

Barriers of Supply Chain Digitalization from the Perspective of Malaysian SMEs

Nurul Muna Najiah Sued*

Tunku Puteri Intan Safinaz School of Accountancy, Universiti Utara Malaysia, Sintok, Kedah Darul Aman

Abstract

As the world is venturing the fourth phase of Industrial Revolution (IR4.0), concern on digitalization in business processes is also rising. Malaysian government has encouraged the small and medium enterprises (SMEs) to implement the digitalization alongside large companies to increase the business growth. This paper attempts to explore if the SMEs find it difficult to implement digitalization in their supply chain management process. Precisely, this paper seeks to comprehend if poor technology capabilities, insufficient procedures and guidelines, workforce training, and resistance to change are preventing the SMEs to adopt digital supply chain. Besides the use of secondary data from various sources to enhance the understanding on technology adoption and behavior towards this adoption, this paper also proposes a conceptual model, developed from technology, organization, and environment (TOE) framework and theory of planned behavior (TPB). To get this model improved, empirical data will be collected through qualitative methods including semi-structured interviews and participant observations.

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Keywords: Supply Chain Digitalization; Small and Medium Enterprises; Digitalization Barriers

1. Introduction

The digitalization term has become rapidly trending and widely used as the world is entering the fourth phase of industrial revolution. This term refers to a transformation process from analogue to digital which is driven by digital technology breakthroughs, changes in people's attitude and behavior, low barriers to entry, and the availability of venture capital in large amounts (Schreckling & Steiger, 2017). Digitalization also indicates the use of data and technologies for the enhancement and transformation of business processes (Machado et al., 2019). Basically, technological drivers such as internet of things (IoT), cloud computing, artificial intelligence, big data analytics, augmented reality, and autonomous robots are among the enablers of technologies advancement and convergence for the production-based industries (MITI, 2018).

In Malaysia, the government puts high expectation to advance in e-commerce and create new opportunities for this country. In 2016, Alibaba Group has been appointed as the digital economic advisor for Malaysia and has helped implementing essential tools for online banking, payment, and e-financing (Fintech, 2016). This digital move are not only set for large companies as Malaysia government has also targeted the SMEs to accelerate their business growth by embracing the transformation. The government, through Malaysia Digital Economy Corporation (MDEC) is committed to boost the digital economy by encouraging the SMEs to move towards digitalization. Among the initiatives taken to make this goal achievable is by introducing SME Business Digitalization Grant, 100 Go Digital, and Digital Enhancement Centres (MDEC, 2020). As SMEs need more clarification and support towards the transformation, SMEUnited has come out with strategies to assist the SMEs in the digital transformation, including capacity building, financial aid, skills establishment, standardization, and appropriate infrastructure (Hendrickx, 2019).

* Corresponding author.

E-mail address: nurul_muna_najiah@oyagsb.uum.edu.my

According to (MDEC, 2020), the government has identified few key areas of digitalization that need to be adopted by Malaysian SMEs, such as digital marketing and sales, electronic point of sales (e-POS) system, HR payroll system, customer relationship management (CRM), procurement, accounting and tax, as well as enterprise resource planning (ERP). This study aims to identify the hurdles that disallow the SMEs to adopt digitalization in their supply chain activities. More precisely, this study attempts to comprehend if poor technology capabilities, insufficient procedures and guidelines, workforce training, and resistance to change are preventing the SMEs to implement supply chain digitalization. This study also proposes a conceptual model that combines theory and framework that are relevant to the technology adoption and human behavior such as technology, organization, and environment (TOE) framework (Tornatzky & Fleischer, 1990) and theory of planned behavior (TPB) (Ajzen, 1991). By using this model, this study suggests few constructs to explain the barriers to adopt digital transformation in different perspectives, such as technology, organization, environment, as well as the human behavior.

2. Problem Statement

A number of variables have been recognised in previous studies to be the barriers to the digital transformation. According to Mattsson et al. (2019), the sole barrier that prevents digitalisation in industry, particularly SMEs is insufficient knowledge about the transformation, hence making it difficult for them to grab the potential benefits. This is aligned with the findings by Sevinc et al. (2018) where the SMEs are not convinced with technology transition due to high investment cost as well as the return on the investment. As indicated by Peillon & Dubruc (2019), organisational and customer-related factors are the main barriers of digital servitization of French manufacturing SMEs. A study by Datti et al. (2020) revealed that technology, psychological, and process are the obstacles that affect digital transformation among Malaysian SMEs.

While several factors have been discovered to be the barriers, there are still issues that create uncertainty in the findings. Digital transformation seems to move in a fast pace, hence attracting the researchers to conduct studies on the opportunities offered by this transformation. However, there is a huge need to shed the light on the issue in different perspectives, as there is still insufficient number of studies that focus on the barriers prior to the digitalisation among companies in Malaysia, notably the SMEs. Furthermore, existing studies that pay attention specifically on this issue may need some improvements in terms of data collection method, sampling, location covered for data collection, as well as the employment of different variables to understand this issue (Datti et al., 2020).

3. Literature Review

3.1. Digital Supply Chain

Kinnett (2015) defined DSCM as a smart process of generating new form of revenue and business value for organizations, as well as discovering new approaches using technological and analytical methods, which is seen as more efficient and value driven. Bhargava et al. (2013) stated that DSCM comprises of software, hardware and communication network that support activities such as procurement, manufacturing, warehousing, logistics and product distribution between global organizations as well as supply chain partners.

Digital supply chains are able to process a great amount of information and encourage the supply chain partners to work together and interact through digital platforms (Agrawal & Narain, 2018). It also allows companies to address the issues and challenges on supply side, manage the new requirements of customers and improve the current efficiency level. It is also expected to be faster in terms of delivery time, more flexible and accurate, as well as more detailed in fulfilling customers' demand (Alicke et al., 2016).

3.2. Barriers to Digital Transformation

A considerable number of scholars have conducted studies and identified various barriers that prevent digital adoption, as discussed below:

3.2.1. Poor Technology Capabilities

As indicated by Datti et al. (2020) and Horvath & Szabo (2019), SMEs seem to have limited availability of digital tools, as well as insufficient knowledge in digital and technology. Besides, these SMEs have not been in any technical demonstration to get them familiarised to this transformation. Batwa & Alamoudi (2019) identified rising of new technologies and innovations, poor internet security, lack of e-commerce infrastructure, qualified staff shortage, and low quality and speed of line as the technological barriers faced by SMEs in Saudi Arabia.

Lack of compatibility between existing technical infrastructure and e-business technology have also contributed to barrier of implementation (Abid et al., 2010). Internal difficulties struggled by SMEs in terms of technology are the implementation of tools such as in customer relationship management (CRM) and digitalized services including teleservices (Peillon & Dubruc, 2019). Companies are also worried of the return on investment in new technologies, hence seeing it as an obstacle to transform their businesses. Another major concern regarding technological barriers faced by SMEs is the data security upon cloud technologies implementation (Belle & Dyk, 2019; Schroder, 2016; Vogelsang et al., 2019).

3.2.2. *Insufficient Procedures and Guideline*

Agrawal et al. (2019) stated most SMEs do not have industry specific guidelines, hence refuse to adopt digital supply chain in their business. These SMEs prefer legal foundations that comprise of transnational digital legal space because this transformation might face legal problems. Specific and uniform standards of technology used are also crucial to exchange information with the suppliers (Schroder, 2016; Vogelsang et al., 2019). Guidelines on law and data security are also needed for before the SMEs could implement this transformation, as customers are reluctant to allow the SMEs to access their data due to these privacy and security concerns. Furthermore, lack of secure payment infrastructure may also be resulted from the poor guidelines. SMEs also have unclear understanding on the benefits of digital adoption, resulted from the lack of specific procedures (Batwa & Alamoudi, 2019).

3.2.3. *Workforce Training*

Skilled employees to handle digital technologies is also an important factor to be considered when digitally transforming the business. However, this may become an obstacle for manufacturing industries, especially the SMEs. According to (Horvath & Szabo, 2019), it is challenging to have a highly competence and technology-skilled workforce as the digitalization is evolving. Retraining current workers can be time consuming and lead to cost increment. Shortage of digital skills and talents is also one of the factors that prevent digital transformation of supply chain management (Agrawal et al., 2019). Vogelsang et al. (2019) stated missing skills as one of the barriers where the successful new technology implementation, necessary competencies and specific skills need to undergo process knowledge.

3.2.4. *Resistance to Change*

It is found that these SMEs resist to change due to fear of invention and work changes, profit loss, higher labor cost, and have no psychological guarantee about digitalization (Datti et al., 2020). Organizational resistance to change is also related to low management support and the companies' mindsets on the difficulty to change current working procedures (Batwa & Alamoudi, 2019). Among the factors that drive this reluctance are unpreparedness, fear of losing jobs among employees due to digitalization, as well as fear of not having appropriate skills for new technologies, insufficient vision, planning and strategies, keeping traditional principles, no urgency to implement, and high implementation and running costs (Abid et al., 2010; Agrawal et al., 2019; Horvath & Szabo, 2019; Vogelsang et al., 2019).

3.3. *Technology, Organization, and Environment (TOE)*

The technology, organization, and environment (TOE) framework is said to be originally authored by Depietro et al. (1990). However, most of the literatures often cited and claimed that is developed by Tornatzky & Fleischer (1990). This framework consists of three elements; technology, organization, and environment that represent enterprise's perspective of adoption and implementation of technological innovation (Oliveira & Martins, 2011). Technological element describes internal and external technologies that are relevant to the companies, including current practices and equipment, and set of available technologies. Organizational element lists out organization's measures including size, scope, and managerial structure. Finally, environmental element refers to a firm's industry, competitors, and dealings with the government (Tornatzky & Fleischer, 1990).

3.4. *Theory of Planned Behavior (TPB)*

Theory of planned behavior (TPB) is extended from theory of reasoned action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The original model had limitations in dealing with behavior, hence TPB came up with behavioral control which acts as additional determinant of behavior and intentions. This additional determinant improves the understanding on the importance of perceived difficulty of the behavior and one's perceived ability to act that behavior (Kim & Crowston, 2011). According to Ajzen (1991), the intentions to perform different behaviors can be estimated with highly accurate

attitudes towards behavior, subjective norms, and perceived behavioral control. These intentions and perceptions of behavioral control can be considerable variance in actual behavior.

4. Methodology

As mentioned, this study attempts to find out the SMEs’ perceptions on the difficulty of digital implementation in organisations’ supply chain process. Besides, it is also intended to discover what are exactly the barriers that prevent the implementation among these SMEs. To answer these questions, this paper proposes a conceptual framework, developed from TOE framework and TPB model as illustrated in Figure 1. The constructs used in this framework represent the research problem (RP), research questions (RQ) and research objectives (RO) of this study. To comprehend the SMEs’ behaviour towards digitalisation, it is important to identify if the implementation of digital supply chain management is difficult to be done by the SMEs (RO1). To specifically identify the barriers that prevent the implementation, four constructs such as poor technology capabilities, insufficient procedures and guidelines, workforce training, and SMEs’ resistance to change are classified according to technological, environmental, and organisational factors, respectively (RO2-RO5). The constructs of barriers and perceptions towards the difficulty of digitalisation are related to each other, as depicted below:

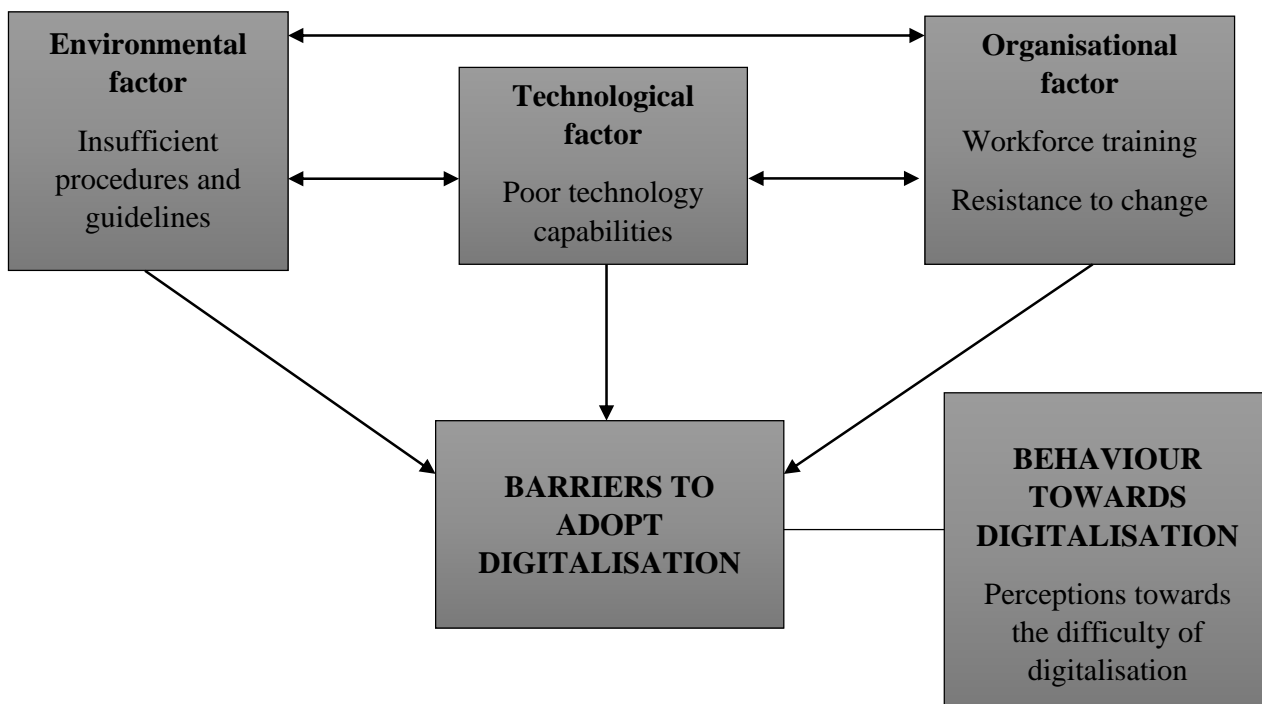


Fig. 1. Conceptual model on behavior towards digitalization and barriers to adopt digitalization

As a conceptual paper, this study also employs secondary data collection through review of documents, mainly from academic literatures such as journal articles, conference papers, and books to understand this issue as well as to support the proposed model. In addition to these sources, this study has also obtained information related to this issue from reports, policies, and websites. The proposed model of this study will further be improved with empirical data, which will be collected qualitatively. Through a case study approach, semi-structured interviews with SMEs in northern part of Malaysia, alongside participant observation. In this study, the participants will be selected through a purposeful sampling technique.

This case study involves manufacturing SMEs that have not implemented digital transformation in their supply chain processes. The participants will be interviewed, where the questions covered the perceptions of these SMEs on the implementation difficulty and barriers that disallow them to transform including poor technology capabilities, insufficient procedures and guidelines, workforce training, and resistance to change. Also, the researcher observes the setting to

comprehend the factors that lead to the barriers of implementation. While observing, the researcher will jot down simple notes before restructuring the notes in full computerized form.

5. Implications of the Study

This paper intends to contribute to the body of knowledge and act as a guide to the society in three ways: theoretically, practically, and methodologically. This paper proposes a conceptual model to specifically discuss the barriers to supply chain digitalisation, by integrating the TOE framework and TPB model which are related to the human behaviour, technology transformation or the adoption of digitalisation in supply chain. The integrated model comprises of different constructs from different concept of theory and framework to discuss the main concern of this study. It is proposed to exactly fit this study and may differ from the models proposed in previous literatures, hence, adding some new insights and perspectives to the existing body of knowledge.

In general, this study aims to inform the society regarding the barriers of technology implementation in daily business process. Practically, the findings will be an eye opener for the authorities, notably the government, agencies, and business providers about the situation faced by the businesses, particularly the SMEs prior to embracing the digitalization. The findings provide direction for these authorities to aid the SMEs with appropriate strategies to implement the technology transformation, hence improving their performance level. This study will also help other industries to monitor their understanding and readiness level in regard to the revolution.

The case study approach applied in this study will help providing better comprehension and insights on the digitalization of supply chain management among Malaysian SMEs. This approach aids the researcher in obtaining the data on the real barriers in adopting digitalization as experienced by the participants. The findings for this study are drawn from multiple methods of data collection such as semi-structured interview, participant observation, and document reviews. The data collected from various sources can provide better understanding on the phenomenon as it enables the researcher to compare each and every data to generate the findings. This study also serves as a guide to the future researchers to extend this study or the students with the same area of interest.

6. Conclusion

In a nutshell, the digital implementation in business process are vital for business growth, especially for smaller organizations that intend to stay competitive. Although digitalization offers numerous benefits, many organizations tend to delay its implementation in their operations. Hence, this conceptual paper seeks to extend the knowledge on digital supply chain barriers among SMEs in Malaysia through a model developed from previous theories and frameworks. To get a better picture on this issue and validate the suggested model, qualitative data that emphasize more on reasons and opinions regarding the main focus of this study will be conducted.

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