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Importance of Strategic Information Systems Planning (SISP) Practices in Industry 4.0 Era

Raja Haslinda Raja Mohd Ali*, Hafizah Mohamad Hsbollah, Haslinda Hassan

Accounting Information Systems Research and Development Institute, Tunku Puteri Intan Safinaz School of Accountancy, Universiti Utara Malaysia, Malaysia

Abstract

Strategic information systems (IS) planning is a process of identifying and acquiring applications and information systems that could assist organizations to achieve its business objectives. The importance of strategic IS planning have been discussed in many studies such as assisting the organizations to acquire a new technology, to justify the investment made on the information systems, to calculate the return on investment made, and to increase the communication between the users and the IS management. Various studies have been conducted in this area including examining the success factors of the strategic IS planning, validating the measurement of strategic IS planning success, and challenges in implementing strategic IS planning. This paper describes the strategic IS planning practices in manufacturing companies and discusses its importance in the industry 4.0 era.

Keywords: Strategic information systems planning, information systems, industry 4.0, SISP

1. INTRODUCTION

Strategic information systems (IS) planning (SISP) is a process to decide what, when, where, and from whom to acquire the information systems and technology that could assist the organisation to achieve their business objectives. Various definitions of SISP have been used in the information systems literature. According to Newkirk et al. (2008), SISP is a method to decide what the information system's (IS) goals, resources, and the organisational structures of a company's computing system, and subsequently identify the potential applications that the company should implement. Lederer and Salmela (1996) has introduced the widely used definition that stated SISP is *a process of identifying an organization's portfolio of computer-based applications and technologies that could help the organization's in executing their business plans and achieving their business objectives*.

Developing a strategic IS plan is a choice and not mandatory. It helps the organisations to identify what applications and information systems that could help the organisation to achieve the business objectives. It also assists the organisation to understand the organisations' needs from the information systems. Therefore, the understanding of the importance of having the strategic IS planning is crucial to motivate organisations to develop it especially in the global current technology trend namely Industry 4.0.

Industry 4.0 refers to as production or manufacturing based industries digitalization transformation, driven by connected technologies (which is also called "smart manufacturing". It is a term developed by German Government's strategic initiative to transform manufacturing industry as a leader in advanced manufacturing provider as well as manufacturing to be more efficient and cost effective. Various names have been given by various countries that refers to Industry 4.0 such as Smart Manufacturing (US), Made in China (China),

*Corresponding author.
E-mail: rj.linda@uum.edu.my

Manufacturing Innovation 3.0 (South Korea), Smart Nation Program (Singapore), Industrial Value Chain Initiative (Japan) and many others. In Malaysia, we adopt the same name as German, Industry 4.0.

The three past industrial revolution were triggered by technical innovations (Brettel et al. 2014). In the first stage, a mechanized manufacturing equipment powered by water and steam was introduced. In the second stage, the manufacturing started to use the mass production with the help of electrical power. In the year 1969, where the first programmable logic controller was applied. The manufacturing was automate by the used of electronics and computers. In the last stage, which is also called the connected industry where the real objects and virtual processes are interlinked.

A fully implemented Industry 4.0 manufacturing system inclusive of the most nine technological advancement integrated namely autonomous robots, simulation, system integration, internet of things (IoT), cybersecurity, cloud computing, additive manufacturing, augmented reality, and big data (Vaidya et al., 2018). Autonomous robots refers to the robots that performs behaviours or tasks without human intervention. Simulation refers to 3D simulation of product and material development that will leverage data to mirror the physical world in the virtual model. System integration shows that the whole organisation is interconnected horizontally and vertically. The IoT includes anything that has on and off switch that is connected to the internet such as computers, TV remote and others. Cybersecurity relates to the sophisticated systems that provide a secure and reliable communications. Cloud computing refers to data storage that can be shared among sites and companies. Additive manufacturing refers to the manufacturing process that provides 3D printing for prototyping purposes. Augmented reality provides operators with the real-time information for faster decision-making. Lastly is the big data where all the structured and non-structured information is analysed to optimize production quality and improve services. Studies also found that the Industry 4.0 can deliver many advantages to organisations that adopt them such as assisting organisations to increase competitiveness, properly manage resources and maintain sustainability.

As there are many different types of technologies included in the Industry 4.0, it is very crucial for the organisation to identify the appropriate technologies that could assist them in achieving the business goals. Therefore, an understanding on the importance of strategic IS planning for the organisations to adopt the technologies in Industry 4.0 is very much crucial. The aim of the study is to increase the understanding on the strategic IS planning practices and to discuss the importance of strategic IS planning towards the studied organisation in the Industry 4.0 era.

This article will be presented as follows. The following section will presents the objectives of the study. Then, the methodology of data collection is discussed. Next section will present the findings and the article will be concluded in the last section.

2. METHODOLOGY

The study employed an interview as a method of data collection. The unit of analysis is an organisation. The organisations were chosen based on their agreement to participate in the study. Initially, telephone calls were made to manufacturing companies listed in the northern area of Malaysia. However, after a few phone calls were made, only two companies agreed to be interviewed. Interview sessions were conducted with the managerial level executive of each companies as it is assumed that they have the strategic knowledge of the organisations. The open-ended interview questions were related to external environment and internal environment of the companies.

3. RESULTS AND ANALYSIS

3.1 Case Company 1: ABC Company

3.1.1 Background

ABC Company is a medium-sized manufacturer company that produces frozen food such as beef, chicken, and burger patties. ABC Company was established in 2007, located at northern state of Malaysia. The company has around 80 employees with the age between 21 to 50 years separated into five departments namely administrative, finance and accounts, human resource, production and marketing. Majority of the employees work at the production department. Their final products are sold to individuals that runs a small businesses, restaurants and wholesalers. Further, they also owns some stalls where they also runs street foods business such as burgers and fried chicken.

Currently, ABC Company uses Microsoft Office applications to support their production and manufacturing department. A stand-alone accounting software also was used which makes the decision making on the

production costing and production produced become inefficient and ineffective. The calculation of the expiry date for the food production was done manually which may affect the quality of the product if the expiry date was not calculated properly. The company also is believed to provide insufficient training for staff to increase their IT knowledge.

3.1.2 SISP Practices

The company itself does not have a documented strategic IS planning. The owner of the case company himself is lack of exposure on the importance of strategic IS planning. His only focus is on production line. Further, the managers themselves are uncertain of their abilities to learn new IT skills. They have the ideas that by having a lot of applications in their daily tasks may increase their workload or scope of work which is to apply the applications. The owner's worried leads to his/her focus only on day-to-day activities.

3.2 Case Company 2 : XWZ Company

3.2.1 Background

XWZ Company is a local, large-size company that was established in 1973. The company specializes in manufacturing and supplying of sugar. The company has more than 280 employees attached to various departments namely accounting, IT, sales, purchase, production, finance and human resources. The main IS function in XWZ Company is to support the management process which involved accounting, human resources and maintenance.

3.2.2 SISP Practices

Similar with ABC Company, XWZ Company does not have a documented planning. Lack of IT specialist to prepare the documentation is one of the main reason that they did not focus on the IS planning documentation. As the main business process is on production, their focus is mainly on managing the production and maintaining the existing software.

4. DISCUSSION

The study has two main objectives. The first objective relates to strategic IS planning practices in manufacturing companies. It was found that the implementation of strategic IS planning practices does not depends on the maturity or size of the organization. Based on the study above, it was found that the lack of knowledge on the benefits that the strategic IS plan could resulted in companies do not focus on developing them. Further, both companies also fail to get top management commitment in the strategic IS planning practices. This commitment is very crucial to ensure that the employees participate in the strategic IS planning practices.

The second objective relates to the importance of strategic IS planning practices in the Industry 4.0 era. As have been highlighted by the two interviewees that their main focus is on their production line. Therefore, it is crucial for them to adopt the technologies involved in the Industry 4.0 because these nine technologies could give benefits to their companies. However, the companies need to identify which of these nine technologies could help them to achieve their business objectives. Some of the technologies might not appropriate with the company's business objectives and business process.

Therefore, as there are nine technology trends involves in the Industry 4.0 and the companies need to identify which technologies are appropriate, the strategic IS planning plays an important roles. The strategic IS plan could assist in managing and monitoring the integration of various technology in the manufacturing. The Industry 4.0 era emphasized the need to integrate various technology in the production line and elevate the production system to the intelligent level. Intelligent production uses advanced information and production technology to perform flexible, intelligent and reconfigurable production processes to address dynamic and global markets (Zhong et al., 2017). Strategic IS plan is important as it consists of all the physical processes and the flow of information available when and where necessary throughout the production chain.

The strategic IS plan also could assist in identifying the possibilities to adopt technologies. By having the strategic IS plan, any possibilities of adopting the information systems and technology will be led by the needs of the technologies towards achieving the organisation's competitive advantage. It will also support activities at all level especially the critical one.

5. CONCLUSION

One of the way to increase the competitiveness and maintain the sustainability, manufacturing companies should include themselves in the Industry 4.0 technology trend without any exception. It is believed that in the Industry 4.0 era, most of the business process will change. The interaction with the new technologies will create a new

ways to deliver the output of the business process, the services given to public and the ways to communicate with each other. This era will also change on jobs roles, business model of organisations, social interactions, and governance.

Despite the various technology trends available, it is crucial that manufacturing companies adapt or acquire the technology that most appropriate and suitable with their companies objectives and goals to ensure the investment made gives appropriate return to the companies. Therefore, it is crucial for the companies to practice their own strategic IS plan. This plan could help to identify the most suitable technologies with the business environment and assist the companies to reduce unnecessary resources resulted from the unnecessary technology or information systems adopted.

This study has highlighted that even a mature company may not have its own strategic IS plan. Awareness activity or campaign on the importance of SISP in assisting the companies to implement Industry 4.0 should be continuously given to manufacturing companies especially in the small and medium sized as these companies consist of more than 98% of business establishment in Malaysia.

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