

Developing a Digital Adaptation Model for Malaysian Manufacturing SMEs

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Abstract

Studies revealed that Malaysian Small and Medium Enterprises (SMEs) are progressing slow towards adoption of IR4.0 with low awareness on its value to operations. The main key concern is the lack of digital mindset among SMEs, which causes misconception and low understanding on how adoption of technologies could enhance firms' operation and benefit them in the long run. This study proposes a development of a digital adaptation model for SMEs from lenses of Information Systems and Change Management. Adaptation requires changes in the business's strategy, organization structure and processes or mindset. Therefore, it is suggested that formulation of the digital adaptation strategy and identification of crucial elements that move the change is best studied from the perspective of change management, particularly to instill changes towards the digital mindset among SMEs. Development of the proposed model is based on the digital transformation framework and the planned model of organizational change. Further, the study proposes an in-depth examination of the phenomenon through a qualitative approach to provide a holistic understanding SMEs' strategy in adapting with digital technology brought by the fourth industrial revolution (IR 4.0).

Keywords: Digital adaptation, industry revolution 4.0, change management, manufacturing SMEs

1. INTRODUCTION

Past study by the FMM-Malaysian Institute of Economic Research Business Conditions in 2016 revealed that there is low awareness of IR 4.0 among Malaysian manufacturing firms. As a matter of fact, results from the survey indicate that only 12% of the respondents are very aware, 41% are somewhat aware, while 28% need more information and almost 20% are not aware at all about IR4.0. In a similar way, industry surveys within the period 2016-2018 revealed that the slow progress towards IR4.0 adoption is due to the low value of IR technologies as perceived by SMEs. Additionally, FMM ICT Adoption study (2016) found that SMEs' awareness towards information communication technology (ICT) itself is still at a low level. Only 20% of SMEs actively engage in ICT applications, 16% started to involve in e-commerce activities, while more than 50% of SMEs are still struggling in using internet. The study further emphasised that lack of understanding on technology benefits and its importance was the main reason for the low adoption of ICT among Malaysian SMEs. Additionally, the results also discovered that low automation is due to misconception that technology upgrade is seen as cost rather than investment for businesses.

Further, Malaysian Digital SME Study (2018) suggested a promising view towards technology adoption among SMEs. The study revealed over 50% of SMEs is perceived to have ICT leader's mindset and believed that the use ICT could transform their businesses and consequently develop a competitive advantage. However, despite of this indication, a further deep-dive into SMEs' actual usage of ICT revealed gaps in terms of business usage and untapped potential. While almost all SMEs in Malaysia have computing capabilities, including smart device or

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desktop/laptop and internet connectivity, the technology usage is primarily for social media and personal consumption of digital content, rather than a business enabler. Ideally, application of computing devices and internet connectivity should extend to their business processes to leverage on technology for technology transformation. Therefore, while majority of SMEs claimed that they are utilising computers and internet to modernise their businesses, the low level of process improvement indicates that Malaysian SMEs are facing hurdles to move towards digitalisation of their businesses.

The IDC survey in 2018 affirms IR 4.0 digital journey among majority of SMEs are hampered by various challenges. The main challenges could include poor environment of technology adoption, lack of knowledge concerning IR4.0 implementation due to little understanding about strategy for going digital and overall benefits of technology adoption, lack of connectivity and unwillingness to invest on connectivity, lack of funding, lack of talent, poor commercialisation of innovative ideas and ineffective metrics to measure digital transformation performance. Overall, the main key concern for slow adoption of IR4.0 could be caused by poor digital mindset among majority of SMEs in Malaysia. The lacking has resulted in misconception and low understanding on how IR4.0 technologies adoption could enhance SMEs operation and benefit them in the long run. Consequently, SMEs are still struggling to leverage on these technologies.

Despite these challenges, disruption of technology is in quick pace and affecting the industry players. Failures in adoption of IR 4.0 could, in long term, result in high unemployment, companies shutting down and government revenue decreasing (IDC Survey, 2018). SMEs need to think about what they should do and how they should embark on IR 4.0. To full fill this need, formulation of a clear digital strategy is a key challenge. Also, to capitalize on digital, SMEs need to have a progressive mindset to embark on their technology adaptation journey. Hence, designing a holistic digital change adaptation strategy for the SMEs is more than crucial. While research in the area is gaining increased attention, research gaps still exists. Due to the scarcity of empirical studies in the field, formulation of a holistic digital strategy is still inconclusive and at a pre-mature stage (Rachinger et al., 2018). This research suggests a crucial focus on changing digital mindset by examining the digital adaptation of IR4.0 from a lens of change management. Therefore, it intends to explore how a holistic digital change adaptation strategy could be developed, as a change adaptation process, to overcome the challenges and enhance IR4.0 technologies adoption among SMEs.

2.0 LITERATURE REVIEW

2.1 Industry Revolution 4.0 (IR4.0)

The term 'industrial revolution', refers to the emergence, during the transition from a pre-industrial to an industrial society, of modern economic growth (Vries, 2008). The advances in science and technology have continuously supported the development of industrialization all around the world (Belvedere et al., 2013). In order to sustain and remain competitive in the global environment, there is a constant need for industries and organizations to evolve accordingly in order to accommodate the demands in the changing markets (Pedersen, Nalpanitidis, Andersen, et al., 2016).

Industrial revolution has been identified occurring in four phases (National Academy of Science and Engineering, 2013). The first industrial revolution, which occurred in Britain between 1750s to the 1850 (Vries, 2008), started by using water and steam-powered mechanical manufacturing facilities. Second industrial revolution was marked when the application of electrical-based mass production technologies, through the division of labour, followed by the utilization of electronics and information technology (IT) in factories during the third revolution. In recent years, attention towards the latest industrial revolution, IR4.0, has been a subject of interest. IR4.0 is generally described as a world where individuals move between digital domains and offline reality with the use of connected technology to enable and manage their lives (Xu, David and Kim, 2018). The fourth industrial revolution is seen as the continuance from the third revolution in terms of the usage of IT. However, IR4.0 emphasizes more to the use of Internet of Things (IoT), Cyber Physical Systems (CPS), Big Data, Artificial Intelligence and Cloud, Smart factory (Lee, Yun, Paika, et al., 2018).

As the IR4.0 occurs globally, its emergence effects cannot be avoided, and people globally need to go with the flow. Accordingly, research on IR4.0 is gaining its place not only in practice, but also in academia. Many researches have focused on the classification of IR4.0, the awareness towards IR4.0, the adoption and the benefits and factors that hinders such adoption. Nevertheless, empirical studies on digital adaptation change strategies is still lacking and at a pre-matured stage.

2.2 Digital Adaptation

The term 'digitalisation' originates from the framework of digitization, which represents a conversion process of analogue data into digital data sets (Rachinger et al., 2018). Digitalisation refers to various forms of changes in an organization due to the increasing use of technologies. Digital transformation is defined as a process of changes by the means of using IR technologies, including cloud, sensors, automation, big data, to name a few, that could improve organization performance. With digital transformation, it is imperative for businesses to adapt their business strategy to a new digital technology, which mainly results in the adaptation of processes and operations management (Reis, Amorim, Melão & Matos, 2018).

At the individual level, user adaptation refers to the degree in which users proactively adapts to the information systems by changing work habits, routines, and the technology itself to improve productivity (Fadel, 2012). Additionally, at the organisational level, Majchrzak et al. (2000) compared two models of technology adaptation process in organisations. From a structuration theory perspective of DeSanctis and Poole (1994), technology adaptation, either recurrent or discontinuous, is constrained by pre-existing structures of the organization. The pre-existing structures represent the context of technology implementation, which consist of three dimensions: technology structure and spirit, task and organizational environment and the internal structure. In this context, new technology represents occasions for restructuring, rather than determinant of outcome. These pre-existing structures affect appropriations, which in turn affect decision processes and outcomes of technology adaptation.

In comparison, Leonard-Barton's (1988) model of the (successful) adaptation process suggests that technology adaptation process consist of cycles of misalignments, followed by alignments, followed by more but smaller misalignments. This process is evolving gradually until reaching to a state in which the technology, the delivery system and the performance criteria are all aligned. Despite the different nature of adaptation, both models agree that adaptation is a process of modifying existing conditions to achieve alignment. For the proposed study, digital adaptation refers to the process of modifying the existing contexts, in which the organization is functioning, towards IR4.0 adaptation.

2.3 SMEs and Digital Adaptation

SMEs are a crucial pillar of Malaysia's economy, forming 98.5% of the total establishments in the country, which contributes to 37.1% of the Malaysia Gross Domestic Product (GDP) and 66.0% of total employment in 2017. According to the latest mid-term Review of the 11th Malaysia Plan 2016-2020 report, SMEs are expected to contribute up to 41% of the country's GDP by 2020, and approximately 32 initiatives will be intensified to develop resilient and sustainable SMEs. The Malaysia Government's goal to grow the economy, improve productivity, start up more entrepreneurial companies and increase employment opportunities are impossible to be materialized without the digital transformation of the SMEs. Therefore, in order to grow and being more innovative, SMEs will need to leverage on the capabilities of technology in Malaysia.

2.4 Towards Development of a Digital Adaptation Model

Matt et al (2015) proposed a digital transformation framework for SMEs, which consists of four elements: use of technologies, changes in value creation, structural changes and financial, which are claimed to be common across industries.

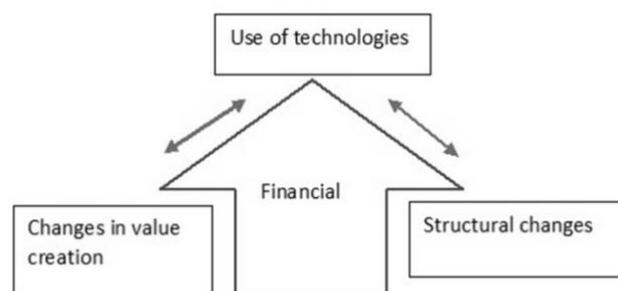


Fig. 1: The digital transformation framework (Matt, Hess & Benlian, 2015)

While this framework considered cross-functional characters and alignment of functional and operational strategies with corporate strategies, the framework focuses on internal operations with great emphasis on the process and technology thrusts. The framework is lacking in terms of how to drive the changes towards technologies, particularly, regarding people thrust. Transformation towards digital technology can be complex as it requires interplay between changes in process, structure and environment. Businesses might need to move from their legacy system and experience changes in business' cultures. Since digital adaptation could be a complex move, development of strategy should be beyond technological and procedural/process elements. Rather, a holistic digital strategy should be overarching that includes strategies to direct, lead and encourage people to embark favourably towards changes, measure progress and redirect those efforts as required. This requires a positive digital change mindset among the people as to achieve shared goal-setting

2.5 Change Management Perspective for Digital Adaptation

Digital technologies transform the way businesses and people communicate, exchange information, and create value and experience. Digitalization keeps evolving and affecting businesses' environment, processes and structures (Quinton et al., 2017; Matt et al, 2015). Businesses that are refused to evolve, fail to adopt new technologies or fail to realize the need for digital transformation are likely less competitive when facing disruption of technology (Ross, Sebastian & Beath, 2017). Due to the increasing opportunities driven by digitalisation, it is imperative for businesses to critically reflect and re-evaluate their existing business/corporate strategy (Rachinger et al., 2018). The evolving and complex transformation requires formulation of a comprehensive digital strategy to facilitate adaptation to the changing business processes and to maximize the value from investment in new technologies (Matt et al., 2015; Ross, Sebastian & Beath, 2017). The digital strategy is, therefore, pivotal because a business's decision towards digitalisation could reshaped or replaced the existing business model.

In Porras & Silver (1991)'s Planned Process Model of Organizational Change, change process begins with change intervention that affects organization's vision or purpose, or occurrence of interventions that cause changes in the aspect of work setting, or both. These interventions will in-turn affect the organizational members' thought process, leading to individuals' behavior changes. These changes then lead to improve organizational performance and individual development. This model met characteristics of a complete change model with inclusion of what, how, why and boundaries of change in addressing the way change occurs in organizations (Burke, 2011).

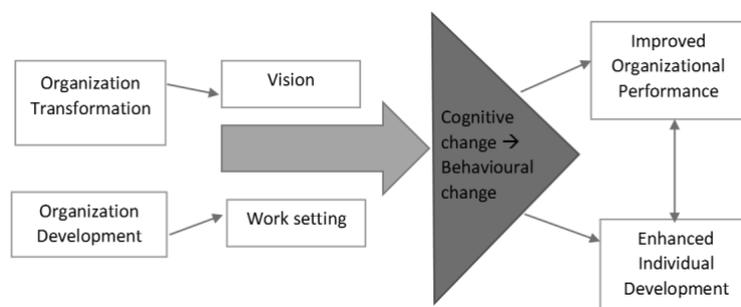


Fig. 2: Planned Process Model of Organizational Change (Porras & Silver, 1991)

The evolution of change management as a discipline is prominent in relation to technology-driven developments and transformation in large corporations (Zhovtyuk, 2018). Digital Transformation is the most important and disruptive organizational change to happen recently that also brings new models for change implementation (Cullen, 2018). Nevertheless, there is little empirical studies on change management practices when it comes to digital transformation. There are several key areas for change management in the digital age, which include digital transformation, digital talent, and digital leadership. On the basis of the above discussions, a model of digital change adaptation strategy for SMEs, in particular, will be developed. The model is expected to extend the digital transformation framework proposed by Matt et al. (2015), specifically with the integration of a change management lens.

3. CONCLUSION

The study proposes a conceptual model of digital adaptation for SMEs that were developed based on the integrated perspectives of information systems and change management. This new integrated model of information systems and change, will provide a holistic understanding of how elements of the dimensions interact and shape the digital change adaptation strategy for SMEs. The explanation of expected findings with reference to Malaysian context is expected to be unique for the developing country context; thus, offering a novel understanding of digital technology adaptation strategy by Malaysian SMEs.

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