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Knowledge Based Information System for Strengthening the Competitive Advantages of Women Technopreneurs in Malaysia

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Abstract: In context of technopreneur business, competitive advantages is the top most issues that facing by women entrepreneurs especially for sustaining their market position and profitability. The dramatically change of technopreneur landscape has exposed the women technopreneur with some of global challenges. In the one hand, competitive advantages possible to transform the business into the best track by monitoring the rapid change of external and internal environment of business. However, in the one hand, competitive advantages have exposed the business to some risks, damage and negative impacts if they are not ready to adopt the suitable strategy. The main objective of the paper is to discuss the competitive advantages forces of women technopreneur firms. Secondly, the paper is aimed to highlight the usability of knowledge based information system (KBIS) in dealing with the main issues of competitive advantages. This study has adopted the model of Porter Five Forces by Michael Porter to understand the competitive advantages as faced by women technopreneur. Meanwhile, the potential use of KBIS will explored by conducting the unstructured interview with selected expertise. In the turbulences market environment, KBIS should integrate with strategy which can help women technopreneur firms to positioning them self into the right time and track. Finally, some suggestion was made to guiding women technopreneur in integrating KBIS sophistication with strategy options as a new way of advancement.

Keyword: *Knowledge Based Information System, Competitive Advantages, Women Technopreneur, Strategy Options*

1. Introduction

In the globalization era, technopreneur play a vital role in creating and promoting new Information and Communication Technology (ICT) sophistications to the local and overseas markets to fulfil the customers demand. In a liberalized environment, newly ICT businesses can fairly compete against already established companies with ICT. The increment of technology knowledge society has contributed to the development of Information Technology (IT) markets locally and globally (Abd Rozan, 2001). As the new-knowledge economy continues to move forward, Teece (2000) pointed that knowledge is being considered a crucial component of business strategy. Consequently, the capacity to manage knowledge is becoming an essential skill for acquiring and sustaining success and organizational survival in the new-knowledge economy. In addition, the topics of knowledge based information system (KBIS) detonated an increase of interest in both academic and popular literature, especially in contact of competitive advantages of technopreneur. In relation with current state of competitive business environment, there are five factors that determine the nature and degree of competition in an industry, such as bargaining power of buyers, threat of substitutes, bargaining power of suppliers, rivalry among existing competitors and threat of new competitors. Dess, *et al.,* (2005) believed that to a large degree, these five market forces collectively determine the ability of a firm, whether large or small, to be successful. In addition, Chong, Robert and Sivakumar (2003) noted there are many factors that could contribute to the failure of technopreneur business. One of the main reasons is it could be due to poor scheduling system. Practical scheduling problems are dynamic, uncertain and often unpredictable due to the continuous arrival of new and unforeseen orders, and the occurrence of all kinds of disturbances.

Cole-Ehmke (2008) believed that competitive advantages don't tend to stay competitive advantages without significant effort. Over time the edge may erode as competitors try to duplicate a successful advantage for themselves and as the market changes. With regard to technopreneur business environment, Shakya (2007)

noted that technopreneurship is not a product but a process of synthesis in engineering the future of a person, an organization, a nation and the world. In a digital, knowledge based society, strategic directions or decision-making processes will be demanding and complex. This requires tertiary level and professional development programs and training to produce strategic thinkers who will have the skills to succeed in a dynamically changing global environment. Traditional educational programs, however, lack the methodology to transform today's students into creative, innovative, visionary global leaders who understand the importance of technopreneurship. In fact, technopreneur are people who own information technology knowledge and make or found their own technology-based businesses by organizing resources and recognizing opportunities. There is a significant difference between an entrepreneur and a technopreneur, with the latter having an advantage on the mastery of the technology element besides possessing good business acumen as mention by Yudha and Ahmad Zaki (2007). In Malaysia, technopreneur activity accounts for a huge amount of gross domestic product and higher percent of all new jobs. This significant economic impact has fuelled the current interest in research on the technopreneur phenomenon. It has been argued that a career in the information technology (IT) profession does not offer a well-defined career path. The pyramidal structure of many IT departments indicates that only minority of computer professionals have the opportunity to make it to the top (Pei, *at al.,* 2010). With regard to scholars as above, competitive advantages is the top most issues that facing by women technopreneur in everywhere at every time. As well as important of competitive advantages to entrepreneurs, women technopreneur will face variety of challenges.

Objective of the Paper: The main objective of the paper is to discuss the competitive advantages forces of women technopreneur firms. Secondly, the paper is aimed to highlight the usability of knowledge based information system (KBIS) in dealing with the main issues of competitive advantages.

2. Methodology

This study has adopted the model of Porter Five Forces as introduced by Michael Porter to understand the competitive advantages as faced by women technopreneur. By there, the major component of market force will identified systematically based on five major forces. Meanwhile, the potential use of KBIS will explored by conducting the unstructured interview with selected expertise; where there are five expertises will participate for the interview session.

Competitive Advantages Issues: According to Duhan, *et al.,* (2001) research into the sources of competitive advantage identifies two competing views. The first concerns industry structure, and the role of information systems in enabling competitive advantage is to lower cost, build barriers to entry and tie in customers and suppliers. The second view is resource-based. This argues that competitive advantage arises from the ability to accumulate resources and capabilities that are rare, valuable, non-substitutable and difficult to imitate. With regard to this perspective, women technopreneur is possible to face both points of view, which drive them to explore the KBIS as platform of competitive in the business landscape. Obviously, all industries are not alike; therefore, each force has varying impact from one situation to the next. Porter identifies numerous elements of industry structure that influence these five factors. Conceptually, Porter (2001) explained that Porter's Five Force Model helps business people understand the relative attractiveness of an industry. According to Bohari (2008) this model will help women entrepreneurs to deal with new challenges of business and ensure the synergy between IT and business well linked. Some of the new challenges are identified as:

- Recognize that IT often is the primary enabler of business solutions.
- Increase the technological maturity of the business entities.
- Create a fabulous vision of the future of IT and promote it to an executive level in business management.
- Implement the IT architecture that will support the business vision.
- Manage IT info-structure's safety, with high security and guarantee.

Basically, the Porter's Five Force Model has five forces which are buyer power, supplier power, threat of substitute products or services, threat of new entrants, and rivalry among existing competition (Porter, 2001). The description about each of the five forces in Porter's competitive force model and how the IT has affected each one, are explained in *Table 1.*

Table 1: Porter's Competitive Forces and the Functions of IT

Competitive Forces	How the IT has affected….
The threat of entry of new competitors	The Internet increases the threat of new competitors by reducing the barriers to entry and increasing the geographical reach of competitors.
The bargaining power of suppliers	The increase by the Internet as suppliers locks in customers and increase switching costs through integrated supply chains and digital exchanges. Besides, it may also be decreased by the Internet as buyers find more choices of supply and can more easily compare prices.
The bargaining power of customers	The Internet largely increases customers' buying power by lowering switching costs and increasing choice and cost information.
The threat of substitute products or services	The digitalized information can replace material goods and the Internet increases this factor.
The rivalry among existing firms in the industry	The Internet increases destructive price competition within an industry.

Sources: Bohari (2008)

Meanwhile, in aspect of technicality, King (2005) pointed out that issues of the IT technopreneur would be the technical issues regarding using machinery in the production line; the need for knowledge for this field of skills is crucially needed. A machine failure could cost millions, if not billions of money from the delay of production it can cause, from either the time for it to be repaired or replaced, and even the deviation time of actual processing from the estimated optimal one. In addition to these, Jeroen and Hartog (2007) mention technopreneurship is also believed to be cultured skill, rather than being born internally. Innovativeness, one of the crucial skills of a technopreneur, is researched to be nurtured by the examples of through leadership. Innovative ideas are mostly stimulated by their leaders. The ability of a leader to encourage and stimulate these skills is also one of the factors that determine success and failure. Therefore, issues of competitive advantage are a significant and have long-term benefits that women entrepreneurs firms enjoy over its competition. Competitive advantages will lead the entrepreneurs firms to bring themselves into the right way forward and thus, this model requires the entrepreneurs firms to scan and follow the current change of external and internal environment of business, in order to generate new knowledge to the managers

In fact, competitive advantage is anything a firm does especially well compared to rival firms, both in international or local operations of businesses. When the women technopreneur firms can do something that rival firms cannot do, these entrepreneurs firms actually have gained their competitive advantages. In fact, if entrepreneurs firms owns something that a rival firm desires, that also will represent a competitive advantage. Here, competitive advantages bring meaning that the companies are one step ahead and to maintain their position, the managers must get and keep the competitive advantage from time to time for the long-term success of entrepreneur's performance. In addition, a firm must strive to achieve a sustained competitive advantage, initially by continually adapting to changes in external trends and events and internal capabilities, competencies and resources. The women technopreneur firms should try effectively in formulating, implementing and evaluating strategies that capitalize upon those factors. So, maintaining competitive advantages means that the entrepreneurs firms will survive and strive for long term performance. In Malaysia contact, generally, technopreneur activity accounts for a huge amount of gross domestic product and higher percent of all new jobs. This significant economic impact has fuelled the current interest in research on the technopreneur phenomenon. It has been argued that a career in IT profession does not offer a well-defined career path

Currently, the competitive forces are related to the Internet with a simple assumption which is a positive relation between competitive force-Internet. As implication, women entrepreneurs in Malaysia must explore the advantages of Internet based business as one of their platform for reach the huge customers in every part of the globe. Based on O'Brian (2007), some of success impacts after using Internet sophistication are:

- Ability to offer quality products and services at a competitive price and provide related services especially services after sales.
- Marketing strategy creativity and developing a personal relationship with the social cultural and norms of societies. This includes frequent visits to the relevant business services, seminars, conferences, and business official's events and activities.

- Develop a close relationship with a local business agent and his customers in both the business and non-business sectors are most important. This is because most foreign products are sophisticated in local nature.

With regard to Malaysia environment, the main challenge for technopreneur in Malaysia is to examine our local entities and identify shared values and technopreneur practices which serve as building blocks to promote truly Malaysian entrepreneurs with our own Malaysian culture. As Malaysia become more exposed to international business practices, IT technopreneur have to take the lead in identifying local cultures that are applicable and affecting their technopreneur behaviour.

3. Knowledge Based Information System

The emerging of organizational information technology, especially Knowledge Based Information System (KBIS) has create highly impact toward the process of learning within an organization, includes the way entrepreneurs managing their knowledge as resources for future growth. Mostly, KBIS is one of the top consideration by many global entrepreneurs because of it has capabilities in supporting organizational learning and handling high volume of information from worldwide customers. KBIS is vital important to women entrepreneur because it's offers platform for collecting, storing and distributes knowledge and information, through-in and through-out of firms that valuable to the performance of business firm. KBIS are able to supply quality and quantity of knowledge that lead to increase competitive advantages to entrepreneurs business, includes strengthening their business strategies and tactics. The objective of the paper is to review the function and capabilities of KBIS in educating women entrepreneurs especially help for gains better knowledge about environment and forces in the marketplace. It is important to understand it capabilities and how the technology support knowledge acquisition and processing, especially to execute some important decision on their strategic business position. Most of the firms are able to employed KBIS for them purposes, however, still less in understanding on how to implementing KBIS in the real situation of firms. Basically, knowledge management is a process that helps people and organizations to identify, select, organize, manage, disseminate, transfer, and apply any kind of information, expertise, and practices, with the aimed to improve the organizational learning culture and promote the best way of using knowledge. KBIS can be a part of the organization's memory and can typically reside within the organization in an unstructured manner. Knowledge management is important nowadays because most of the international and local firm tend to turn themselves to be knowledge firms and hope so, their workers will be knowledge worker together with their company vision and mission. In short, KBIS brings different meaning to different people, and because it is still a new field, we can say that knowledge management is the process of accumulating and creating knowledge efficiently for learning organization and help them to manage a knowledge base application, and facilitate staffs with the concepts of knowledge sharing within the organization. In actual situation, knowledge management is the set of processes developed in an organization and is used to create, maintain, disseminate, and encourage the firm's knowledge sharing cultures.

Sajja and Akerkar (2010) explained that Knowledge-Based System (KBS) is one of the major family members of the artificial intelligent group. With availability of advanced computing facilities and other resources, attention is now turning to more and more demanding tasks, which might require intelligence. The society and industry are becoming knowledge oriented and rely on different experts' decision-making ability. KBS can act as an expert on demand without wasting time, anytime and anywhere. KBS can save money by leveraging expert, allowing users to function at higher level and promoting consistency. One may consider the KBS as productive tool, having knowledge of more than one expert for long period of time. In fact, a KBS is a computer based system, which uses and generates knowledge from data, information and knowledge. These systems are capable of understanding the information under process and can take decision based on the residing information/knowledge in the system whereas the traditional computer systems do not understand the data/information they process. In addition, KBIS promotes organizational learning by providing the staffs with leaning platform and allowing the organization to learn both from its internal and external environment. KBIS enable the process of creation that occurs within the firm and then, support the knowledge networks, knowledge repositories, and communities practice in organization and inter organization. Moreover, knowledge networks enable people to be linked in particular of interest group, so that experts in a specific area can be easily identified and share their knowledge to any customers needed. Furthermore, knowledge

management will streamline the workflow of knowledge activities within the organization and provides tools and platform for creating a knowledge sharing and database. *Table 2* describe the important concept related to knowledge management. You can read it and feel what does it meant by all of concepts. In today organization, it is really important to all workers and staffs to understand on KBIS because of the knowledge based are makes some advancement and improvement in all the positions and works within an organization.

Table 2: Some of the Important Concepts in Knowledge Management.

Basic Concepts	Explanation and Descriptions
Tacit Knowledge	Tacit knowledge is highly personal and unstructured form of knowledge which is hard to formalize. Tacit knowledge is the cumulative store that contains organizational experiences, insights view, real expertise skills, know-how, trade secrets, skill dominant and sets, believe and understanding, and any kind of learning that an organization has and extract, both form internal and external environment.
Explicit Knowledge	Explicit knowledge is the more objective and rational compared to tacit knowledge. It is also declared as technical type of knowledge. Simply, explicit is knowledge that has been codified in a form that can be distributed to other parties in organization. In some business firms, this kind of knowledge can be transformed into a process and used as a strategy for streaming their competitive advantage, especially for long term strategic planning.
Basis Technologies of Knowledge Management.	Knowledge management systems are build based on: ▪ Communication technology that provides access to knowledge, processing knowledge, and support interchange of knowledge. ▪ Collaboration technology that provides support for group works and facilitate them with collaborative tools and platform. ▪ Storage and Retrieval technology that provides the means for capturing, storing, and managing explicit and tacit knowledge. This part is also called as knowledge management database.

Sources: Bohari (2008)

KBIS have their own roles in the enterprise based organization. Basically, it will improve the process of learning in the organization. KBIS plays important roles in term of codifying related knowledge and experience and then, making the collected knowledge and experience available to every person. It also provides links to both internet and external sources of knowledge and then ensures process of transferring is well done. In terms of what kind of organizational processes that are supported by knowledge management application; it should include the following:

- Knowledge work based systems to support knowledge creation process and information repository and storage activities.
- Artificial intelligence based systems to support knowledge discovery, knowledge codification, and sharing especially among new staffs in organization.
- Group work collaboration systems to support knowledge sharing, learning, and group based activities, including group based decision making activities.
- Office Automation System and any types of ICT tools to support knowledge distribution, dissemination, and transfers activities within organization.

To make sure the KBIS development runs well in real environment, we need to know about the knowledge management system cycle. This kind of KBIS practices is really important to the firms where it involves six steps that are performed iteratively as knowledge is dynamically refined over time. In advanced, KBIS process will continue from time to time and there is no ending for knowledge creation and distribution, as well as knowledge generated in everyday business activities and transactions. In contact of technopreneur, we are really need to understand and how to apply knowledge management system as our office information technology. In fact, Sajja and Akerkar (2010) KBIS are more useful in many situations than the traditional computer based information systems. Some major situations includes when expert is not available, when expertise is to be stored for future use or when expertise is to be cloned or multiplied, when intelligent assistance and/or training are required for the decision making for problem solving and when more than one

experts' knowledge have to be grouped at one platform. In case of Small and Medium Enterprise (SME), Harker and Akkeren (2002) noticed that the factor which influences ICT adoption in SMEs includes: organization's ICT readiness, external pressure to adopt, customer/supplier dependency, structural sophistication of the businesses, size, sector and status and its information intensity. In a case of Small and Medium Enterprises (SME), as example, Kushwaha (2011) noticed that ICTs adoptions by SMEs are faced with many challenges especially poor ICTs infrastructure, lack of ICTs technical and managerial capacity. Beside that Sajja and Akerkar (2010) mention that the proper utilization of knowledge, the KBIS increase productivity, document rare knowledge by capturing scare expertise, and enhance problem solving capabilities in most flexible way. Such systems also document knowledge for future use and training. This leads to increased quality in problem solving process. However, the scarcity and nature of knowledge make the KBIS development process difficult and complex. The transparent and abstract nature of knowledge is mainly responsible for this. In addition, following are some of the major limitations with the KBIS are acquisition, representation and manipulation of the large volume of the data/information/knowledge; abstract nature of the knowledge; and imitations of cognitive science and other scientific methods.

It is commonly accepted that KBIS provides many potential benefits to organizations so as to make them more efficient, effective and competitive (Fink & Disterer, 2006). In term of KBIS application, Sajja and Akerkar (2010) had identified KBIS applications are divided into two broad categories namely: (i) pure knowledge-based systems applications and (ii) applied knowledge-based systems application. Pure applications include research contributing in knowledge-based systems and AI development techniques such as knowledge acquisition, knowledge representation, models of automated knowledge-based systems development (knowledge engineering approaches, models and CASE tools for KBS), knowledge discovery and knowledge management types of tools. In another aspect of opinion as mention above, the managers need to make some modifications on their strategy, according to current situation of business operation. Maybe, some of the managers decide to use two or three mixed strategies at one time, without any guarantees in return to a company's income. In addition, women technopreneur especially the importance of business partnerships, business societal environment, and the business network when they implementing their strategy. From previous studies that have done by researchers, these three aspects are vitally important to business success factors. Moreover, the competitive forces model, business partnerships, business societal environment, and the business network should be used to identify strategies at the life cycle of business. From the current view of business, initiates have been taken to increasingly harness KBIS especially to improve productivity and competitiveness as well as progress to high value added and knowledge-intensive economic activities. Therefore, the Malaysian Government has built and enhanced KBIS capability for ubiquitous access and has developed more core competencies. Malaysia also has done so many great efforts on using KBIS as tools for gaining competitive advantage to keep this country on the right track. So far, the main efforts have been the continued consistency undertaken to strengthen the foundation for a knowledge-based economy.

The technopreneur should realize that most firms are going global nowadays. Here, Internet sophistications that help companies get real time data can be created. In contact of women technopreneur in Malaysia, there is not impossible to them to utilized ICT sophistication as a tool for strengthening their competitive advantages. The used of ICT will empowering their strategy options and make it more effective. With regard to above facts, Casolaro and Gobbi (2007) coined out that in this era of globalization the revolution of ICTs has affected the way businesses operate. First, it has changed the business structures and altered the degree of competition. Secondly, it has created a competitive advantage for the businesses which have adopted ICTs. Thirdly, it has affected the new businesses operations. These changes have compelled the business to adopt ICTs in order to cope with these changes in the environment. By utilizing KBIS sophistications it will help the manager to perform better in environmental scanning, and make the process be more systematic and precise. This will happen because information system deals with strategic factors getting to corporate and business level planners and then, directly to decision makers in a timely manner. For a particular purpose, a computerized KBIS can be used to develop a series of likely data industry scenarios as well as a number of alternative strategies and implementation programs. Finally, the efficiencies are coming from integrated KBIS that allows the company to share the knowledge with customers and suppliers.

Future Prospect of KWS: Fundamentally, KBIS are building upon three technology sets. Recently, the three technology sets of building KBIS are (i) Communication technology that provided access to knowledge and

interchange of knowledge; (ii) Collaboration technology for providing support for group work; and (iii) Storage and retrieval technology for providing the means to capture, store and manage explicit and tacit knowledge. However, in future, KBIS technologies will have significant contribution in enhancing the knowledge management tools. Technologies that have contributed to significant advances in knowledge management tools are (i) Artificial intelligence methods can assist in identifying expertise, eliciting knowledge, interfacing through natural language interactions, and performing intelligent searches; (ii) Intelligent agents are software applications that learn how users work and provide assistance in daily tasks; and (iii) Knowledge discovery in databases searches for and extracts useful information from volumes of documents and data. In case of Malaysia, Pei, *et al.,* (2010) explain technopreneurships have contributed to the nation's economy. The entrepreneur creates, promotes and markets new KBIS products and services to both markets local and abroad to fulfil the demand from customers. It will help the country to enhance its economic and lead to produce more job opportunities for people. However, there are still many newly established KBIS technopreneur that found themselves either failed right at the start-up or during the maturity of the businesses. These could be due to either both the internal or external factors, or even a combination of both factors

According to the classification of KBIS, there are main 5 types of the KBS exist such as (i) Expert Systems, (ii) Hypertext Manipulation Systems, (iii) CASE Based Systems, (iv) Database in conjunction with an Intelligent User Interface and (v) Intelligent Tutoring Systems. Meanwhile, Sajja and Akerkar (2010) explain that typical information systems deal with data while knowledge-based systems automate expertise and deal with knowledge. Every business in today's competitive world is full of uncertainty and risk. Managing and satisfying customers with quality product/services have become trivial challenge. In this situation the knowledge-based system is wise choice. In spite of plenty of obvious advantages, the knowledge base system development and usage are difficult because of the problems associated them. With regard to these opinions, women technopreneur should pay more attention on how to apply and expanded the capability of KBIS into the current capability of the business. In future, these are possible to apply where competitive advantage through KBIS is the major focused.

4. Conclusion

In conclusion, competitive advantage is vital to women technopreneur firm does especially well compared to rival firms either in international operations or local operations of businesses. In contact of women technopreneur, especially in Malaysia, there is no exception for them because competitive advantages, on one side can offer better opportunities to them especially to create more share market. However, on the other side, competitive advantages have potential to harm their future prospect to ended their successfully performance. One of the reasons is that was building sustainable competitive advantages revolves around differentiating a product from the competition along attributes that are important and relevant to customers. Unfortunately, women entrepreneurs are often confronted with two myths surrounding the creation of a competitive advantage. In the Internet revolution, most of women technopreneur find it cheaper and easier to relate to external parties such as suppliers and customers, enabling the company to meet a competitive problem identified using the competitive force model. The competitive force model has also changed in the Internet era because firms do not just compete with each other within the same industry; but they compete as part of industry sets.

References

Abd Rozan, M. Z. (2001). A study on entrepreneurial intention among information technology technopreneurs. Unpublished MSc (IT), UTM, October 2001.

Bohari, A. M. (2008). Management information system. Kuala Kumpur: Asia e-University Publication.

Casolaro, L. & Gobbi, G. (2007). Information technology and productivity changes in the banking industry. *Economic Notes*, 36, 43-76.

Chong, C. S., Robert, G. & Sivakumar, A. I. (2003). Simulation-based scheduling for dynamic discrete manufacturing. *Proceedings of the 2003 Winter Simulation Conference*, 2, 1465-1473.

Cole-Ehmke, M. S. (2008). Strategies for competitive advantage. Department of Agricultural and Applied Economics, University of Wyoming.

Dess, G. G., Lumpkin, G. T. & Taylor, M. L. (2005). Strategic Management (2 Ed). New York: McGraw-Hill Irwin.

Duhan, S., Levy, M. & Powell, P. (2001). Information systems strategies in knowledge-based SMEs: the role of core competencies. *European Journal of Information Systems,* 10, 25–40.

Harker, D. & Akkeren, J. V. (2002). Exploring the needs of SMEs for mobile data technologies: The role of qualitative research. *Journal of Research Practice Inform. Tech*., 5, 199-209.

Jeroen, P. J. J. & Hartog, D. N. D. (2007). How leaders influence employees' innovative behavior. *European Journal of Innovation Management,* 10(1), 41-64.

King, J. B. (2005). The Top 10 Reasons Businesses Succeed. Ezine Articles. Retrieved May 2008 from http://ezinearticles.com/?The-Top-10-Reasons-Businesses-Succeed&id=12514

Kushwaha, G. S. (2011). Competitive advantage through information and communication technology (ICT) enabled supply chain management practices. *International Journal of Enterprise Computing and Business Systems*, 1(2).

O'Brian, J. A. (2007). Management information systems: Managing information technology in the business enterprise. New York: McGraw-Hill Irwin.

Pei, L. K., Noordin, K. A., Ting, Y. P. & Baharudin, A. S. (2010). Failure factors of The Malaysian IT technopreneurship. International Conference on Science and Social Research (CSSR) 2010. 5-7 December 2010, 686 – 690

Porter, M. (2001). Strategy and the internet. *Harvard Business Review*, 79(3), 63-78.

Sajja, P. S. & Akerkar, R. (2010). Chapter 1 Knowledge-Based Systems for Development. In Sajja & Akerkar (Eds.), Advanced Knowledge Based Systems: Model. *Applications & Research,* 1, 1 – 11.

Shakya, R. (2007). What is Technopreneurship? September 5, 2007.

Teece, D. J. (2000). Strategies for managing knowledge assets: the role of firm structure and industrial context. *Long Range Planning*, 33, 35–54

Yudha P. & Ahmad-Zaki, A. B. (2007). Utilization of human virtual intelligence framework in managing technopreneur knowledge. Proceedings of the International Conference on Electrical Engineering and Informatics, Institute Teknologi Bandung, Indonesia, 17-19, June 2007.