further, the results of this study extend these researchers' studies by providing statistical evidence and using sample from Indonesian SMEs to confirm the importance of user satisfaction in determining ERP projects' success.

Antecedents to User Satisfaction

In this study, user satisfaction measures the extent to which a user feels that the ERP system has improved the work process. The questions asked intended to determine whether the implemented ERP system was able to address the key-users' needs and the organisation's business requirements. Here, the hypothesis examined the effect of the two key knowledge factors, examined earlier, on delivering user satisfaction.

Hypothesis of effect of knowledge content quality on user satisfaction was accepted, with t=4.78 at $\alpha = .05$. On the other hand, a different result with a lower effect was demonstrated for knowledge transfer effectiveness effect as the correlation was in the weak range exhibiting a statistically insignificant t-value at $\alpha = .05$.

The findings of this study showed that knowledge transfer effectiveness was not found to be a significant determinant of user satisfaction. As effective knowledge transfer was found to have a weaker effect on user satisfaction, this could mean that the respondents were not as certain about its positive impact. This could be because knowledge content quality is a more objective criterion that can be judged by the perusing the knowledge material made available to the users. But knowledge transfer measuring the extent of knowledge internalised by users is a more elusive notion to pin down, so the user satisfaction from knowledge transfer could be slightly more ambiguous.

The other hypothesis was accepted, indicating that there is a relationship between knowledge content quality and user satisfaction. This means that when the consultants and project team deliver training formats with high-quality knowledge, employees are better able to make optimum use of their ERP system, which drives up their user

satisfaction with the change brought about by the newly implemented system. Respondents believe that the availability and quality of various reading materials provided by the consultants and the owners lead to more awareness of the ERP system, and more awareness leads to greater acceptance to continue using the system in the organisation. The results from the C1 and C2 case studies presented in chapter 6 confirm knowledge content quality as a significant factor in improving key-users satisfaction. The findings of this study also found in other studies about relationship between knowledge content quality and user satisfaction (Ali and Money, 2005; Kulkarni et al., 2007). Further, the results of this study extend these researchers' studies by providing statistical evidence and using sample from Indonesian SMEs to confirm the importance of knowledge content quality in improving ERP systems' user satisfaction.

Chapter 8 Conclusions

From the findings discussed in the last chapter, this chapter draws some theoretical and practical implications for the academic literature and empirical context of Indonesian SMEs. The last sections of the chapter, and this thesis, reflect on the limitations of the study and suggestions for future research.

8.1. Contributions of the study

This study has achieved its goal to assess the determinants of knowledge transfer in ERP system project and the effect of knowledge transfer process on ERP system project in Indonesian SMEs. Small and medium firms play a significant role in Indonesia's economy and the use of ERP system for those firms is continuously growing. So, the findings from this study about the knowledge transfer process within ERP system projects will contribute to both theory and practice in that area. The two subsections given below discuss the theoretical and practical implications of this study.

8.1.1. Theroretical implications

By applying the research model in the context of ERP implementation in Indonesian SMEs, this study has significantly contributed to the literature on this issue. These theoretical contributions are:

1) In order to obtain a holistic perspective of ERP success, this study examined the influence of diverse organisational and external factors on knowledge transfer process. To the best of the author's knowledge, the current study is among the first to examine the influence of contextual elements within the organisation by using the variables of absorptive capacity, user satisfaction, business owner's leadership, incentives and knowledge sharing culture. Along with the focus on organisational factors, the study included a significant external factor in the form of consultant credibility. This holistic approach described the effect of these conditions not only on knowledge transfer process, but also on the implemented ERP system and its perceived success.

2) Second, the theoretical model established in this study provides a framework to evaluate knowledge transfer process in the context of ERP system projects in Indonesian SMEs. This may be used in future studies focussing on knowledge management initiatives in Indonesian SMEs, especially as a way to introduce

new technology into their organisation. Also, future research could replicate the design of this study to test the perceptions of knowledge transfer process and ERP system results using actual characteristics of employees in other developing countries in Asia to obtain generalisable findings on the dynamic relationships of these factors.

3) By incorporating constructs of knowledge content quality and knowledge transfer effectiveness in line with the KMS model by Kulkarni et al. (2007), this model has updated the DeLone and McLean's (2003) IS Success model to make it suitable for a knowledge management perspective on IS implementation. This framework successfully synthesises variables usually employed in both knowledge management and behavioural science in information system research. Moreover, by focussing on ERP success, the research model has enhanced the scope of the KMS success model in the field of ERP system research.

4) Lastly, this study provided a robust methodology making use of mixed research methods. While quantitative studies are able to provide broad generalised information in quantified data, qualitative studies enable the researcher to explore the behaviours and experiences in greater detail. IS researchers normally tend to employ quantitative methods and ignore qualitative research. Drawing on strengths of both these approaches, the methodology adopted in this study may be replicated in future studies for a more holistic approach to data collection and analysis. The use of mixed method in those future studies would give wider and more generalisable results on the interrelationships among those factors in knowledge transfer process adoption with all their complexities.

8.1.2. Practical implications

Taken from a practical perspective, many lessons can be derived from the results of this study for Indonesian SMEs utilising knowledge management as a method to support the implementation of their ERP systems. Due to their limited human, financial, and organisational resources, these SMEs need to be cautious with how their resources are expended when they decide to make investments in ERP systems. By carefully managing the knowledge transfer process to ensure that employees acquire the requisite skills to successfully adopt the program and troubleshoot future problems, SMEs can

achieve ERP success without allocating large budgets for constant intervention from consultants. Indonesian SMEs could use the model to inform them of the factors they need to consider to facilitate the ERP system initiatives in their companies. The practical implications of this study are:

1) First, prior to implementing their ERP systems, Indonesian SMEs should carefully choose their implementation partners to meet the specific business requirements of their companies. For knowledge transfer process to be successful, consultants must have adequate experience and expertise to deliver the ERP package and provide useful knowledge content for their client companies. A careful consideration of the role of consulting companies is critical because this factor has not only been validated in the quantitative survey, but the case studies have also shown how the failure or success at the two companies was significantly determined by the consultant's ability. Indonesian SMEs owners can find reliable consultants for their ERP projects by demanding the consultants to provide references from other completed projects, or by actively sourcing suggestion and feedback from ERP system users at similar companies. Since knowledge transfer activities usually involve transfer of explicit and tacit knowledge of technical and business processes between the adopting organisation and its third-party implementation partners, both the adopting company and consultant company must focus on the execution of knowledge transfer.

2) Second, demonstrated leadership and continuous support from the SMEs' owners are key factors in shaping the outcomes of the ERP system project and knowledge management practices. The statistical analysis verified the significant effect of owner support and top management involvement, while the case studies showed how the consistent support and supervision from the owner led to ERP success at one company. This implies that Indonesian SMEs owners must work on their leadership skills and managerial support to deliver a positive outcome for their ERP system project. The business process owner should become in conversant in ERP systems so that they are able to customise the basic functionality of the software, monitor the activities of employee ERP users and identify hindrances in business processes.

3) Third, ERP project team should prepare and select certain knowledge content to be placed around the company workspaces. The ERP project should ensure that the knowledge provided can be easily understood and accessed by the intended users and other related employees. In fulfilling the knowledge requirements of different types of users, ERP project team should balance the knowledge content presented for key users with that of regular employees outside the project team. Particularly for the latter, the knowledge content should be presented in language that is easily understandable and allows less expert users to comprehend it. Indonesian SMEs can achieve this by working closely with their consultants who can provide them with updated knowledge and latest case studies from similar companies.

4) Fourth, this study shows that incentives are positively related to knowledge content quality. Even though this study could not find support for a facilitating role of incentives towards the perceived results of ERP system, it has acknowledged the importance of incentives as a facilitator for employees sharing their knowledge. As such financial incentives are less likely to be awarded due to the financial limitations of SMEs, but appreciation and acknowledgment can also act as motivators to boost employee contribution. Indonesian SME owners should be aware that without any form of appreciation, employees would not be interested in supporting the knowledge transfer process and would tend to hoard their knowledge, which would eventually have some negative influence on the way employees use the ERP.

5) Fifth, SME owners in Indonesia should also consider absorptive capacity as an important factor. In the statistical analysis and case studies, absorptive capacity was identified as a significant factor making positive contribution to the effectiveness of knowledge transfer. In this regard, managers at Indonesian SMEs can begin by recruiting human resources equipped with business system skills or adequate experience to create the ERP project team. In addition, appropriate training and education programs in related skills, such as computer and basic management information system, can help adopting companies to increase employee skills and awareness in ERP systems.

6) Sixth, knowledge sharing culture in an organisation can influence knowledge transfer process. This implies that SME owners must take steps to build communication networks between their employees in order to support knowledge management initiatives in their company. SME owners should anticipate their employees' communicative needs, provide adequate infrastructure, and conducive work environment for effective knowledge sharing. Indonesian SMEs should select an internal team composed of experienced employees who are given the responsibility to disseminate ERP-related knowledge within their department.

7) Companies adopting ERP systems should launch in-house communications networks, including discussion groups, newsletters, e-mailing list and Web-based documents, in order to continuously inform their employees about recent developments, and provide answer to any doubts or questions. With such a flow of information, good communication competence will assist the adopting company in their required business process re-engineering and drive up employee commitment to ERP success in their workplace.

8) Finally, the effectiveness of knowledge transfer process should be assessed by considering the user satisfaction towards the ERP system. In other words, the benefits of using the ERP system need to be reinforced because failure to provide a rationale for the change may result in employees forming negative attitudes. If the employees are not adequately skilled to cope with the new processes or the new systems are not seamlessly integrated into the operations, they can often be frustrated with the new system and reject the change. When employees are able to use the system with ease and realise the benefit of the change from their old way of doing things, their user satisfaction will rise and compel them to switch to the ERP system. Managers and consultants must also ensure that the ERP system is customised and fitted with all the required functionalities that actually give superior advantage over old methods of doing business. When employees see tangible evidence of the benefits of the system change to their work process and efficiency, they will voluntarily take the initiative to become proficient users of the system.

8.2. Limitations of current study

This chapter has essentially provided a critical discussion of the research findings of this study in relation to its two objectives of exploring the factors significant to ERP success in Indonesian SMEs and formulating suggestions for aiding knowledge management initiatives in those firms. As the conclusion to this thesis, this section turns its attention from the achievements of the study to reflect on the limitations that circumscribe its scope and approach. The findings of this study are certainly limited to the proposed research model and are only applicable in the limited context of ERP implementation in Indonesian SMEs. But apart from that there are some limitations in relation to its approach and focus that necessitate further explanation.

1) Using statistical analysis is a method to draw valid inferences from the sample that represents a larger population being studied. PLS regression analysis is used to calculate numerical coefficients that represent the predictive power of the model in this study. However, this tool was not designed to generalise the relationships between dependent and independent variables to a broader population. Therefore, the results of this study are significant to the population of Indonesian SMEs that implemented ERP systems, but may not be applied to a larger population of business organisations.

2) In regard to statistical analysis, the validity and reliability of questions used in the survey maybe limited as this study relied upon perceptual measures to obtain data and information which can often be quite subjective. Even though perceptual measures are widely used in IS research, it should be noted that respondent's perceptions of given phenomena may not reflect what actually happened in reality. Additionally, there is a further question as to whether or not the perceived success of ERP system implementation materialise into actual and tangible financial benefits for Indonesian SMEs.

3) There are potential limitations related to the qualitative approach used in this study. The semi-structured interviews were employed to collect the participants' response based on their memory, perceptions and experiences. There is a possibility that their responses did not reflect on what really happened and may not exhibit high external validity. The causality between variables is also difficult to establish because there were only a few cases in this study and the

important variables examined can be unclear for the participants. However, the semi-structured interviews in this study were developed to repeat similar questions at different actors within the companies. Verification of the interviews results was done in this study by comparing each participant's responses and further clarifying to the participants if necessary. Further, the interviews in this study were combined with site observations to obtain information about what the participants and the companies do in their ERP system implementation.

4) Another consideration is that the interviews were conducted in Indonesian language. Therefore, the translation and interpretation process of interview transcripts from original language to English is an apparent limitation of this study. In order to preserve the contextual aspect of data, the content analysis was performed in Indonesian language and the findings are explained in English.

5) The design of this study is limited in generalisation as the current study was narrowed in some regards to mitigate the impact of diverse technology alternatives and varying business environments. Since the number of Indonesian SMEs implementing ERP systems is not very large, data analysis in this study was conducted on a small sample size which can lead to a generalisation issue. However, determining the appropriate sample size is essential for the generalisability of the results of a study (Pallant, 2007). Chin (1998) proposed the rule of 10 to determine the minimum requirement of sample size. Even though, Hair, et al., (2010) suggested that only 5 samples per variables is adequate, this study followed Chin's (1998) recommendation to ensure that the sample size required for PLS analysis was at least 10 times the number of independent variables and in knowledge management study small samples are evident (Hua et. al., 2004; Ko et al., 2005; Lane and Lubatkin, 1998). The data were collected from 56 respondents purposively chosen from a State Ministry of Cooperative and SMEs database and mailing list of ERP user members' directories. Further, this study used mixed methods research to observe more evidence to answer the research questions. Seddon and Scheepers (2012, p.12) suggest that "if the forces within an organization that drove observed behaviour are likely to exist in other organizations, it is likely that those other organizations, too, will exhibit similar behaviour". Following these authors, it is

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expected that one might obtain similar results in analysing ERP-adopting companies that are akin to the sample data used in this study.

6) This study was conducted in Indonesia and participants were selected from Indonesian SMEs that implemented ERP systems in their organisations. The research model may be used to assess knowledge transfer process in SMEs from other developing countries especially in the Asian region albeit with modifications to suit the particular corporate and business context under examination. It is recommended that other researchers learn from the design and implementation of this study before they conduct similar studies in other contexts. As Hawking (2007) notes, differences in language, currency and culture across the Asian region make ERP implementation issues different from country to country.

8.3. Directions for future research

With the limitations of the study in mind, some suggestions for future studies are presented.

1) The research model developed in this study may just be sufficient to understand the influence of the factors that have been explicitly targeted by this study. The actual condition of business organisations is diverse and complicated, and it may be difficult to contain all the relevant contextual factors in a single research attempt. This study encourages the application of other IS success theories and their proposed factors to build alternative research models that can provide a different view on the factors influencing knowledge management in ERP usage in Indonesian SMEs. Some examples include business competition, system quality, government initiatives or cultural direction. Future research may employ objective measures of company's performance, such as, productivity, sales, profits, and compare hard data on these aspects across periods before and after ERP implementation to examine if there are any tangible benefits delivered by ERP in those areas.

2) The researcher undertook a careful literature review and consulted with experts in this area to ensure face validity and composite reliability of the measurement for indicators used in this study. These attempts helped to generate valid and reliable statistical results. Nevertheless, future research should carefully define

and measure the consistency of question items used in survey as the results for certain variables like incentives were ambiguous. The variable of incentives was found to have an effect on knowledge content quality but not a direct effect on ERP implementation success. These findings indicate that the question items developed to assess the intended factors need to be more specific and comprehensive. For example, more specific questions, such as 'what is your opinion on financial reward as motivation factor to support ERP system implementation', could be raised in future studies.

3) Even though the sample size of 56 respondents was sufficient for PLS path method analysis, more responses and larger sample are required in future studies using SEM to test the relationships between multiple latent variables and further verify the findings of this study. Moreover, this study only investigated the perceptions of key users of ERP system in the survey. It may be possible that other employees affected by the system have different perceptions on the issue than these key users, so a future study could expand the focus of the study to include employees from different organisational ranks in the survey.

4) More Indonesian SMEs are expected to implement ERP system solutions in the future. It is also likely that there will be further development in strategies for managing knowledge assets in ERP system projects. Therefore, this study's findings may need to be tested in the future as ERP usage in Indonesian expands and research on knowledge management matures. Future research could develop a longitudinal study or cross-sectional study of Indonesian SMEs to explain the development and causal relationships between ERP system functionality and various factors of knowledge transfer. The longitudinal study could examine the progress in ERP adoption at selected firms over an extended period of time. On the other hand, a cross-sectional study could examine ERP usage across different industry sectors, such as logistics, trading, manufacturing or hospitality services.

8.4. Concluding remarks

This research has attempted to explore the gaps in existing literature on knowledge management and ERP system by investigating the factors influencing knowledge transfer process and the role of this process in ERP system project in Indonesian SMEs.

Following Kulkarni et al. (2007), a research model was developed to investigate the effectiveness of the knowledge transfer process as a determinant of ERP system projects success in Indonesian SMEs. In this study, the original Kulkarni KMS success model was modified and several of its constructs were replaced to develop a research model that is more appropriate for the current research context.

In order to test the hypotheses proposed in the research model, this study includes the application of a quantitative design method employing statistical analysis of survey questionnaires. It then used qualitative methods, such as interviews and observations, as the primary instruments for data collection.

For the quantitative phase in this study, a survey among SMEs located in various cities in Indonesia was conducted. The data were collected from December 2011 until March 2012 by means of traditional postage as well as web-based online survey tool.

Just over 81 % variance in perceived effectiveness of knowledge transfer process can be explained by the research model. This figure means that the research model demonstrated a high degree to which the proposed variables can predict changes in the variable of knowledge transfer process. Particularly, this large variance has been caused by direct effects of absorptive capacity, knowledge sharing culture and knowledge content quality.

A further finding indicates that management factors and the skills of the consultants have significant effects on the knowledge content quality. The model used accounts for 57% of total the knowledge content quality variance. The model exhibited a more than moderate, but less than the substantial, cut-off point to predict the knowledge content quality variable. A possible explanation maybe that in many Indonesian SMEs, knowledge transfer process is still regarded as a new activity. According to Kulkarni et al. (2007), employees in such situation will find it difficult to accurately assess the knowledge content quality available in the knowledge base. However, this study results still imply that better
   a) leadership examples provided by the Indonesian SMEs' owners,
   b) incentives given to use the system and
   c) consultant credibility

led to a higher knowledge content quality provided during the ERP system project.

The results suggest that most of the additional effect paths, from the project members' perception towards the ERP system implementation partners (e.g. consultants, vendors) to the outcome of knowledge content quality and the knowledge transfer process, developed for the research model are acceptable. In addition, the statistical analysis showed that knowledge transfer effectiveness has a positive relationship with Indonesian SMEs ERP system project results. The higher the level of effectiveness of the knowledge transfer process as perceived by the ERP users in our sample, the higher their intention to use the system. This also led to a greater perception amongst users of the benefits of the system for their firms.

For the qualitative phase in this study, two case studies from Indonesian SMEs that had different backgrounds, managerial approaches and ERP system results, were conducted. The data were collected from October 2012 until December 2012 by means of interviews and site observations. The cases used a purposive sample of 2-3 top managers or ERP system key users as representative of the relevant groups. Semi-structured interviews were conducted to gather enough information about the case to understand problems and causes related to the knowledge transfer processes during their organizations' ERP project. In addition, site observations were also conducted for the two selected case studies. These observations provided additional information about the research object and allowed for an exploration of the context within which the ERP systems were being implemented.

The comparison between both studies suggests that the ERP implementation projects in the Indonesian SMEs shared most of the issues which are related with the process of knowledge transfer. It seems that the knowledge transfer process affects the level of ERP system results. Some evidence show that the knowledge transfer process in the case of C1[3] needs more development to support the ERP project, than in the case of C2, where the impression is that the process is fine and the system fits the C2's business requirements quite well.

This evidence is related to the organizational and external factors of the knowledge transfer process. With respect to organizational factors, interviewees in both cases

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[3] Company 1 (C1) is a woodworking/furniture manufacturing specialises in factory direct and custom made-to-order furniture and provides a range of furniture product to the household sector Company 2 (C2) is a supplier and manufacturer of a wide variety of heat transfer equipment mainly in the area of the refining, petrochemical, and gas processing industries

considered SMEs' owners leadership styles, employees' capability, the knowledge sharing culture and incentives as the important factors for ERP system implementation. There are two important relationships revealed through these case studies,

1) The results provide evidence that organization strategies and external forces are connected and their influence on knowledge transfer is difficult to separate. The knowledge transfer process can be determined from the presence of managerial strategies, organizational capability and management supports.

2) There is a dynamic relationship between ERP system technology, the knowledge transfer process and the social constructs around them.

Therefore, these case studies have revealed the impact of organizational, cultural and environmental factors on effective knowledge transfer and success of ERP system project in Indonesian SMEs.

Following the results of quantitative and qualitative analysis, this study discussed its academic contributions and practical implications for SMEs. The study findings enrich existing literature in the area of ERP system success, by shedding light on the factors of knowledge transfer and the influence of relevant variables on the overall results of ERP system project in Indonesian SMEs. Consequently, this study supports the use of variables usually employed in knowledge management and behavioural science, in information systems research. By incorporating these additional variables and hypotheses, the research model has significantly enhanced the original Kulkarni KMS success model to apply it to the ERP system research area.

To be specific, this study has contributed towards significant advancements to the literature on knowledge transfer process in SMEs' ERP system projects by evaluating the relationships between knowledge sharing culture, absorptive capacity and consultant credibility with the phenomenon being studied. Also, this study provides a robust methodology making use of mixed research methods to examine the influence of diverse organisational and external factors on knowledge transfer process in Indonesian SMEs' ERP system projects.

Apart from those academic contributions, the study findings also yield some implications for practice. For the knowledge transfer process to be successful, consultants must have adequate experience and expertise, as well as be able to provide useful knowledge content for their client companies. Indonesian SMEs need to work

closely with their consultants to provide their employees with relevant and updated knowledge about the system being implemented. To sustain these initiatives, Indonesian SMEs' owners should equip their human resources with adequate business system skills and appreciate their employees' knowledge contribution in the project. Above all, the knowledge transfer process will not be effective if the owners do not show continuous commitment and encourage knowledge sharing culture in their company.

Research on ERP implementation project in Indonesian SMEs should not end here. Lessons learned from this study hopefully will be used by Indonesian SME's management and consulting companies in developing effective strategies to encourage their employees to be more involved in knowledge transfer activities to appropriately adopt ERP systems. By practicing these strategies, it is expected that positive perceptions and acceptance of ERP system projects among Indonesian SMEs' employees can be further developed.

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Appendices

Appendix A: Consent form

Appendix B: Survey Questionnaire

Appendix C: Cross loadings

Appendix D: Sample of Interview

Appendix A: Consent Form

VICTORIA UNIVERSITY | A NEW SCHOOL OF THOUGHT

CONSENT FORM FOR PARTICIPANTS INVOLVED IN RESEARCH

INFORMATION TO PARTICIPANTS:

We would like to invite you to be a part of a study into research project entitled

Factors Influencing Knowledge Transfer Process in Enterprise Resource Planning System Implementation within Indonesian Small and Medium Enterprises

This research will attempt to describe the ERP adoption in Indonesian SMEs and pinpoint linkages between ERP system and the learning process of Indonesian small firms. It is projected that the analysis will contribute to the understanding of how better knowledge transfer processes can facilitate ERP implementation project within SMEs in developing countries, particularly in Indonesia.

This research will assist SMEs' management to identify and examine the knowledge related factors that facilitate their ERP implementation projects. The results from this research will also provide guidance for ERP system vendors and consultants in developing better strategies to improve their product acceptance in small business firms in Indonesia.

In order to meet these objectives, you are invited to answer survey questions in the following pages related to your experience from the ERP system project in your company. You are then may be invited to participate in an interview about the project. The interview may take approximately 2 hours and is based on a previously developed questionnaire with opportunities for clarification and extension of discussion. Collected research data will be treated as strictly confident and will never be revealed to unauthorised personnel. We will keep the secrecy of all participants.

CERTIFICATION BY SUBJECT

I, _____

of _____

certify that I am at least 18 years old* and that I am voluntarily giving my consent to participate in the study:

Factors Influencing Knowledge Transfer Process in Enterprise Resource Planning System Implementation within Indonesian Small and Medium Enterprises being conducted at Victoria University by Professor John Zeleznikow.

I certify that the objectives of the study, together with any risks and safeguards associated with the procedures listed hereunder to be carried out in the research, have been fully explained to me by his PhD student Indra Cahyadi, as part of the thesis for fulfillment of the requirements for the degree of Doctor of Philosophy, and that I freely consent to participation involving the below mentioned procedures:

- Interviewer provides a brief overview of the research aim and objective, as well as the conceptual model.
- Interviewer explains about voluntary nature of the interview and data confidentiality obtained from it.
- Questionnaire is used during the interview.
- Interview is conducted in Indonesian language
- A further clarification or additional information might be required
- All answers from interviewee will be recorded, and later will be transcribed
- At the end of interview, the interviewee will be reminded that all discussions are confidential and asked if any material should not be disclosed in any format.
- Interviewee will be reminded that all the data will not be discussed with or released to employees or the employers.
- Interviewer will provide the interview transcript if required by the interviewee.

I certify that I have had the opportunity to have any questions answered and that I understand that I can withdraw from this study at any time and that this withdrawal will not jeopardise me in any way.

I have been informed that the information I provide will be kept confidential.

Signed:

Date:

Any queries about your participation in this project may be directed to the Principal Investigator

Professor John Zeleznikow, Laboratory of Decision Support and Dispute Management,School of Management and Information Systems, Victoria University, Room G.03, Land Titles Office, 283 Queen St., Melbourne, Victoria, Australia, Mobile: 61.4.32 154 217, Phone: 61.3.95053323, E-mail: john.zeleznikow@vu.edu.au

If you have any queries or complaints about the way you have been treated, you may contact the Ethics and Biosafety Coordinator, Victoria University Human Research Ethics Committee, Victoria University, PO Box 14428, Melbourne, VIC, 8001 Telephone 61 3 99194148.

Appendix B: Survey Questionnaire

FORM 1 Demographic Questions

1. Could you give general information about the company that you lead?
   a. Name :
   b. Organisational focus :

2. In average, how many full-time employees work in this company?

   a. 0-25
   b. 26-100
   c. 101-250
   d. 250-500

3. How much revenue of this company in a last year?
   a. Up to US$ 100,000,
   b. US$ 100,000 – US$ 1,000,000, or
   c. US$ 1,000,000 - US$ 5,000,000

4. What kind of ERP system implemented in this company?
   a. SAP,
   b. Oracle,
   c. Microsoft ERP,
   d. Open Bravo ERP
   e. Compiere-based, or
   f. Other, please mention...................

5. What percentage you spent on the ERP system implementation related to the company's annual revenue?
   a. Less than 15 %
   b. 15 % - 20 %
   c. 20 % - 25 %
   d. 25% - 30%
   e. More than 30 %

6. What is the ERP system implementation project's result in this company?
   a. Successful,
   b. Fairly successful, or
   c. Unsuccessful

7. How was the ERP system implementation project's budget realization in this company?
   a. On budget,
   b. 1%-25% over budget,
   c. 25%-50% over budget, or
   d. More than 50% over budget

8. The time taken for the ERP system implementation in this company, was it
    a. On time,
    b. Earlier,
    c. 1 month - 6 months late,
    d. 6 months – 1 year late, or
    e. More than 1 year late

9. How long has the ERP system been used in this company?
    a. Up to 6 months,
    b. 6 months – 1 year,
    c. 1 year – 2 years,
    d. 2-4 years or
    e. More than 4 years

10. In your opinion, what is the biggest impact of the ERP system for your company?

FORM 2 Research Questions Related to the Model

<u>**Topic 1: SMEs owner's leadership**</u>

No.	Question	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
		1	2	3	4	5
1	SME's owners generally understand about how ERP system is integrated into the business					
2	SME's owners show their commitment and support with respect to ERP system activities, guidelines and policy					
3	The effectiveness of ERP system for the whole company is periodically reviewed by the SME's owners					

<u>**Topic 2: Consultant Credibility**</u>

No.	Question	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
		1	2	3	4	5
1	I find that the ERP vendors/consultants is trustworthy					
2	I believe that the ERP vendors/consultants is experienced					
3	I believe that the ERP vendors/consultants is well-trained					

<u>**Topic 3: Incentive**</u>

No.	Question	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
		1	2	3	4	5
1	The top management rewards my knowledge contribution to the ERP system implementation project					
2	My knowledge contribution to the ERP system implementation project is well-recognised and well-respected by my peers					

Topic 4: Knowledge Content Quality

No.	Question	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
		1	**2**	**3**	**4**	**5**
1	The knowledge provided by the ERP vendors/consultants during the ERP system implementation is correct					
2	The ERP system functionality and its content are logical and fits					
3	The knowledge provided by the ERP vendors/consultants during the ERP system implementation is meaningful.					
4	The knowledge provided by the ERP vendors/consultants during the ERP system implementation is understandable, and practicable					
5	The knowledge provided by the ERP vendors/consultants during the ERP system implementation is available at a time suitable for its use					

Topic 5: Knowledge Sharing Culture

No.	Question	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
		1	**2**	**3**	**4**	**5**
1	My colleagues like to share their experiences and ideas to work-related problems					
2	Knowledge sharing among my colleagues is regarded as regular activities in my company.					
3	Knowledge sharing between sections/divisions often occurs in my company.					

Topic 6: Absorptive Capacity

No.	Question	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
		1	2	3	4	5
1	There is a clear understanding of goals, tasks, and responsibilities of implementing the ERP System					
2	I have technical skill to understand the technical knowledge about ERP System					
3	I have the managerial skill to understand the business knowledge about ERP System					
4	I can help solve problems associated with the ERP System					
5	I have the necessary skills to implement the ERP System					

Topic 7: User Satisfaction

No.	Question	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
		1	2	3	4	5
1	I find it easy to get the knowledge from the ERP system to do my job					
2	I find that the knowledge provided by the ERP system meets my needs adequately					
3	I am satisfied with the knowledge provided by the ERP system to do my job					

Topic 8: Perceived Effectiveness of Knowledge Transfer

No.	Question	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
		1	**2**	**3**	**4**	**5**
1	My understanding of how ERP modules integrate with each other has increased					
2	My knowledge of ERP system has improved					
3	My knowledge about ERP system module's training documents for end-users has increased					
4	My knowledge about setting up the configuration that support the business process has improved					

Topic 9: Perceived Overall ERP system Implementation Success

No.	Question	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
		1	**2**	**3**	**4**	**5**
1	The ERP system has provided useful information when needed					
2	Heavily use the ERP system whenever I needed					
3	The departments within my company have gained benefits from system integration					
4	The ERP system significantly contributes to my company's business functionalities to compete in the market					
5	The ERP system can be generally considered a success					

FORM 3 Interview Questions

Prior to the interview:

> *A brief overview and the objective of the study will be provided,*

> *A brief overview of the model will be presented, and*

> *A brief overview about Knowledge Management, ERP systems implementation and their terminologies will be explained.*

1. Who was initiated or proposed the idea to adopt ERP system for your organisation?

2. Could you describe the implementation process?

3. What were the supporting knowledge factors for ERP system adoption?

4. What were the knowledge factors that you considered to have negative influence for ERP system implementation?

5. What were the impacts of ERP system adoption to your organisation and the business?

6. Do you feel the ERP system was a success? Why?

Appendix C: Cross Loading Examination

All Indicators should load highest into their expected factors

	Absorptive Capacity	ERP Success	Incentive	Knowledge Content Quality	Knowledge Transfer Effectiveness	Owner Leadership	Sharing Culture	Consultant Credibility	User Satisfaction
ABCAP1	**-0.0073**	-0.426088	-0.210198	-0.135931	-0.03632	-0.139583	-0.028999	-0.226056	-0.126995
ABCAP2	**0.750094**	0.299474	-0.084208	0.452524	0.525987	0.413057	0.50064	0.38397	0.383153
ABCAP3	**0.748447**	0.369454	0.199223	0.641536	0.654677	0.434999	0.650095	0.32736	0.632456
ABCAP4	**0.848733**	0.732467	0.136158	0.56671	0.664989	0.419401	0.510504	0.501777	0.61056
ABCAP5	**0.903485**	0.637	0.134894	0.536693	0.63841	0.426381	0.56289	0.469358	0.563213
CCRED1	0.438276	0.617791	0.178706	0.540252	0.515517	0.315238	0.391847	**0.799619**	0.479191
CCRED2	0.430946	0.376724	0.168354	0.420453	0.497488	0.407396	0.351184	**0.73629**	0.532795
CCRED3	0.367138	0.4008	0.078168	0.532616	0.468038	0.420238	0.416711	**0.826692**	0.494498
CULT1	0.582152	0.416504	0.040697	0.656942	0.662818	0.35092	**0.788476**	0.546569	0.470978
CULT2	0.72069	0.509335	0.273148	0.653572	0.75661	0.52276	**0.877107**	0.427215	0.678998
CULT3	0.618131	0.334312	0.22194	0.611059	0.666864	0.452481	**0.858296**	0.269094	0.45345
EFKTR1	0.660582	0.560714	0.189694	0.713199	**0.79415**	0.456722	0.77571	0.455725	0.586384
EFKTR2	0.458948	0.39758	0.190528	0.617152	**0.621019**	0.499287	0.408573	0.52775	0.629691
EFKTR3	0.705118	0.510923	0.068445	0.719886	**0.883015**	0.479187	0.704402	0.563775	0.622997
EFKTR4	0.753719	0.508571	0.218231	0.713647	**0.906228**	0.424831	0.739716	0.485413	0.598353

	Absorptive Capacity	ERP Success	Incentive	Knowledge Content Quality	Knowledge Transfer Effectiveness	Owner Leadership	Sharing Culture	Consultant Credibility	User Satisfaction
ESUCC1	-0.090778	**-0.11319**	0.187186	-0.069805	-0.051887	-0.11085	0.002033	0.070316	-0.026652
ESUCC2	0.550526	**0.897577**	0.173698	0.605703	0.603351	0.570218	0.473098	0.625103	0.560494
ESUCC3	0.557855	**0.920983**	0.385549	0.614873	0.538076	0.525405	0.451943	0.504821	0.637534
ESUCC4	0.677598	**0.901539**	0.245471	0.559697	0.539091	0.405004	0.47134	0.505134	0.591615
ESUCC5	0.001266	**0.24112**	0.080438	0.082158	0.139115	0.194372	0.045388	0.180627	0.147206
INC1	0.103306	0.192842	**0.871138**	0.199131	0.143094	0.030836	0.210299	0.165356	0.133198
INC2	0.14205	0.318796	**0.946574**	0.275638	0.215368	0.132499	0.191466	0.159918	0.24646
KNCONT1	0.622802	0.556529	0.131881	**0.860669**	0.759979	0.497598	0.574409	0.550623	0.672476
KNCONT2	0.342586	0.368437	0.062816	**0.619122**	0.429648	0.198029	0.389793	0.257694	0.435148
KNCONT3	0.593093	0.57717	0.346551	**0.888304**	0.799425	0.521539	0.692521	0.603937	0.706005
KNCONT4	0.043604	0.102522	0.039986	**0.055993**	0.06123	-0.031427	0.013134	-0.080052	0.059742
KNCONT5	0.59005	0.544398	0.25078	**0.80537**	0.677745	0.594432	0.719163	0.544536	0.642454
OLEAD1	0.513943	0.551667	0.160229	0.567397	0.537438	**0.956261**	0.511063	0.460059	0.58573
OLEAD2	0.483205	0.547891	0.051329	0.564296	0.53932	**0.953375**	0.495048	0.470526	0.567893
OLEAD3	0.165264	0.007692	-0.08668	0.181968	0.213435	**0.269032**	0.162705	0.031391	0.125662
USAT1	0.489428	0.491563	0.237107	0.616005	0.515689	0.536818	0.499616	0.419053	**0.785968**
USAT2	0.588076	0.521794	0.156978	0.645539	0.619264	0.488103	0.5581	0.576566	**0.848316**
USAT3	0.661536	0.638428	0.17417	0.719466	0.745161	0.511461	0.571622	0.595511	**0.903707**

Appendix D: Sample of Interview Transcript

1. Who was initiated or proposed the idea to adopt ERP system for your organisation?

1	M1:	The Company's owner proposed	Big bos mengusulkan
2		the ERP system implementation	implementasi sistem ERP
3		after he received some	setelah dia mendapat
4		suggestions from his colleagues	masukan dari teman-teman dia
5		in the United States (.) This idea	di Amerika(.) Habis itu idenya
6		was passed on to the board	diteruskan ke para
7		of management in Jakarta to be	direktur yang ada di Jakarta untuk
8		implemented	dikerjakan
9		as soon as possible(.)	secepatnya(.)
10		An ERP system consulting	Konsultan ERP
11		company in Jakarta was appointed	asal Jakarta langsung ditunjuk
12		to deliver the implementation	buat mengerjakan
13		project in this company(.)	proyek ini di perusahaan(.)
14	E1:	The management bought the ERP	Manajemen beli ERP
15	E2:	System with the instructions from	atas perintah
16		the company's owner(.)	big bos(.)

2. Could you describe the implementation process?

1	M1:	A local consultant company	Konsultan lokal
2		holding an ERP system	ahli ERP yang memegang
3		certified partner license	sertifikat lisensi sebagai partner
4		was appointed(.)	langsung ditunjuk big bos(.)
5		The C1 owners identified that the	Menurut big bos
6		financial, supply chain, and	departemen finance, logistik sama
7		marketing areas were as of	marketing adalah
8		importance and assigned the	penting dan menempatkan
9		Business Administration Manager	manajer bisnis
10		as the project leader(1.0)	jadi pimpinan proyek(1.0)
11		The Managers then picked four	Para manajer terus mengambil empat
12		staff from department of	karyawan dari departemen
13		finance, accounting, logistic and	finance, akunting, gudang dan
14		production to form	produksi untuk ditempatkan
15		ERP project team along with six	di tim ERP bersama dengan enam
16		specialists from the consultant	konsultan dari
17		company	perusahaan Jakarta
18	E1:	The company bought	Perusahaan beli
19		Production Planning	modul Production Planning
20		Material Management Finance,	Material Management Finance
21		Marketing modules(.)	sama Marketing(.)
22		The ERP project team developed	Tim diminta menyiapkan
23		a documentation known	dokumen yang isinya
24		as project blueprint	blueprint proyek
25		which represents	untuk menentukan
26	E1:	the business requirements	kebutuhan perusahaan

27		given to the consultants(1.0)	ke konsultan(1.0)
28		During the course of the project(.)	Di tengah jalan(.)
29		the team decided to move with the	tim memutuskan untuk
30		customization due to requests	kustomisasi karena permintaan
31		from key users and	para manajer dan
32		the specific activities(.)especially	adanya kegiatan spesifik(.)
34		in the area of finance and	di area finance dan
35		production	produksi
36	E2:	The customization was	Kustomisasi program
37		entirely handled by	seluruhnya dikerjakan
38		the IT specialists	spesialis IT
39		from the consultant company(.)	dari konsultan Jakarta(0.5)
40		The consultant company provided	Konsultan memberikan
41		training to help the key users	pelatihan buat para pengguna
42		understand and familiarise	agar cepat mengerti dan familier
43		themselves with the new software	dengan program ERP

3. What were the supporting knowledge factors for ERP system adoption? What were the factors that bring negative influence for ERP system implementation?

1	M1:	The most important	Hal yang paling penting
2		in a new system implementation is	dalam implementasi sistem adalah
3		the willingness	kemauan
4		of the management(.)They must	dari manajemen(.)Mereka harus
5		be solid and committed(.)	kompak dan punya komitmen
6		In the other words	Dengan kata lain
7		they must be aware of	mereka harus sadar
8		the consequences	konsekuensi
9		that the system would bring	yang akan dibawa oleh sistem
10		to their departments(.)	ke departemen-departemen(.)
11		They must have the same vision(.)	Mereka harus punya visi sama(.)
12		This is important (.)	Hal ini penting(.)
13		If the management cannot	Kalau manajemen tidak
14		show their commitment,	menunjukkan komitmen
15		the employees will find it	karyawan akan
16		difficult to accept and	kesulita untuk menerima
17		use the new system(2.0)	dan memakai sistem itu(2.0)
18		In this company(.)	Di perusahaan ini(.)
19		the management did not provide	manajemen tidak memberikan
20		sufficient direction on	arahan yang jelas
21		how the system would be	bagaimana sistem akan
23		incorporated to	diterapkan ke
24		their business activities(.)	dalam proses bisnis(.)
25		As if the management did not	Seakan-akan manajemen tidak
26		have a unified vision	memilik visi yang satu
27		about the project(.)	tentang proyek ini(.)
28		The company's owner did not	Big bo juga tidak pernah
29		even socialise	berkumpul
30		or engage the team(0.5)	atau menyapa tim proyek(0.5)

31	M1:	Many employees realised that	Kebanyakan karyawan sadar
32		the project required a lot of	proyek ini butuh jumlah
34		company's resources(.)	dana yang besar(.)
35		However(.) the company' owner	Tapi(.)big bos
36		put the burden of the ERP project	justru membebankan proyek ERP
37		solely on	seluruhnya pada
38		the project team members(.)	anggota tim proyek(.)
39		leading most of the	sehingga hampir
40		managers to detach from	seluruh manajer menjauhi
41		the project and	proyek dan bahkan
42		neglect the invitation	mengabaikan undangan
43		to attend the ERP project meeting	pertemuan dengan tim proyek ERP
44		where a discussion between	dimana diskusi antara
45		departments and	departemen departemen den
46		the ERP project team	tim proyek ERP
47		could happen(3.0)	mestinya terjadi(3.0)
48		Another factor is	Faktor lainnya adalah
49		the human resources capability(.)	kemampuan sumber daya manusia(.)
50		The owner was too ambitious and	Big bos telalu ambisius dan
51		not realise that most of	tidak paham bahwa hampir
52		the human resources were not able	kebanyakan SDM tidak tahu
53		to operate a computer(.)	cara menggunakan komputer(.)
54		Almost all the production heads	Hampir seluruh kabag produksi
55		even the plant manager(.)	bahkan manajer pabrik(.)
56		only had high school diploma(.)	hanya memiliki ijasah SMA(.)
57		It was as if someone asked to do	Ini seperti menyuruh seseorang
58		math multiplication	mengerjakan perkalian
59		when they cannot even	tapi mereka bahkan belum
60		properly sum the numbers(.)	bisa mengerjakan penjumlahan(.)
61		You can imagine how	Bayangkan bagaimana
62		difficult it was to explain	susahnya menjelaskan
63		the ERP system to them(5.0)	sistem ERP kepada mereka(5.0)
64		In one of the project's plan(.)	Rencana di awal proyek(.)
65		the management could designate	manajemen akan menugaskan
66		an employee to assist	satu karyawan untuk membantu
67		the Head of Department to put	kabag Produksi untuk memasukkan
68		their department business	kegiatan admnistrasi departemen
69		activities into the ERP system(.)	dan proses bisnis dalam sistem(.)
70		But in reality(.)	Tapi kenyataanya(.)
71		it was hardly occurred(.)	hal ini tidak bisa direalisasikan(.)
72		This was because	Ini gara-gara(.)
73		the Head of Department powers	pengaruh kabag Produksi
74		were so great that	yang demikian besar sehingga
75		this personnel's effort	usaha karyawan dan tim proyek
76		to properly run the system	untuk menjalankan sistem disitu
77		always be inhibited(1.0)	selalu dikesampingkan(1.0)
78		For example(.)	Contohnya(.)
79		in Production and Planning	di modul Production Planning
80		the personnel was often asked to	karyawan justru lebih sering
81		work more in the production floor	bekerja di lantai produksi

82		than in operating the system(.)	daripada mengerjakan tugas ERP(.)
83		Moreover(.)	Bahkan(.)
84		most of the management	seluruh manajer
85		had been stuck	lebih sering berkutat
86		in their work routines for years	dengan pekerjaan rutin
87		without any	tanpa adanya
88		personal development training(.)	usaha pengembangan diri(.)
89		So the problem is this company	Jadi masalah perusahaan ini
90		does not have enough capability	adalah mereka tidak mampu
91		to support the project(.)	untuk mendukung proyek ERP(.)
94		There were ideas to replace	Ada pikiran untuk mengganti
95		these employees(.) but the owner	sebagian karyawan(.)tapi big bos
96		was reluctant because he knew	selalu ragu-ragu karena dia kenal
97		them since his childhood(10)	baik dengan mereka sejak kecil(10)
98		The company culture is	Budaya perusahaan adalah
99		another reason(.)Of course(.)	faktor lain(.)Tentu(.)
100		each organisation has	tiap perusahaan punya
101		their own culture(.)	budaya sendiri-sendiri(.)
102		One of the Plant Managers once	Manajer pabrik saya pernah
103		told me to look at	cerita bahwa saya perlu lihat
104		the corporate culture(.)	budaya di perusahaan ini(.)
105		He told me that culture is a habit	Katanya budaya adalah kebiasaan
106		considered as something that is	yang sudah dilakukan karena itu hal
107		correct(.)Seen from his eyes	yang benar(.)Dari sudut pandang itu
108		I saw that the culture tends to be	saya lihat budaya selalu dijadikan
109		an excuse to reject	alasan untuk menolak
110		something new(.) It always	sesuatu hal baru(.)Budaya selalu
111		become a reason for someone	jadi alasan seseorang
112		to say that the works	untuk mengarakan pekerjaan
113		has been doing well so far(.)	mereka sejauh ini baik-baik saja(.)
114		why would anyone want to	kenapa ada seseorang yang
115		change it?(5.0)	ingin merubah?(5.0)
116		In this company(.)there is always	Di perusahaan ini(.)selalu
117		a will to change something but	ada keinginan untuk berubah tapi
118		the will to exchange knowledge	usaha untuk bertukar ilmu
119		and share the ideas are	atau berbagi ide selalu
120		constrained by	dibatasi oleh
121		the management level(.)	pihak manajemen(.)
122		We should be able to create and	Kita seharusnya mampu berbuat
123		foster better culture(.)The culture	dan bergerak ke depan(.) Budaya ini
124		which is created to solve problems	akan memecahkan banyak masalah
125		among the departments across the	di berbagai departemen
126		company(.)Unfortunately	di perusahaan(.)Sayangnya
127		it did not happen in this company	ini tidak terjadi disini
128		because each department was too	karena tiap bagian selalu
129		busy with their own business	sibuk dengan dirinya sendiri
130	E1:	So far there was no	Sejauh ini tidak ada
131		special incentives or rewards	insntif atau penghargaan
132		given to team members during the	diberikan pada anggota tim

134	E1:	project implementation(.)	selama proyek implementasi(.)
135		Recognition given by co-workers	Penghargaan dari rekan kerja
136		often received by	seringkali diberikan pada
137		the IT department which is	bagian IT yang
138		currently working on a new	sekarang membuat hal baru
139		software to replace	sebuah program untuk mengganti
140		the ERP system(2.0)	sistem ERP ini(2.0)
141		I also need to mention that	Saya juga perlu tambahkan bahwa
142		there were lack of training	pelatihan yang tidak mumpuni
143		material suitable for the	dan material yang terbatas bagi
144		employees(.)Even	karyawan(.)Bahkan
145		the project documentation is	dokumentasi proyek
146		stored in the project's server and	tersimpam dalam server komputer
147		its existence is rarely exposed(.)	dan jarang dibuka-buka lagi(.)
148		The consulting company and	Konsultan Jakarta dan
149		the IT department were rarely talk	bagian IT jarang berbicara
150		about the ERP system documents	tentang dokumen sistem ERP
151		Therefore(.) all team members	Sehingga(.)anggota tim
152		apart from IT department	yang bukan dari bagian IT
153		have lack of knowledge on how	tidak punya cukup ilmu untuk
154		to customise the system or	melakukan kustomisasi atau
155		produce department report in	membuat format laporan sederhana
156		an acceptable format(.)	yang mudah dibaca karyawan lain(.)
157		The company have always relied	Semuanya selalu tergantung pada
158		on the works of	hasil kerja dari
159		the IT Department	bagian IT

160	E2:	People from the department	Karyawan dari bagian
161		associated with the ERP system	yang terkait dengan sistem ERP
162		were rarely involved in	jarang terlibat dalam
163		the project(.)So(.)they are hardly	proyek(.)Sehingga(.)mereka tidak
164		understand how ERP system	paham bagaimana sistem ERP
165		process works(.)	dan prosesnya berjalan(.)
166		Technical knowledge of	Pengetahuan teknis tentang
167		the system was only given to	sistem hanya diberikan pada
168		the IT Department(.)There were	bagian(IT).Memang ada
169		only a few of meetings between	beberapa pertemuan antara
170		departments to exchange	bagian untuk bertukar
171		knowledge related to	ilmu yang berhubungan dengan
172		the ERP system(.)Meetings	ERP(.)Pertemuan
173		between Production Planning,	antara bagian Production Planning
174		Finance and Accounting	Finance dan Akunting
175		departments were held only when	hanya dilakukan kalau
176		the consultants found a problem(.)	konsultan menemui masalah(.)
177		The ERP system users feel that	Pengguna sistem ERP merasa
178		their training programs were not	pelatihan mereka tidak
179		sufficient(.)These users were not	mencukupi(.)Para pengguna ini tidak
180		satisfied with their system	puas dengan sistem mereka
181		because the system failed to	karena sistem ini gagal untuk
182		reflect the business processes that	menterjemahkan proses bisnis yang

E2:   run on the company   berjalan di perusahaan

4. What were the impacts of ERP system adoption to your organisation and the business?

1	M1:	The promise of ERP technology	ERP menjanjikan
2		to provide a complete	mampu memberikan seluruh
3		production data available for	data produksi yang tersedia untuk
4		Production Planning department	bagian Production Planning
5		to analyse was ultimately not be	agar bisa dianalisa tapi ini tidak
6		realised(.)The departments cannot	terealisasi(.)Seluruh bagian tidak
7		present a reliable data of actual	dapat menyajikan data aktual yang
8		stock level of raw material and	berisi jumlah stok bahan baku dan
9		work-in-progress inventory(1.0)	persediaan work-in-progress(1.0)
10		What and when the department	Kapan dan bagaimana bagian
11		create a Purchase Request was not	membuat Purchase Request tidak
12		recorded properly(.)and I have to	tercatat dengan baik(.) dan saya
13		search the manual document one	mencocokkan dokumen satu
14		by one(.)Imagine how much work	per satu(.)Bayangkan banyaknya
15		should I do?(5.0)	hal yang saya lakukan?(5.0)
16		As a result(.)the departments	Akibatnya(.)bagian-bagian
17		started to blame each other when	menyalahkan satu sama lain jika
18		if the goods required for certain	barang yang dipesan untuk suatu
19		production order did not arrive	Production Order tidak datang
20		on time(.)Furthermore(.)this	tepat waktu(.)Parahnya(.)hal ini
21		situation affected the department	mempengaruhi bagian dan
22		performance because it was	kinerjanya karena menyebabkan
23		become harder to analyse	upaya analisa menjadi lebih sulit
24		the Re-Order Point and	untuk menghitung Reorder Point dan
25		Safety Stock of inventory(.)	jumlah persediaan yang aman(.)
26		The Warehouse personnel	Karyawan bagian gudang
27		responsible for the system were	yang bertugas memasukkan data
28		always late to enter the data into	selalu terlambat melakukan ke dalam
29		the system(.)Stock reconciliation	sistem(.)Sehingga rekonsiliasi stok
30		were always conducted twice a	harus dilakukan dua kali dalam
31		week(.)Overall(.)the work burden	seminggu(.)Tentunya(.)beban kerja
32		of this department was	bagian ini menjadi
34		significantly increased since	lebih banyak sejak
35		the ERP system implementation	implementasi sistem ERP
36		started	dimulai
37	E1:	The situation is worse than	Situasi lebih buruk dari
38		before(.)We now need to perform	sebelumnya(.)Sekarang kita harus
39		our job with more effort and	bekerja lebih keras dan
40		time(.)The report takes too long to	lebih lama(.)Laporan produksi lama
41		print(.)It is very frustrating	dicetaknya(.)Ini sangat menyusahkan
42		especially when our managers	terutama kalau para manajer
43		need accurate information to	meminta informasi yang akurat
44		make a purchasing decision(.)We	untuk memutuskan pembelian(.)Kita
45		cannot get the same kind of	tidak bisa mendapat hal yang ssma

46	E1:	production reports that we always	seperti laporan produksi yang dulu
47		bring during the production plan	dibawa pada perencanaan produksi
48		meeting(1.0)The content and	dan pertemuan(1.0)Isi dan
49		format of ERP system reports are	format laporan ERP system
50		totally different than the old ones	jauh berbeda dari laporan yang lama
51		(3.0)The employees here still	(3.)Karyawan disini masih
52		favour the old system more than	lebih suka sistem yang lama daripada
53		the new one(.)They think that the	sistem baru(.)Mereka merasa
54		new system restricts them from	sistem baru terlalu banyak aturan
55		doing the things usually	yang membuat kerja mereka lebih
56		do with the old system	susah dibanding dengan yang lama
57	E2:	ERP system was considered to	SIstem ERP sudah dianggap
58		increase workload because the	menambah beban kerja saja karena
59		employees were required to entry	karyawan harus memasukkan
60		the data accurately(.)	data mengikuti langkah-langkah(.)
61		For example(.)procedures for	Contohnya(.)prosedur untuk
62		Production Order cancellations	membatalkan Production Order
63		were very tedious(.)When this	sangat merepotkan(.)Kalau
64		situation happened(.) it is	terjadi situasi ini(.)masalahnya
65		the responsibility of the personnel	menjadi tanggung jawab karyawan
66		to explain the reasons in front of	untuk menjelaskan alasan batalnya
67		the General Manager(.)	di hadapan General Manager(.)
68		As a result(.)employees are more	Sehingga(.)para karyawan jadi lebih
69		reluctant to use the ERP system	enggan menggunakan sistem ERP

5. Do you feel the ERP system was a success? Why?

1	M1:	I feel this project was worthless	Saya rasa proyek ini tidak berguna
2		and it only increased the	dan hanya menambah
3		employees' workload(.)I think by	beban kerja karyawan(.)Saya pikir
4		the time the project was	awalnya proyek ini
5		conducted, the company already	dikerjakan, perusahaan sudah
6		had the infrastructure and	memiliki infrastruktur dan
7		the financial resources(.)But	modal yang cukup(.)Tetapi
8		the attitude of the owner and	sikap pemilik perusahaan dan
9		the lack of commitment from	kurangnya komitmen dari
10		the management have led	manajemen telah menyebabkan
11		the project to be unsuccessful	proyek ini tidak berhasil
12	E1:	The ERP system in this company	Sistem ERP di perusahaan ini
13		were becoming obsolete(.)	sudah mulai ditinggalkan(.)
14		The ERP functionalities used in	Fungsi-fungsi ERP hanya dipakai
15		our department are only the ones	sebagian di bagian kami
16		related to	yang berhubungan dengan
17		Production Order number(.)	nomer Production Order(.)
18		Purchase Request and	Purchase Request dan
19		Production Time Ticket(.)	Production Time Ticket(.)
20		Most of the Production Planning	Kebanyakan modul Production
21		functions and the data can be	fungsi dan datanya telah

23	E1:	obtained from the new software	tergantikan oleh program baru
24		developed by the IT department	yang dibuat oleh bagian IT
25	E2:	Of all the modules	Dari seluruh modul
26		purchased(.)only finance and	yang dibeli(.)hanya Finance dan
27		marketing modules can be	Marketing yang bisa
28		effectively operated(.)Since the.	berjalan efektif(.)Sejak adanya
29		introduction of	pembuatan
30		the new software(.) the data entry	program baru(.)kerja data entry
31		workload was increased(0.5)	bebannya makin bertambah(0.5)
32		For example(.)the Finance	Contohnya(.)bagian Keuangan
34		department requires input from	meminta data dari
35		the ERP system to generate billing	sistem ERP untuk membuat tagihan
36		documents(.)while the production	dan dokumen lain(.)namun bagian
37		department looked at the data	Produksi justru melihat data
38		from the new software to	dari program baru yang beda untuk
39		determine the percentage of	menentukan persentase dari
40		production that has been	order produksi yang telah
41		fulfilled(.) I heard that once the	dikerjakan(.)Saya dengar nantinya
42		development of the new software	apabila pembuatan program baru
43		was completely finished(.)	sepenuhnya selesai(.)
44		the ERP system would be	sistem ERP akan
45		discarded and the computer	ditinggalkan dan komputer
46		hardware would be sold to	perngkat lainnya akan dijual ke
47		other companies	perusahaan lain