IT COMPETENCY AND FIRM PERFORMANCE: THE ROLE OF ORGANIZATIONAL LEARNING CAPABILITY IN INDONESIAN MANUFACTURING FIRMS

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KOMPETENSI TEKNOLOGI MAKLUMAT DAN PRESTASI SYARIKAT: PERANAN KEBOLEHAN PEMBELAJARAN ORGANISASI PADA SYARIKAT SYARIKAT PEMBUATAN INDONESIA

ABSTRAK

Sehingga kini, kesan teknologi maklumat pada prestasi syarikat masih boleh dipersoalkan, kerana beberapa hasil kajian terdahulu adalah sangat bervariasi. Hal ini disebabkan oleh kepelbagaian konsepsi dari konstruk utama dan hubungkaitnya dan tidak memasukan kesan yang tak ketara (Intangible effect) dari teknologi maklumat atas prestasi syarikat. Berbagai-bagai paradigma teori yang telah digunakan oleh para penyelidik dalam mengkaji hubungan di antara teknologi maklumat dan prestasi syarikat dan menyebabkan masalah kaitan teknologi maklumat atas prestasi syarikat menjadi kompleks.

Para cendikiawan mempertikaikan bahawa rangka teori yang menyatu didasarkan pada pandangan teori sumber (Resource based view) mesti dikembangkan supaya menyatukan pelbagai unsur-unsur kajian dalam satu kerangka. Selain itu, teknologi maklumat sendirian tidak boleh menghasilkan manfaat yang dapat mengekalkan dan untuk itu ia mesti dilindungi dengan mengabungkan ia dalam organisasi melalui sumber saling melengkapi dan membantu pengkhususan.

Kajian kesan teknologi maklumat atas prestasi syarikat dengan menggunakan syarikat pembuatan Indonesia masih sangat jarang dalam literature, oleh kerana itu kajian terhadap masalah ini adalah amat tepat pada masanya, sebagaimana maklumat sedemikian adalah jarang dalam persekitaran Indonesia.

Oleh itu, kajian ini mengembangkan kerangka penyelidikan yang terdiri dari prestasi syarikat sebagai pembolehubah bersandar, kompetensi teknologi maklumat sebagai pembolehubah tidak bersandar dengan sumber pengkhususannya (pengetahuan, operasi, dan objek teknologi maklumat) dan kebolehan pembelajaran organisasi sebagai pembolehubah pencelahan (mediator) (sumber yang melengkapi). Kajian ini juga menyelidiki peranan stratejik pengetahuan (kodifikasi dan personaliassi) sebagai pembolehubah penyerdehana (moderator).

Kajian ini menggunakan kaedah pendekatan kuantitatif (the positivism paradigm), dan data dikumpulkan melalui soal selidik yang diposkan kepada CEO syarikat pembuatan sederhana dan besar di Indonesia. Akhirnya, sejumlah 192 soal selidik yang dapat digunakan diperolehi untuk tujuan kajian ini. Analisis data statistik multivariate digunakan dalam kajian ini.

Kajian ini mendapati bahawa :

1. Kompetensi teknologi maklumat mempunyai kesan positif dan signifikan atas prestasi syarikat keseluruhan (keuntungan, pengekalan pelanggan, pertumbuhan jualan, pulangan pelaburan) dan kebolehan pembelajaran organisasi.
2. Hasil kajian ini menunjukkan bahawa kebolehan pembelajaran organisasi adalah penentuan yang penting dan memberi kesan positif dan signifikan atas prestasi syarikat keseluruhan. Setiap dimensi dari empat dimensi kebolehan pembelajaran organisasi memberi kesan pencelahan sepenuhnya dan tidak sepenuhnya (pencelah separa).atas hubungan di antara kompetensi teknologi maklumat dan prestasi syarikat keseluruhan. Kesan pecelahan dari dimensi pertukaran dan integrasi pengetahuan memberikan variansi yang tinggi dan diikuti oleh dimensi terbukaan dan ujikaji, komitmen pengurusan, dan perspektif system.
3. Stratejik kodifikasi dan personalisasi kedua-duanya memberi kesan penyederhana (moderating effect) atas hubungan di antara kompetensi teknologi maklumat dan kebolehan pembelajaran organisasi. Kesan penyederhana kodifikasi lebih tinggi dari pada kesan penyederhana personalisasi.

Berdasarkan pada penemuan-penemuan kajian ini kontribusi teoritikal dan praktikal dibincangkan. Pada akhirnya, batasan dan cadangan dipaparkan untuk penyelidikan masa hadapan.

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ABSTRACT

To date, the impact of information technology (IT) on firm performance remains debatable, because some results of previous studies have high variations. The variations of result are caused by diversities in the conceptualization of the key constructs and their interrelationship and the exclusion of intangible effect of IT on performance. The multiple theoretical paradigms have also been employed by researchers in investigating the relationship between IT and firm performance and they caused the problem of linking IT to firm performance to become rather complex.

Scholars argued that the unified theoretical framework based on the resource-based view (RBV) should be developed in order to integrate the various elements of research into a single framework. Further, IT alone may not generate a sustainable advantage, because it can be easily imitated by competitors. However, the advantages should be protected by embedding it in an organization through complementary and co-specialized resource.

Since studies on the impact of IT on firm performance by using indonesian firms are few in the literature, this study is very timely, as such information is lacking in the Indonesian enviroment.

This research developed a framework in which firm performance is the dependent variable, IT competency is an independent variable with the co-specialized resources (IT object, IT knowledge, and IT operations) and the organizational learning capability is the complementary resource (mediate the relationship between IT competency and firm performance). This research also investigated the role of the knowledge strategy (codification and personalization) as moderating variable.

This research used the quantitative approach (the positivism paradigm), and data was collected through mailed questionnaires to CEOs of large manufacturing firms in Indonesia. Finally, a total of 192 responses were used for this study. Multivariate data analyses were then conducted.

The findings revealed:

1. IT competency positively and significantly influences overall firm performance (profitability, ROI, customer retention, and sale growth) and organizational learning capability.
2. Organizational learning capability is an important determinant of overall firm performance whereby it positively and significantly influences overall performance. Each of the four dimensions of organizational learning capability fully and partially mediates the relationship between IT competency and overall firm performance. The mediating effect of knowledge transfer and integration is the highest variance, followed by openness and experimentation, managerial commitment, and systems perspective.
3. The impact of IT competency on the organizational learning capability is moderated by both codification and personalization strategy. The moderating effect of the codification strategy is higher than the moderating effect of personalization strategy

CHAPTER I

INTRODUCTION

1.0 Introduction.

This Chapter intends to provide an overview of study. This chapter begins with the background of the study, followed by the research problem, research questions, and research objectives. It also highlights the significance and scope of the study, definitions of terms, and end with organization of the study chapter.

1.1 Background of the study.

The problem of relating IT on firm performance has been recognized by many researchers. The main issue is the inconsistencies in the research findings. Some researchers found that the relationship between IT and firm performance is significantly positive but the results are huge variations across organizations. For example, some firms have spent vast sums of money on IT with little benefit, while others spent similar amounts with tremendous success (Brynjolfsson & Hitt, 1998).

Tam (1998) also presented mixed findings for the relationship between IT hardware capital and firm-level financial performance, and no evidence to the effect of the former on total shareholder returns across four Asian countries (South Korea, Taiwan, Hong Kong, and Singapore). Some studies also found no evidence for the contribution of IT to productivity (Hu and Plant, 2001). Therefore, the inconsistencies in the research findings have led to criticisms that the traditional evaluation approaches are inappropriate for the study of IT benefits. Its imperfections, according to critics, include diversities in the conceptualization of the key constructs and their interrelationship (Melville et al., 2004), and the exclusion of

intangible benefits that are difficult to capture using the traditional accounting based methods (Counihan et al., 2002;Law & Ngai.,2005; Murphy & Simon, 2002; Shang & Seddom, 2002; Suwardy, Ratnatunga & Sohal, 2003).

Diverse conceptualizations of IT and extending beyond hardware and software have been adopted by information system scholars, and also to include a range of contextual factors associated with its application within organizations (Kling, 1980; Markus & Robey, 1987). For example, Orlikoswski and Lacono (2001) found that five conceptualizations of IT artifact have been adopted in information system research: tool view, proxy view, computational view, ensemble view and nominal view. As a result, the impact of IT on firm performance is dependent upon the understanding how IT has been conceptualized by researchers. Since the IT artifact is still not well-defined, to better understand the impact of IT on firm performance, other researchers have attempted to develop a more generalized view of IT resource. To operationalize the IT resource, researchers melt these formulations with Barney's (1991) classification of firm resources into physical capital, human capital, and organizational capital resources. (Melville et al., 2004).

Theoretical paradigms that have been employed by researchers in examining the relationship between IT on firm performance in prior studies (Melville et al, 2004), including microeconomics (Berndt, 1991; Hittt et al., 1996; Lichtenberg, 1995; Markus & Soh, 1993; Shao & Lin, 2002) , industrial organizational theory (Bakos & Nault, 1997; Bellleflamne, 2001; Clemons & Row,1991), and sociology and socio-political paradigms (Chatfield & Yetton, 2000; Hoogenveen & Oppelland,2002; Kling, 1980). On the other hand, the insights of these multiple theoretical paradigms caused the problem of linking IT to firm performance became complex. However, the absence of a unified theoretical framework has led to a fractured research stream

with many simultaneous but non-overlapping research conversations (Chan, 2000). Therefore, researchers develop a model of the impact of IT on firm performance based in the resource-based view (RBV) of the firm that integrates the various strands of research into a single framework (Bharadwaj, 2000; Caldeira & Ward, 2003; Santhanan & Hartono, 2003; Tippin & Sohi; 2003). Such research provides a firm foundation from which to derive the integrative model (Melville et al., 2004).

Parker (1982) stated that the impact of IT on firm performance fall into two groups. The tangible group has some direct measurable elements in benefits and the intangible group has only indirect measurable values. However, these intangible effects may not translate to financial measures of performance. One implication is that a firm is not able to capture all the value it generates from IT (Barua et al, 1995; Brynjolfsson et al, 2002). Moreover, the intangible benefit of IT such as improved customer service, enhanced product quality and increased market responsiveness can be achieved by intermediate processes or complementary organizational resources that interact with IT, whether as mediator or moderator (Melville et al., 2004). A similar perspective is adopted by Weill (1992), who focuses on the ability of firms to convert IT assets into organizational performance, identifying several "conversion effectiveness factor" that mediate the relationship between IT and firm performance relationship. Therefore, recent literature suggest that organizational learning as complementary resource that plays an important role enhancing a firm's capabilities and competitive advantage (Lei et al., 1996; Real et al., 2005; Tippin & Sohi, 2003). Organizational learning is seen as a dynamic process of knowledge creation generated at the heart of organization via its individuals and groups that enables the organization to improve its performance (Real et al., 2005).

Literature reviews (Dewan & Kraemer, 1998) show that most of the existing studies in this IT- firm performance analysis are mainly conducted in the United States using American firms. Furthermore, scholars believe it is important that researchers add an international dimension to the matter of IT investment-performance relationships, extending beyond United States to encompass the experience of the organization in other developed countries (Mahmood & Mann, 2000). For example, IT spending revenue increased from 2005-2007 in Indonesian IT market. Moreover, this IT market reflected the growing activities of IT application in Industrial and private sector, especially from banking, discrete manufacture and telecommunication industries which dominate 50% IT spending due to large customer base, highly competitive, and capitalize on the latest technology (ASPILUKI, 2007). Table 1.1 shows hardware sales were strong from 2005- 2007 and this sale value have reached USD 6,014.7 million despite government moves to crack down on software piracy.

Table 1.1. Indonesian IT Spending Revenue from 2005- 2007 in USD million

	2005	2006	2007
Software	185.3	211.5	245.4
Hardware	4,820.4	5,616.2	6,014.7
IT services	228.8	283.5	340.9
Total	5,234.5	6,111.1	6,601.0

Source: IDC 2008

The fast growth of the Indonesian computer market would be predicted to grow at a compound annual growth rate of at least 11% between 2007 and 2012. By 2011, the hardware-dominated IT market will approach a value of more than USD 6,000 million as Indonesia displays faster growth than many ASEAN neighbors. With

information and communication technology (ICT) penetration of only around 20% and development restricted to richer areas such as Java (Business monitor, 2008). Moreover, the ICT development in Indonesia will plays important role in helping business community to generate more economic growth to higher level of 7.6% as visualized in Indonesian Vision 2030 (Universitas Indonesia, 2004).

In addition, the growing ICT applications also encourage the Indonesian enterprises more actively implement the organizational learning and knowledge management. The number of Indonesian companies that are interested in applying organizational learning and knowledge management increased every year after PT Dunamis intensively promoted the most admired knowledge enterprise (MAKE) award through the Indonesian companies that have succeeded in the application of organizational learning and knowledge management. Discussions concerning organizational learning and knowledge management have been booming and also have spread over the academician circles (Sitorus, 2006).

The development of Indonesian information technology has supported the growing implementation of organizational learning and knowledge management in every Indonesian company (Yuliazmi, 2005). Moreover, Zulaikha (2007) examined the mediating effect of knowledge management capability on the relationship between information technology relatedness and firm performance in Indonesian multibusiness firms. The result indicated that information technology relatedness has a significant effect on the knowledge management capability and knowledge management capability, in turn, has significant effects on corporate performance of multibusiness firm, so that information technology relatedness has significant indirect effects on corporate performance through the mediation of knowledge management capability. Sutrisno (2007) also examined the impact of information

technology application on enterprise design factor and competitive advantage in Indonesian manufacturing firms. Therefore, the result of the study indicted that IT application influence positively and significantly on competitive advantage, business operation efficiency, faster products differentiation, products quality improvement, and spawning new business.

In modern companies that use advanced technology, the value of non-financial assets often exceeds that of financial assets (Roos et al., 1997). Case study to determine the contribution of IT to non financial asset such as intangible asset was conducted in Indonesia on financial service company, which specializes in stock brokerage service. Based on the calculation, the company has IC absolute measure value amounts USD 4.12 million, with index of efficiency of 73%, therefore total IC value of the company amounts USD 3.02 million. IT contribution to this value is 68.7%, which is equal to USD 2.06 million. This result describes that IT contribution to total company IC value is quite significant (Martias, 2002). Therefore, investment on IT could be justified and result in significant return to the company. Finally, the above issues offer a significant opportunity to explore the complementary organizational resources whether as mediator or moderator in examining the realtionship between IT resources and firm performance in Indonesia by using resource-based view of the firm as theoretical paradigm. Since studies on the impact of IT on firm performance by using indonesian firms are few in the literature, research on such matters is very timely, as such information is lacking for the Indonesian enviroment.

1.2. Problem statement.

There is a limited knowledge and empirical research concerning the IT-performance relationship analysis in developing countries, because most of the

existing studies are mainly conducted in the United States using American firms (Dewan & Kraemer, 1998). To illustrate the selected studies are provided in Table1. 2 of Appendix I. This research would therefore be conducted in Indonesia which is one of the developing countries that displays faster growth rate (11.0%) of IT spending revenue in the ASEAN region and increasing the implementation of organizational learning and knowledge management and is also motivated by these considerations:

1. Few previous researches have used the resource-based view (RBV) of the firm as framework for analyzing whether and how IT may be associated with competitive advantage (Melville et al., 2004). For example, Mata et al (1995) have applied RBV to theoretically analyze the competitive advantage implication of IT.
2. Few previous researches have attempted to develop a more generalized view of IT resources (Melville et al., 2004). In other words, only a limited number of studies have explored resource-based view of IT (Bharadwaj, 2000). According to the RBV, IT per se has not generated a sustainable advantage, because it can be imitated by competitors (Clemon & Row, 1991). However, the advantage of IT can be protected by embedding it in organization through complementary and co-specializations (Powel & Dent-Micalleft, 1997). This perspective has been used by Tippins et al. (2003) to develop the concept of IT competency.
3. Few researches have investigated and identified complementary organizational resource, whether as mediator or moderator, that convert the intangible benefit of IT into firm performance, for example, Tippins

and Sohi (2003) proposed the organizational learning as mediator in the relationship between IT competency and firm performance.

4. Scholars argued that strategy must be viewed as major moderating variable (Schroeder et all., 1995). Choice of a knowledge strategy has been closely linked to the organization's competitive positioning (Zack, 1999a). It is therefore argued that the knowledge strategy should be considered a key component of its business strategy (Grant, 1996; Hasen et all., 1999; Zack, 1999b; Earl, 2001; Scheepers et al., 2004). Hence, there is a need to identify the role of knowledge strategy in determining how IT competency can enable and support knowledge work in the organization.

Based on the above consideration, the problem seeks to address in this research is "*what is the relationship between IT competency and firm performance and what are the role of organizational learning capability and knowledge strategy to this relationship in the Indonesian manufacturing firm"*

1.3 Research Objectives

The broad objective of this study is to investigate the relationship between IT competency, organizational learning capability and firm performance. The specific objectives are as follows:

1. To confirm the relationship between IT competency and firm performance
2. To investigate the relationship between the IT competency and organizational learning capability
3. To investigate the relationship between the organizational learning capability and firm performance.

4. To investigate whether the organizational learning capability mediates the relationship between IT competency and firm performance.
5. To investigate whether the knowledge strategy moderates the relationship between IT competency and organizational learning.

1.4 Research Questions

Based on the above, the research questions are formulated as follows:

1. Is there a relationship between IT competency and firm's performance in Indonesian companies?
2. Is IT competency related to organizational learning capability in Indonesian companies?
3. Is there a relationship between organizational learning capability and Indonesian firm performance?
4. Does the organizational learning capability mediate the relationship between IT competency and Indonesian firm performance?
5. Does the knowledge strategy moderate the relationship between IT competency and organizational learning capability?

1.5. Scope of the study

This study focuses on the manufacturing industries, specifically large companies in Indonesia. Companies in the manufacturing sector ranged from ISIC code 26 (Other non-metallic mineral products) to ISIC code 34 (Motor vehicles, trailers and semi-trailers). Key respondents are chief executive officer who had been identified and considered as person that possesses sufficient knowledge regarding the issues under investigation.

1.6. Significance of the study

This study is expected to contribute to both theoretical and practical perspectives.

The theoretical significances are:

1. Proposing IT capability as a resource that not only includes all benefit such as the tangible and intangible benefit, but also introduce the IT operation and knowledge work leverage.
2. Proposing the organizational learning capability as a resource that play an important role in enhancing firm performance and competitive advantage and may benefit from the prudent application of IT. In other words, the organizational learning can be proved as partial mediator on the relationship between IT capability and firm performance.
3. To explore the effects of knowledge strategy on the relationship between IT and organizational learning capability; i.e. in capturing the codified knowledge in explicit form and shared knowledge in tacit form. This study will shed some light on how the firms can align knowledge management strategy with its creation process to improve corporate performance.

The practical significance are:

1. The three dimensions of IT competency can be used as serving training needs that help a manager in developing appropriate training program for capturing the real benefits of IT capability on firm performance.
2. The firm can built learning capability by enhancing its competence in four dimensions of organizational learning in this framework.
3. The firm can formulate effective knowledge management strategies which influence performance and competitive advantage.

1.7. Definitions and description of terminologies

The followings discuss the definitions and descriptions of key terminologies in this study:

1.7.1 IT competency

Tippins and Sohi (2003) defined IT competency as, “the extent to which a firm is knowledgeable about and effectively utilizes IT to manage information within a firm” and IT competency consists of three components: *IT knowledge* is, “the extent to which a firm possesses a body of technical knowledge about objects such as computer based system”; *IT operation* is, “the extent to which a firm utilizes IT to manage market and customer information.”; and *IT objects* represent, “computer-based hardware, software, and support personnel”.

1.7.2 Organizational learning capability.

Gomez et al.(2005) defined organizational learning as “the capability of an organization to process knowledge, in other word, to create, acquire, transfer, and integrate knowledge, and to modify its behavior to reflect the cognitive situation, with a view to improving its performance” and organizational learning capability consisting of four components: *Managerial commitment* refers to, “management should recognize the relevance of learning, articulate a strategy view of learning, ensure that the firm’s employees understand the important of learning and become involved in its achievement and drive the process of change”; *systems perspective* refers to, “the organization should be considered as a system that is made up of different parts, each with its own function but act in a coordinated manner”; *Openness and experimentation* refers to, “a climate of openness that welcome the arrival of new ideas and points of view, both internal and external, allowing individual knowledge to be constantly renewed, widened, and improved”; and

Knowledge transfer and integration refers to, “two closely linked processes, which occur simultaneously rather than successively: internal transfer and integration of knowledge”.

1.7.3 Knowledge strategy

Knowledge strategy refers two main organizational knowledge strategies namely: codification and personalization.

Scheeper et al. (2004) defined the codification strategy aims to, “capture and codify knowledge in explicit form (e.g. in documents, database) and these available to everyone in the organization for further reuse”, and the personalization strategy draws on, “interpersonal relationships to mobilize and share knowledge in tacit form across the organization and to create and facilitate networks between people to share and learn form their individual skills, experiences, and expertise.”

1.7.4 Firm performance

Firm performance is considered as,” the ability of firm to produce results in relation to the set target, such as return on investment (ROI), customer retention, sales growth and profitability”. (Tippins & Sohi, 2003).

1.7.5 Small, medium, and large size manufacturing in Indonesia

Classification of the size of the manufacturing firm are based on number of employees that was obtained from the Indonesian Directory of Manufacturing Industry such as following : (1) firms with 5-19 employees are classified as small, (2) firms of 29-99 employees are classified as medium, (3) firms over 100 employees are classified as large.

1.8. Organization of Thesis

This study consists of six chapters. The beginning chapter presents a brief introduction on the background of the study, problem statement, research questions, research objectives, scope and significance of the study, definition of terms.

Chapter two will provide an extensive overview of the literature on theoretical background, conceptualization of IT, IT competency, firm performance, organizational learning capability, and knowledge strategy, which are central to the present study.

Chapter three will especially provide development and implementation of ICT in Indonesia, IT market, implementation of organizational learning, knowledge management, and information technology in Indonesian companies.

Chapter four will describe the research methodology employed in the present study in attempting to answer the research question, and it will include: the research framework, research hypotheses, justification of research paradigm, sampling design, data collection procedure, research instrument, construct measurements, and the proposed statistical analysis.

Chapter five presents the data analysis and findings. It begins with undertaking descriptive statistics on response rate and profile of responding firms. This is followed by assessing goodness of measures, test of response bias, correlation analysis, multiple regression analysis, and hierarchical regression analysis in order to test the research hypotheses.

Chapter six deals with discussion and conclusions, It begins with the recapitulations of the study and is followed by discussion on the findings and the contribution of the study both theoretically and practically. The conclusions, limitation of the study, and suggestions for the future research are also included.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter describes theoretical background, conceptualization of IT, IT competency, performance of the firm, organizational learning capability and knowledge strategy to show the relevance and significance of the research questions outlined in Chapter One.

2.1 Theoretical Background.

There are several theoretical paradigms in examining the IT-performance relationship, including microeconomics, industrial organizational theory, sociology and socio-political and resource-based view of the firm (Melville et al., 2004).

2.1.1 Microeconomic theory

Microeconomic theory provides a set of well-defined constructs where they interrelate to each other through theoretical models and mathematical specifications. In examining the relevant theory applied in many of the previous studies of IT value and provides a guide to interpreting the various findings. Hitt et al. (1996) stated that there are three frameworks which are consistently used namely, theory of production, theories of competitive strategy and theory of the consumer.

The theory of production has been used extensively to evaluate the productivity of various firm inputs such as capital, labor and R & D expenditures (Berndt, 1991). More recently, it has been used to assess IT investments. The theory posits that firms possess a method for transforming various inputs into output, represented by a production functions. For example, previous research by Brynjolfsson and HItt

(1995) and Lichtenberg (1995) demonstrated that the theory of production has been particularly useful in providing empirical estimations of the economic impact of IT and also showed that IT investment generate positive returns. In line with this, Dewan and Min (1997) used the same computer world survey data as Brynjolfsson and Hitt (1995) and Lichtenberg (1995) to examine whether IT is a net substitution or complement for the traditional inputs of ordinary capital and labor, and estimate output and substitutions elasticities. Therefore, their analysis confirmed earlier findings of positive marginal returns to IT investment.

Competitive strategy theory will be used to predict the relationship between IT and profit or market value. Much of the previous research in this area has examined correlations between measures of IT spending and measures of profitability (Dos Santos et al., 1993; Markus & Soh, 1993; Strassmann, 1990). On other hand, the result did not show clearly either a positive or negative relationship between IT and profit. Competitive advantage is "normally defined as the ability to earn returns on investment persistently above the average for industry" (Porter, 1985). The only way IT can lead to sustained supernormal profits is if the industry has barriers to entry. Moreover, a barrier to entry is "broadly defined as anything that allows firms to earn supernormal profit, such as patents, economies of scale, search costs, product differentiation, or preferential access to scarce resources" (Bain, 1956). Therefore, Hitt et al., (1996) stated that there are two possible ways in which IT value is related to barrier to entry. The first is that in industries with existing barriers to entry, it may be possible for firms in a particular industry to increase profits through the innovative use of IT, provided the barriers to entry remain intact. Second, the use of IT may raise or lower existing barriers or create new ones, thus changing the profitability of individual firms and industries.

Theory of the customer is also grounded in microeconomic theory which can be used to estimate the total benefit that a given purchase confers to consumers. The demand curve for a product represents how much consumers would be willing to pay for each successive unit of product. However, in practice they need only pay the market price, so consumers with valuations higher than the market price retain the surplus. By adding up the successive benefits of each additional unit of good, the total benefit can be calculated as the area between the demand curve and the supply curve. Furthermore, in a competitive industry, the surplus from an input to production will be passed along to customers, so the area under the demand curve for an input such as IT will also be an accurate estimate of customer surplus (Schmalensee, 1976). Therefore, by examining how the actual quantity of IT purchased has changed over time, an estimate of the demand curve can be traced out, and the total customer surplus can be calculated (Brynjolfsson, 1996). Besides the three theories above there are still the other theories which are categorized in microeconomic such as data envelopment analysis (DEA), Tobin's q ratio and real options pricing (Melville et al.,2004).

Data envelopment analysis (DEA) is a linear programming model for constructing the nonparametric production frontier and measuring technical efficiency. The integration of IT into the various activities of production process presumably is able to reduce or eliminate some rectifiable causes for technical inefficiency. In other word, the deployment of IT in an organization is able to enhance its capability to produce more output using the same amount of input or, alternatively, produce the same level of output less input (Shao & Lin, 2002). Bharadwaj et al. (1999) analyzed the impact of announcements of IT investments on a firm's stock prices and found that while announcement of innovative IT investment

tended to positively impact the market value of the firms, investments in noninnovative IT spending tended to have zero or negative effect on stock price. Furthermore, they used Tobin's q, a financial market-based measure of firm performance and examined the association between IT investments and firm q value, after controlling for a variety of industry factors and firm-specific variables. The results showed that IT investment had a significantly positive association with Tobin's q value. To account for the inherent risk and uncertainty of IT investments, option pricing models have been applied to the IT context. Conducting a real-option analysis of point-of-sale (POS) debit services by an electronic banking network, Benaroch and Kauffman (1999) describe the logic of option pricing as how it can handle getting the timing right, scaling up or even abandonment, as the organizations learns about its business environment with the passage of time.

2.1.2 Industrial Organization Theory.

From the industrial organization theory researchers examined how firms jointly interact in IT investment decisions and understood how the resulting benefits are divided. To investigate the role of strategic interaction among competitors in creating the impact of IT on performance, Belleflamne (2001) has used game theory. He built a two-stage game of IT investment and production choice under oligopolistic competition. Other researchers have drawn from the incomplete contracts and transaction cost literature. For example, Bakos and Nault (1997) employed the theory of incomplete contracts to examine the relationship between ownership and investment in electronic networks such as the internet and interorganizational information systems. An electronic network is defined as a set of participants and a portfolio of assets. The salient concept in this perspective is the degree to which network participants are indispensable in making network assets productive. They

found three main results. First, if one or more assets are essential to all network participants, then all assets should be owned together. Second, participants that are indispensable to an asset essential to all participants should own all network assets. Third and most important, in the absence of an indispensable participant, as long as the cooperation of at least two participants is necessary to create value, sole ownership is never the best form of ownership for an electronic network.

Clemons and Row (1991) employed the transaction cost theory to understand the role of IT in reduction transaction costs. Moreover, transaction cost theory leads them to focus on applications that manage interactions between separable productive activities. For example, in practice the unit of analysis of activity - machines, plants, or strategic business units- will depend on the situation under study. There are two basic types of interactions that can be affected by IT: vertical interaction and horizontal interactions. Vertical interactions involve the flow of goods, services, and information along a single value chain with the output of one process becoming the input of the next. IT can reduce the basic transactions cost involved in the vertical flow of goods and services along a value chain. On the other hand, horizontal interactions involve coordination of similar or complementary strategic resources, or fixed factors of productions, in multiple markets or uses. IT can reduce the coordination costs. For example, the fixed development cost of IT for purchasing support can be spread over all divisions, lowering the average cost. Therefore, IT reduces the transaction costs of coordinating vertical interactions and IT can enable the coordination of different but related resources to create new products and services with enhanced value to consumer.

2.1.3 Sociology and Socio-Political Perspectives

Kling (1980) examined the studies of computing that use in organizations and in public life. He also investigated the role computer technologies in the workplace, in decision making, in altering power relationship, and in influencing personal privacy. In addition, studied that examine the social accountability of computing arrangements to broad publics are reviewed. Moreover, all studies of computing in social life made important assumptions about the social world in which computing were embedded. He compared two broad perspectives, namely systems rationalism with segmented institutionalist analyses. Systems rationalism, a collection of approaches including management science, managerial rationalism, and the systems approach, is found to be most helpful in stable settings, when there is considerable consensus over important social values. In contrast, segmented institutionalist analyses, which assume social conflict rather than consensus, are particularly powerful as the social world of computing use becomes more dynamic and as a wide variety of groups is involved. According to Uzzi (1997) “embeddedness is logic of exchange that promotes economies of time, integrative agreements, and Pareto improvements in allocative efficiency and complex adaptation”. Furthermore, Chatfield and Yetton(2000) employed the theory of embeddedness to inform understanding of how interorganizational relationships impact IT business value in the context of electronic data interchange (EDI). Therefore, they found that the achievement of strategic payoffs is a function of EDI embeddedness.

The socio- political perspective has been used to examine the relationship between IT investment and firm performance (Hoogeveen & Oppelland, 2002). The results of this research showed that socio-political variables influence the relationship between IT investment and business performance. On the other word, in

the investment process, a non critical attitude towards the value of IT, destructive conflict and lack of trust between different managers negatively influenced the relationship between the IT investment and the quality of the IT assets. In the use process, destructive conflict and a low level of trust among users or between users and IT department, or a low level of trust by users in the customer, might influence negatively the relationship between the IT assets and IT impact.

2.1.4 Resource-Based View of The firm

The resource-based view of the firm emphasizes heterogonous firm resource endowments as a basis for competitive advantage. It is instructed thoroughly in the seminal work of economists related to firm heterogeneity and imperfect competition (Chamberlain, 1933; Robinson, 1933). Initially the theorists give emphasis at the importance of firm heterogeneity, as against market structure, in conferring above normal profits and in driving imperfect competition. Furthermore, these ideas can be refined through the theory of firm growth by conceptualizing the firm as a bundle of resources within administrative framework (Penrose, 1959). Moreover, scholar proposes the notion of resource positions barriers, namely, barriers to imitation, and links resource attributes to profitability (Wernerfelt, 1984), and other researchers examine how resource attributes lead to competitive advantage (Amit & Schoemaker, 1993; Dierickx & Cool, 1989; Peteraf, 1993), also including the analysis of resources in the context of interconnected organization (Dovev, 2002). In line with this, Barney (1991) specifies the conditions required for a resource to confer a competitive advantage. If the valuable resource is also rare, namely, few firm have access to it, it gives a temporary competitive advantage. If it is also imperfectly imitable, such as competitors don’t know what factors lead to success and therefore what to imitate, then there no readily available substitutes, the resource

gives a sustained competitive advantage. In this case, the firm is using the resource to implement a value creating strategy not simultaneously being implemented by any current or potential competitors and one that its rivals are unable to duplicate. Therefore, In the IT-performance analysis, researchers will adopt this Barney's formulation.

Competitive advantage, from the RBV perspective is achieved by focusing on and exploiting the firm's internal characteristics, specifically its resource profile (Rumelt, 1994; Hamel & Prahalad, 1994). Researchers adopting these perspectives, therefore, have had to define the concept of resource and core competence, as well as the characteristics of these resources that make them strategically relevant. In essence, the firm has internal abilities which it does better than its competitors. Moreover, a competence in the resource based perspective is defined as: A bundle of aptitudes, skills, and technologies that the firm performs better than its competitors that is difficult to imitate and provides an advantage in the marketplace" (Prahalad, C.K & Hamel, G., 1990; Coates, T.T & McDermott, C. M, 2002). In RBV, firm's resources or competencies are generally defined as all the assets, capabilities, processes and knowledge that reside in the firm (Amit & Schoemaker, 1993; Grant, 1991). Such a definition is consistent with Penrose (1959), which includes both tangible and intangible assets as firm resources. In the resources and competence based perspective these resources must meet the following conditions: (1) the competence is difficult to imitate, (2) there is asymmetry among the firms with respect to ownership, (3); it must provide opportunities for the firm. Other RBV theorists have begun to conceptualize what makes these competencies unique (Hamel & Prahalad, 1994; Teece et al., 1997; Conner, 1991). They assume that learning and

knowledge are inherent to resources and capabilities which give competitive advantage.

The complex problem of the IT-performance relationship is informed by the insights of multiple theoretical paradigms. For example, in microeconomic theory as noted in the literature review above, the three methods measure several different things. The effect of IT on productivity can be measured by using the theory of production, the effect of IT on business profitability can be measured by using theories of competitive strategy, and the effect of IT on consumer surplus can be measured by using theory of the consumer. In addition, Industrial organization theory could only explain from 6 to 30 percent of the variance in performance across firm. On the other word, based on empirical evidence, a large proportion of the variation in firm performance appears not to be explained by various factors of industrial structure as the key determinant of firm success. However, the absence of a unified theoretical framework has led to a fractured research stream with many simultaneous but non-overlapping research conversations (Chan, 2000). Therefore, Melville et al., (2004) suggest to develop a model of IT-performance relationship based in the resource based view of the firm that integrates the various strands of research into a single framework. They choose the resource-based view of the firm as the primary theoretical foundation, because this approach enables the integration of research assessing both the efficiency implications of IT application as well as its ability to confer a competitive advantage, heretofore separate research conversations.

In recent years, there are an increasing number of IT- performance relationship studies that are based on the resource based-view. For example, the studies were done by Riverd et al., (2005), Huang et al.,(2005), Galbreath, (2005), Wu et al.,(2005) and Fredericks, (2005). In addition, the resource-based view of the firm

has emerged as leading theory within strategy research (Barney, 2001) and is also used in various management literatures including marketing (Fahy & Smithee, 1999). Therefore, this study will also use the resource-based view of the firm to explain this research framework.

2.2 Conceptualization of IT

Researchers have adopted diverse conceptualizations of IT, extending beyond hardware and software to include a range of contextual factors associated its application within organizations (Kling, 1980; Markus & Robey, 1987). Furthermore, a precise specification of the impact of IT on firm performance is dependent upon how to conceptualize the IT itself. In the other word, the impact of IT on firm performance depends on how to underlay the assumptions about what constitutes IT (Melville et al., 2004). Orlikowski and Locono (2001) studied the conceptualization of IT in prior research, and provided a firm foundation from which to derive a systematic and theoretically based definition of IT within the derivation of model. They identified 14 specific conceptualizations of IT within the 188 articles published in the past decade of information system research (ISR). They then compared these 14 conceptualizations, looking for commonalities and differences, and found that they can cluster them into five broad metacategories of the IT artifact namely tool, proxy, ensemble, computational, and nominal view. In the first conceptualization, IT can be viewed as a tool whose intended purpose is to generate value, whether productivity enhancement, cost reduction, competitive advantage, improved supplier relationship, etc. Specific intention for IT is often unknown. Studies of specific system and implementation contexts enable examination of tool view assumptions. Such a view is often used within the organizational performance

impacts of IT research. In the proxy view, IT is operationalized via proxies such as capital stock denominated in dollars. Wide range of potential proxies exists, but few have been adopted. Adoption of diverse proxies enables triangulation and enhances accumulated knowledge. The ensemble view is focusing on the interaction of people and technology in both the development and use of IT. Case studies examining the organizational performance impacts of IT within specific organizations often adopt the ensemble view (Kraemer et al., 2000, Williams & Frolick, 2001). The computational view emphasizes on algorithm and system development and testing as well as data modeling and simulation, it is less applicable to use IT generating value research. In the last view, studies adopting nominal view where IT is not conceptualized and appears in name but not in fact. An example is the derivation of a two-stage game analyzing the impact IT application on total factor productivity in the context of oligopolistic competition, which introduces IT solely via its postulated impact on cost reduction and product differentiation (Belleflamme, 2001).

Based on the examining conceptualizations of the IT artifact by researchers revealed that prevailing assumptions have delimited accumulated knowledge of its firm performance impacts in three principal respects (Melville et al., 2004):

1. IT is frequently considered as aggregate variables and is measured in dollars or counts systems (proxy view), this mater will limit our understanding of the differential impact of alternative types of IT as well as the role of usage (Devaraj & Kohli, 2003). Furthermore, software is often treated implicitly via assumptive measures or sometimes omitted entirely from the analysis. To investigate the impact of IT on firm performance, software should be incorporated in the conceptualizing IT (Hitt et al., 2002).