

**COMPETITIVE ADVANTAGE THROUGH INFORMATION TECHNOLOGY INNOVATION
ADOPTION BY SMALL AND MEDIUM ENTERPRISES IN MALAYSIA**

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ABSTRACT

The Information Technology concept is considered as a powerful competitive weapon in the modern economy. This paper seeks to explain the impact of information technology innovation on a competitive advantage; the barriers and the benefits companies gain from adopting and using these innovations. This study used IDT as the base theory, and added attitude and self efficacy as determinants to measure individual's perception toward innovation adoption. Individual self-efficacy and attitude toward innovation adoption shape beliefs and perceptions toward innovation, leading them to adopt or reject an innovation. Adding these factors to IDT will examine the individual's dimension toward technology adoption. This research reviews the role of SMEs in Malaysian economy and the effect of government policy in encouraging companies to adopt IT innovation. This is an ongoing research, and at this stage, we are mainly developing a theoretical argument and methodology that is currently in the process of being tested.

Keywords: Information technology, innovation adoption, competitive advantage, barriers, Innovation Diffusion Theory, SMEs, Malaysia.

INTRODUCTION

Increasing globalization and rapid technological revolution presents serious challenges to a company's ability to maintain their competitiveness (Hitt et al., 1998). In the economic globalization, competition is more dynamic and innovation is vital for future business' growth (Jin, 2007). Firms need to actively participate in the global market, use the latest technology, continue to develop new technology, and structure themselves to be ahead in these markets (Hitt et al., 1998). Information technology has the potential to enhance operational efficiency and effectiveness, change the way businesses compete create strategic opportunity and redraw competitive boundaries (Lai et al., 2006). IT is considered as the new competitive weapon, crucial in developing a sustainable competitive advantage, and is also the primary management tool in competitive market to enhance firms' competitiveness and as well as productivity and flexibility, even in Small and Medium size Enterprises (Jin, 2007; Mata et al.1995; Byrd & Turner, 2001; Lai et al., 2006). Small and Medium industries (SMEs) is the most active economic growing force in nearly all countries, playing a significant role in economic growth and considered the backbone of industrial development (Guriting et al., 2006; Ramayah et al., 2003; Alam, 2007). The Malaysian government started a policy to convince small and medium sized enterprises (SMEs) to adopt IT products as a new, more efficient way of performing job. One of the most important strategic technology priorities is MSC Malaysia named cloud computing for 2010. The government used the element of cloud computing to deliver some government service in Malaysia, and hope that cloud computing adoption would lead Malaysia to an advanced economy. They announced that they wanted SMEs to contribute 50% of the country's GDP from the current 32%, with the application of new technologies being the key in achieving this goal. They allocated funds to help smaller companies upgrade their processes and increase efficiency. Survey shows that only 5% of Malaysian SMEs have fully automated IT and communication operations, and only 30% have any form of enterprise level ICT solutions (Malaysian International Report, 2010). Researches around the globe have shown that IT adoption by SMEs is still low and have not reached expectations (Yu, 2006). Since Small and Medium Size Enterprise is a main concern in Malaysia, this study tries to investigate the advantages and barriers of IT adoption, and its relationship with SMEs growth. Firstly reviewing the competitive advantage, then the determinants of IT adoption, barriers of IT adoption and after; the SMEs condition in Malaysia and their barriers to adopt IT.

COMPETITIVE ADVANTAGE OF USING IT

Information technology (IT) is defined as an area of research that includes study, design, development, implementation, support and management of computer-based information systems, particularly computer software and hardware (Kittipong, 2008). In short, IT can be defined as an infrastructure that is capable to

electronically convert, store, retrieve and manage data and information, in the form of graphics, text, video and sound. In many literatures, terms such as information systems (IS) as well as information and communication technology (ICT) are often interchangeably used and mixed with the term IT. There are several purposes for which IT can be used, amongst others, for value creation, problem solving (Melville et al, 2004; Stump & Sriram, 1997) as well as for the purposes of communicating (Ryssel et al, 2004). Given that IT usage enables efficiency and considering that IS must be able to generate returns on investment, the usage of IT can also be seen as strategic and an important competitive advantage enabler (Valacich & Schneider, 2010). Porter and Millar (1985) highlighted that there are three ways in which IT can impact competition among business organizations, whereby the adoption establishes new businesses, develops competitive advantage and finally, it totally changes the industry structure. By adopting an appropriate technology, a business organization can reach greater heights of competency, see improvements in its performance and ensure that its competitive advantage is retained. In order to prevail against rivals in today's business environment, having precise information is crucial, which can only be attained by having an appropriate IT infrastructure. According to Porter, competitive advantage stems from the ability of a business organization to create a value exceeding the cost involved in developing that particular product or service. Sustained competitive advantage flows from organizational capabilities and resources that are rare, valuable, non-substitutable and imperfectly imitable. In sustaining competitive advantage, business organizations must have the capability of implementing strategies based on the organization's internal strength, ability to respond to environmental opportunities, avoid or improve internal weaknesses as well as the ability to neutralize threats. IT is being promoted as one of the critical resources that can be used by business organization to gain competitive advantage.

IT is best used when it supports the business organization's strategy towards achieving or sustaining competitive advantage against their rivals (Valacich and Schneider, 2010). Some sources of competitive advantage which can gain from IT implementation include having the best-made product on the market, delivering superior customer service, achieving lower cost than rivals, having a proprietary manufacturing technology, having shorter lead times in developing and testing new products. These competitive advantages can be gained or sustained by business organizations if IT is used effectively (Valacich and Schneider, 2010). Given the increasing level of competition within the industry and rampant usage of IT, adoption of IT by a business organization would be a strategic necessity, more than any other reason. IT has a positive effect on a business organization's performance in the area of profitability, market share and value as well as reduction in cost of operation; increases speed of delivery by suppliers; better co-ordination of organizations within the value chain; closer and personalized relationship among employees and trading partners; communication with customers; larger market share and new business opportunities; access to knowledge and market information; and a tool to facilitate new ways towards management and organization of business (Khong, et al., 2009; Bartelsman & Doms, 2000; Brynjolfsson & Hitt, 2000; Dedrick et al, 2003; Kohli & Devaraj, 2003; and Melville et al., 2004). In many researches, it is found that SMEs can expand their business by taking proper advantage of IT. Most of the time, SMEs are able to provide customers with more personalized service in comparison to the larger business organizations, giving the SMEs a competitive advantage. SMEs are able to compete globally, given the closer relationship between the supplier and the customer as well as improved efficiency with the help of IT (Chong et al, 2001).

Determinants of IT innovation adoption

The innovation is an idea, practice, or objects that are perceived as new by an individual or a unit of adoption. IT is considered as an innovation when it is felt to be new by the potential adopter. It is a new technology pattern that affects the management, control of production and service systems throughout the economy based on radical innovation in electronic computers, control systems, software engineering, and telecommunication, that have significantly reduced the cost storing, processing, communicating and disseminating information. According to Rogers (1983); adoption is the decision to make full use of an innovation as the best course of action and passes through a sequence of stages before acceptance of a new product, whereas rejection is the decision not to adopt an available innovation (Knol & Stroken, 2001). Innovation adoption is "the process where an individual or another decision making unit passes knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision" (Roger, 1995; Knol & Stroken, 2001). In assessing the determinants of IT adoption in SMEs, a number of studies have considered the technological, environmental, organizational and individual aspects of the business organization. Rogers (1962) developed the Innovation Diffusion Theory and posited that innovations are not equivalent units of analysis and explains how an innovation can be accepted and disseminated among customers. Some innovations receive high level of adoption in few years by specific population, in contrast; others need decades. The process begins with the consumer's awareness of an innovation, and during this stage, consumers actively seek or receive information and shape their favorable or unfavorable beliefs and perception regarding the innovations. This is the leading

cause of adoption or rejection decision (Yu & Tao, 2009). In IDT, Roger explains five general attributes of innovation: relative advantage, complexity, trialability, observability, and compatibility (Roger, 2002). Relative advantage is defined as “the degree to which an innovation is perceived as being better than precursor”. Compatibility is “the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters”. Complexity relates to the difficulty or ease to use of innovation. Trialability is defined as the degree to which an innovation may be experimented with on a limited basis. Observability is related to the visibility of results of an innovation compared to others (others using the system in organization, and tangibility of the results of using new technology (Agarwal & Prasad, 1997; Karahanna et al. 1999; Rashid, 2001; Sparling et al., 2007; Rahman, 2003).

BARRIERS TO IT ADOPTION

IT adoption is the business to adopt or absorb IT solution as a means to grow and manage their business (Jin, 2007). Researches around the globe have shown that IT adoption by SMEs is still low and have not reached expectations (Pavic, et al, 2007; Yu, 2006). Review of literature shows the factors as to why SMEs aren't adopting IT are as the following; management incompetence, poor financial control, non-sufficient funding, owner lacking the leadership ability and knowledge necessary to make the business, and lack of information technology experts (Jin, 2007). A number of barriers leading to the lack of IT adoption have been identified, which includes shortage of resources, (expertise and financial), lack of skills and knowledge with regard to advantages of IT (Blackburn and Athayde, 2000; Cavalcanti, 2006; Ndubisi & Jantan, 2003; Utomo, 2001). Financial limitations and company size restrictions inhibit SMEs to hire IT professionals or implement information technology. A number of studies revealed that SME's perceived barriers such as complex procedure, shortage of technical experts, risk, expensive cost and customers services in implementing and adopting IT into business operations, investment costs outweighs the return on investment; legal issues on adoption of IT; and concerns over the security of IT (Yeung, et al, 2003; Chong et al, 2001; Pires and Aisbett, 2001). Various researchers studied the impact of cost on IT adoption (Seyal & Rahim, 2006; Premkumar et al, 1997; Drury and Farhoomad, 1996; Coz & Ghoneim, 1996) and a significant and direct relationship was found between IT adoption and cost; which means cost plays an important role in influencing IT adoption by SMEs. It was also found that higher cost slows down the pace of IT adoption. Considering the size and resources of SMEs, any new technology can be expensive.

SME IN MALAYSIA

SMEs in Malaysia plays key role, as 99.2% of business are from SMEs. Furthermore, it contributes 32% of Malaysian Gross Domestic Product (GDP) (New Sunday Times, March 2009). Based on the Census on Establishment and Enterprises 2005, conducted by the Department of Statistics Malaysia (DOSM), SMEs in Malaysia are mainly in the services sector, accounting for 87% or 474 706 of total business establishments. Since SMEs play a vital role in the Malaysian economy, the Government is committed towards creating the foundation to support and nurture the development of SMEs into becoming the main growth engine for the country. SME Corp (known as SMIDEC, established in 1996) helps SMEs in promoting and coordinating the development of SME in Malaysia. It provides technical and advisory support services in collaboration with other related agencies involved in SME development.

INNOVATION AND IT ADOPTION IN MALAYSIAN SMEs

Based on the Bank Negara Malaysia's SME Survey in 2001, Malaysian SMEs are still mostly inward-looking and are faced with constraints in management and technological capabilities, limiting their ability to compete and to add value effectively. Review of literature showed that the bulk of the Malaysian industry sector 'consists of small traditional firms using low-technology and low-skill technologies.' According to statistics, 82% of SMEs only use computers for office work such as billing and invoicing, while 94% have no e-commerce exposure. Only 53% own a corporate website, with no e-commerce capabilities (Star online portal, SME Eager to Tap e-Commerce, December 2009). A study by Khong et al., (2008) on 406 managers/owners of SMEs in the southern region of Malaysia found that SMEs in Malaysia are often in a dilemma when deciding adoption of IT. In a study conducted by Hashim (2007), the usage of ICT is low, ICT skills level is poor and the ICT adoption is slow and late as the ICT adoption is deemed difficult by SME owners.

PROBLEM FACED BY MALAYSIAN SMEs IN ADOPTING IT

Problems encountered by SMEs are caused by internal and external environments, such as the lack of capabilities and resources, poor management, low technology, competition, economics, technology, socio-

cultural, and international factors (Hashim, 2000). According to Ghosh and Kwan (1996), the problems faced by SMEs in Malaysia are cost, shortage of workers, and competition. Furthermore, the economic crisis provides a big challenge to the business operation and adds to the difficulty in assessing financial assistance or funding. Since SMEs have a limited capital, they do not plan to modernize their business by spending in information technologies such as e-commerce and software such as ERP and e-HRM to enhance their business competitiveness. In a study by Reynolds (1994), it was concluded that SME owners / managers are not keen on adopting technologies that are sophisticated if they are not able to comprehend even the basic ones. This reveals that SMEs do come across certain problems in formulating internal innovation strategies given their limited resources and technological competencies.

THEORETICAL FRAMEWORK

Rogers (1962) developed Innovation Diffusion Theory and posited that innovations are not equivalent unit of analysis. Some innovations receive high level of adoption in few years by specific population, in contrast other need decade. Rogers's study on the IDT was conducted in many areas of business such as farming, medicine, justice, and others (Lee, 2011). Rogers argued that individuals are classified based on how quickly their adoption of innovation occurs. He categorized them to innovators (2.5%), early (13.5%), early majority (34%), late majority (34%) and laggard (16%). Rogers (1995) posited that the innovation process goes through channel that are created over time among members of an organization, the process stage include knowledge, persuasion, decision, implementation, and confirmation. The decision stage seeks commitments on innovation stage and adopters consider characteristics of innovation to adopt or reject the innovation. Roger in IDT explains five general attribute of innovation: relative advantage, complexity, trialability, observability, and compatibility. Relative advantage is defined as "the degree to which an innovation is perceived as being better than precursor". Compatibility is defined as "the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters". Complexity is "the degree to which an innovation is perceived difficult to understand and use" complexity of innovation has negative relation with its rate of adoption. Trialability is defined as the degree to which an innovation may be experimented with on a limited basis. Visibility and result demonstrability are two construct of Observability that Moore and Benbasat considered in the model. Visibility related to the others using the system in organization, and result demonstrability explains about tangibility of the results of using new technology including their communicability and observability.

Innovation are adopted in phases that include first knowledge, formation an attitude, a decision to adopt or reject, implementation and use and confirmation. The Innovation Diffusion theory measures the innovation characteristics toward innovation adoption and explains the diffusion of innovation across the time and innovation decision process. The innovation decision process is a mental process that an individual or a unit of adoption go through, with the first stage being gathering knowledge on an innovation, and to form attitudes toward the innovation, to making decision whether to adopt or reject, and adopting an innovation and implementation of new ideas to the last stage to confirm this decision (Roger, 2002). The most important factors in all phases is positive or negative attitude toward adopt and use innovation which related to different factors. Shaping favorable or unfavorable attitude toward innovation will affect adopting; a more favorable attitude toward innovation leads to stronger intention to adopt and use innovation. Therefore, it is important to consider attitude as an important factor that leads to intention to adopt or reject the innovation. We hypothesized that if SME owners have a positive attitude toward innovation, they would have stronger intention to adopt and use innovation in their company. Another factor that an individual considers important in this stage is self efficacy. Self efficacy refers to one's belief about his or her ability to do a specific task given a set of circumstances. Therefore it's about the individual's ability and one's judgments about their capabilities to use innovation (Straub, 2009). A higher level of self efficacy will lead to higher intention to adopt and use innovation. It is compatible with perceived behavioral control in the Theory of Planned Behavior. Literature shows that the complexity of innovation prevents users to adopt and use innovation. We hypothesized that if SME owners believe that they have the skill and ability to use innovation, they have a higher intention to adopt and use it. Adding these two predictors increases the chance of measure SMEs owners' intention to adopt and use innovation.

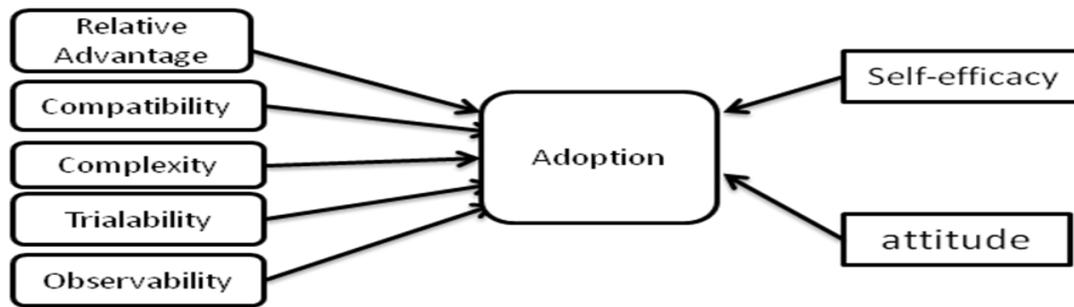


Figure 1. Research framework adapted from Rogers (1983).

METHODOLOGY

The survey is in progress and contained a number of questions that were designed to capture information about the constructs in the research model. The study used the original questionnaire from IDT to measure relative advantage, compatibility, complexity, triability, observability. For measuring attitude and self efficacy which researcher adds to the model items are adopted from Venkatesh et al. (2003). To suit the context of the study, some words have been modified accordingly. Likert scales (1-7) ranging from 'extremely agree' to 'extremely disagree' was used for all construct items. This model will be empirically validated using survey data. Random samples of managers that are owner of the SMEs, or manager of the company in Kuala Lumpur, Malaysia are targeted for sampling. We choose manager or owner of the company because most influential people affecting innovation and change in organizations are top managers (Damanpour, 2006) from the sample we choose sub sample that include the SMEs owners that their work related to information technology and they use IT technology.

CONCLUSION

Information technology is critical for SME's growth, and can increase competitive strength of companies from process reengineering, cost reduction, efficiency and effectiveness. SMEs in Malaysia need to be competitive in the rapidly growing environment. To be competitive, they need to adapt to new technologies by acquiring IT knowledge and making use of platforms set by the government. The use of IT reduces the cost of business process, customer or suppliers, differentiates product and services/ reduces the differentiation advantage of competitors, creates new products and services and make radical changes to business processes, improve quality, efficiency, and reduce the time span to market and expand regional business. The Malaysian government needs to assist the SME's in providing assistance in terms of monetary and guarantee scheme in acquiring IT skills and equipment as they contribute greatly to the country's employment and GDP.

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