

Knowledge Creation in Malaysia: a SWOT analysis

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ABSTRACT

Malaysia aims to be a developed nation by 2025. In congruence with this, the National Industry 4.0 Strategy (NI4.0) was launched in 2018 to accelerate high-technology adoption, improve efficiency and competitiveness across industries. NI4.0 utilizes data across the dynamics enactment process to maximize businesses' intelligence capacity as a smart factory in the ASEAN region. The effect of high-technology adoption in NI4.0 is expected to accelerate knowledge creation (KC). However, research on this impact is still scant. As such, KC should be promptly analyzed as it has become a global source for competition-surpassing individuals, organizations, and nations. IT professionals are heavily reliant on the value of KC to sustain competitive advantage. Evidence shows that KC in Malaysia is growing at a slower rate. Therefore, this paper aims to provide a SWOT analysis of KC in Malaysia, discussion of the evidence and insights for a slower KC growth and discussion of the findings to accelerate KC in Malaysia.

Keywords: knowledge creation, national industry 4.0, SWOT analysis

I INTRODUCTION

In recent years, the remarkable development of Information and Communications Technology (ICT) systems has encouraged the movement of talent, resources, and knowledge beyond the limits of ICT ventures. The ICT industry has increased employment opportunities in Malaysia which consequently, increased the country's GDP. To enumerate, statistics indicate that the ICT industry contributes RM 267.7 billion to the national economy, which is equivalent to 18.5 percent of the GDP in 2018 (DOSM, 2019). Under NI4.0, the Malaysian government has defined main digital areas for the ICT industry which inevitably facilitates a digital transition in the ongoing industrial revolution. (Reinhard et al., 2016). Key digital fields include Artificial Intelligence (AI), Internet of Things (IoT), Cloud, Data Mining, Cyber Protection, Data Centres, and e-commerce. Meanwhile, the increased use of new technology with broader scope and complexity within the ICT industry has created a wealth of new knowledge. While the usage of such emerging technology by organizations has been an increasing cause of worry, the implications for the practice of KC and the potential to

improve for enterprises remain mostly unknown (Pauleen and Wang, 2017). As a consequence, the future of a business relies on its knowledge maximization in the shortest period to gain a sustainable competitive advantage. KC fosters organizational human resources development (Mehralian et al, 2018), resulting in an organization to become more innovative and achieve better competitive advantage.

KC has been a catalyst for global competitiveness for NI4.0. Competitive advantage is attained through KC and contributed to the firm's potential progress. Moreover, KC is a constant commitment to broaden knowledge in Malaysian organizations and to create greater insights for the firms.

The current KC landscape in Malaysia encompasses a research focus on the KC process, factors and influence on various contexts covering medical, cultural, tourism, government, wakf, education, technology, and agriculture. This paper will expound on KC's strengths and opportunities, avoiding the threats and weaknesses within this paradigm. Therefore, the aim of this paper is:

1. To review KC in Malaysia.
2. To perform a SWOT analysis for KC in Malaysia.
3. To suggest the way forward for the KC agenda in Malaysia.

This paper proceeds as follows: Section I provides an introduction to the study. Section II provides a literature review on KC and the background of the study, revealing the current KC trend in Malaysia. Section III describes the SWOT analysis. Section IV discusses the way forward. Finally, Section V concludes the study.

II LITERATURE REVIEW

A. Knowledge in Organizations

In the modern world of the digital age, it is challenging for an organization to locate correct information in the right form to support its daily activities. Hence, the organization might lose its competitive advantage. Ikujiro Nonaka and Hirotaka Takeuchi, pioneers in knowledge creation research, have performed extensive studies on how the nation of the rising sun had developed its economy in 1995 by using this knowledge.

Plato, a philosopher in ancient Greece, defines knowledge as a “justified true belief” (Fowler, 1966). He stresses that belief in the truth of something does not constitute our true knowledge of it, so long as there is a chance or a possibility that we may have made mistakes in our belief (Cambridge, 1995). Nevertheless, knowledge needs to be nurtured, supported, enhanced, and protected by humans (Nonaka and Konno, 1998). In the modern world, the Cambridge dictionary defines a knowledge worker as an individual who knows how to apply and create knowledge in the job field (Cambridge, 1995). Later, scholars clarified that knowledge is not utter reality; hence it can be modified according to perspectives through synthesized contradictions allowing one to overcome the current state and build a new truth (Nonaka, Toyama and Konno, 2000). Multiple scholars (Quinn, 1992; Toffler, 1990; Nonaka et al., 2000) speak of knowledge as the new resource for the new economy, and consequently an essential asset.

B. Knowledge Creation

The Theory of Organizational Knowledge Creation (TOKC) by Nonaka and Takeuchi (1995) is the kernel theory. TOKC explains the organizational knowledge creation process through four modes of conversion- through individual or group experiences sharing (Socialization), expressing awareness into concepts (Externalization), linking and systemizing the concepts (Combination), and embodying knowledge to create product value (Internalization) (Nonaka and Takeuchi, 1995). Nonaka, Toyama, and Konno (2000) further explained that KC is a subsidiary process under Knowledge Management (KM). That is, to acquire a new context, view, or knowledge, one transcends the limit of the old self to a new self. From past research, TOKC indicated that innovation through the integration of both explicit and tacit knowledge amongst different sources in the value chain broadens the organization’s knowledge (Nonaka et al., 2014). KC covers multidimensional studies that broach numerous areas of research dealing with human interactions, organizational behavior, organizational learning, and leadership (Kao and Wu, 2016). As a result, the phronesis dimension covering an individual’s beliefs, obligations, passions, and judgments were incorporated in KC to solve the practical issues in organizations (Nonaka and Nishihara, 2018).

KC has become increasingly necessary as businesses adapt to continual rapid shifts in the market and advances in emerging technology (Kiklhorn et al, 2020). In the new competitive market climate, KC is highly associated with innovation to modernize goods and services (Andersson et al, 2008; Anthony and Tripsas, 2016; Goyal et al., 2020). Innovation is the fruition of knowledge (Faccin and Balestrin, 2018), as a result of the KC process (Landoni, 2020). In the

modern business world, co-creation is a sustainable method for leveraging expertise and creating new forms of knowledge (Goyal et al., 2020).

C. KC in Malaysia

The current KC activities in Malaysia are described in Table 1.

Table 1. Current KC activities in Malaysia

Initiative (Year)	Agency	Details	Contribution on KC
Malaysia International Centre for Sustainable Cities (MyICSC)	Malaysian Industry-Government Group of High Technology (MIGHT)	Knowledge hub to dissemination and sharing knowledge in sustainable cities initiative	Accelerate innovation and develop new knowledge
My Digital Maker Fair	Malaysia Digital Economy Corporation (MDEC)	Fair aims to embrace youth innovation in science, technology, engineering and mathematics (STEM)	New knowledge creation through STEM innovation
Malaysia Social Innovation (MySI)	Ministry of Science, Technology, and Innovation (MOSTI)	Program to improve services and welfare of rural community	New innovation generate new knowledge
High Impact Program 6 (HIP6)	Yayasan Inovasi Malaysia (YIM)	Program to source and develop new innovation	Platform to perform science and technology research and create new knowledge
Mainstreaming Grassroots Innovations (MaGRIs)			
National Technology and Innovation Sandbox (NTIS)	Malaysia Global Innovation & Creativity Centre (MaGIC)	Platform to develop advanced technologies	New knowledge creation through experiment and development process

Malaysian Industry-Government Group of High Technology (MIGHT) introduced Malaysia International Centre for Sustainable Cities (MyICSC) to serve as a knowledge hub to disseminate and share knowledge in the sustainable cities initiative (MIGHT, n.d.). The project accelerates innovation and develops new knowledge. Malaysia Digital Economy Corporation (MDEC) organized My Digital Maker Fair to embrace youth innovation in Science, Technology, Engineering, and Mathematics (STEM) (MDEC, n.d.). New knowledge creation was achieved through STEM innovation. Ministry of Science, Technology, and Innovation (MOSTI) implemented the Malaysia Social Innovation (MySI) program to improve services and welfare within the rural community (MOSTI, n.d.). Hence, innovation generated new knowledge.

Yayasan Inovasi Malaysia (YIM), which is a government agency that promotes creativity and innovation amongst Malaysians offered programs such as High Impact Program 6 (HIP6) and

Mainstreaming Grassroots Innovations (MaGRIs) to serve as platforms to create new knowledge through research in the area of Science and Technology (YIM, 2020). Meanwhile, Malaysia Global Innovation & Creativity Centre (MaGIC) provides National Technology and Innovation Sandbox to develop advanced technologies and new knowledge creation through the experimentation and development process (NTS, 2020).

An exploration of research papers on KC in Malaysia within the last five years from major international databases such as Scopus and Emerald revealed minimal research on KC in Malaysia, particularly concerning NI4.0. However, the 14 papers found on the MyCite database are further discussed in groups (KC process, KC factors, KC influence). The summary is provided in Table 2.

Table 2. Past Studies on KC in Malaysia

Author	KC Focus	Focus	Context	Key Factor to KC
Yee et al. (2020)	Organizational factors (Reward, training, and collaboration) – R&D Project Performance	KC Process & KC Factors	Association of Malaysian Medical Industries (AAMI)	Reward and Collaboration
Wahono and Hara (2019)	Corporate Knowledge and Innovation	KC Process	Batik industry	Environmental conditions
Liow et al. (2019)	Brand Orientation & Organizational Performance	KC Process	Tourism	Top-down management approach
Yusof and Masrek (2016)	Job Design and Knowledge Productivity	KC Factors	Administrative and Diplomatic Officers (PTD)	Task, knowledge, social and work context characteristics
Yusof et al. (2016)	Job design's task characteristics	KC Process & KC Factors	Administrative and Diplomatic Officers in Malaysian federal ministries	Work Scheduling Autonomy Decision Making Autonomy Work Methods Autonomy Task Variety Task Significance Task Identity and Feedback form Job
Siswanto and Rosdiana (2016)	Sustainable development of cash waqf	KC Influence	Wakf	Innovation
Jali, Abas, & Ariffin (2016)	Social innovation	KC Factors	Malaysian university-industry-community	Social innovation
Omar, Aris, & Nazri (2016)	Entrepreneurial orientation, Innovation capability	KC Factors	Entrepreneurs	Innovation capability
Abas, & Jali (2015)	Capability of managing knowledge	KC Process	Technology Development	Innovation process
Wahil et al. (2015)	Entrepreneurship Intentions	KC Factors	Entrepreneurship Education	Innovation

Zwain, Lim, & Othman (2014)	Total quality management (TQM)	KC Process	Iraqi Higher Education Institutions (HEIs)	Total quality management (TQM)
Nguyen, Truong, & Nguyen (2013)	Creativity and innovation	KC Process	Vietnamese agricultural companies	Leadership, teamwork and Ba, corporate culture, and human resource management.
Ismail & Abdullah (2011)	People, process, and technology	KC Process	Malaysian Armed Forces (MAF)	Demographic elements Leadership
Saludadez (2010)	Communication phenomenon	KC Process	Distance education – Tutor and learner	Communication

KC Process: KC process has 7 papers. These papers discussed the organizational and environmental conditions to perform KC in batik, tourism, technology, education, agriculture, and armed forces.

KC Factor: This dimension has 4 papers. The key factors of KC include work context characteristics, social innovation, and innovation capability.

KC Process & KC Factor: 2 papers discussed both the KC process and factors. The papers discovered that reward, collaboration, job design, and task characteristics play significant roles in KC.

KC Influence: Only 1 paper was found in this dimension. The study explained that innovation is crucial to develop cash waqf sustainably.

A review was done on the papers published in relation to the Malaysian NI4.0. The challenges of NI4.0 that would influence KC in Malaysia are presented in Table 3.

Table 3. Past Studies on Malaysia NI4.0

Author	Journal	Issues	Impact to KC
Abdul-Hamid et al. (2020)	Computers & Operations Research	Lack of Knowledge management system	Absence of central repository of new knowledge
Mokhtar and Noordin (2019)	Indonesian Journal of Electrical Engineering and Computer Science	Lack of awareness, skills and competencies	Difficulty to create knowledge
Kannan and Garad (2020)	International Journal of Quality & Reliability Management		
Ghobakhloo and Fathi (2019)	Journal of Manufacturing Technology Management	Lack of collaboration between academics and industries	Absence of KC ecosystem
Lin et al. (2018)	Industrial Management	Lack of foreign direct	

	& Data Systems	investments and trade prospects	No financial support for KC
Mohamad et al. (2018)	The Japan Society of Mechanical Engineers		

Abdul-Hamid et al. (2020) found there is a lack of knowledge management system which impacts KC. Furthermore, lack of awareness, skills, and competencies causes difficulties to create knowledge (Mokhtar and *Noordin*, 2019, Kannan and Garad, 2020). Moreover, a lack of collaboration between academic institutions and industries to build knowledge together impacts the KC ecosystem (Ghobakhloo and Fathi, 2019). Lin et al., (2018) and Mohamad et al., (2018) revealed that a lack of foreign direct investments and trade prospects causes a void in financial support for KC.

In a nutshell, literature on KC in Malaysia revealed that it requires a detailed study to accelerate KC proliferation in Malaysia. Therefore, a SWOT analysis is required. The primary objective of the SWOT analysis is to help Malaysian organizations to develop awareness of the fundamental change involved in enhancing KC in Malaysia.

III METHODOLOGY

This paper is constructed based on an extensive review of KC literature in the context of Malaysia and develops a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. Secondary data were analyzed to identify SWOT. It includes newspaper and annual reports from PwC, HRDF, EPU, MCMC, MOHE, MOSTI, and MyIPO. These reports were selected based on their coverage of various national perspectives including education, ICT, intellectual property, technology, human resources and, Research and development (R&D).

The contribution of this paper is the SWOT analysis that will serve as an insight for any agencies working on KC agendas in Malaysia.

A. SWOT Analysis

Figure 1 shows an analysis result of the Strengths, Weaknesses, Opportunities, and Threats for KC in the context of Malaysia.

Strength: Recent statistics have shown that Malaysia had remarkable growth in educational institutions from the public and private sectors. In Malaysia, there are five research universities, fourteen public universities, four hundred private institutions covering university, university college, and international branch campus (MOHE, 2019). Besides that, educational institutions linked local and foreign communities to expand their knowledge and expertise (Aziz and

Abdullah, 2012). Additionally, the growth of educational institutions had significantly contributed to new knowledge in the nation through journal publications, conferences, and proceedings.

Strengths 1. The growth of the education institutions (SJR, 2020) 2. Government promote R&D (PwC, 2019) 3. Government support education and training (PwC, 2019)	Weaknesses 1. Lack of innovation capability (MyIPO, 2018) 2. Weak R&D landscape (WIPO, 2020) 3. Inadequate reading culture. (The Star, 2019)
Opportunities 1. High-technology on Blockchain, Artificial Intelligent (AI), Internet of Things (IoT), Big Data Analytics (EPU, 2019) 2. Rapid growth of online communities. (DOSM, 2020)	Threats 1. Political and economic instability (Wong, 2020) 2. Information overload. (MCMC, 2018)

Figure 1. Strengths, Weaknesses, Opportunities, and Threats for Knowledge Creation in Malaysia.

According to the Scientific Journal Rankings, a total of seventy-three Malaysian publishers had generated 6,044 journals and 1,001 conferences and proceedings in 2019 (SJR, 2020). Moreover, a total of 18,875 journals and 2,379 conferences and proceedings have been published in the past three years (SJR, 2020). In the past three years, two percent of the published journals are first quartiles and twenty-five percent of the published journals are second quartiles (SJR, 2020). This statistics indicates that Malaysian journals are competitive with other publishers from the rest of the world. Nevertheless, Malaysia is a key player in knowledge creation in the region. Statistics have shown Malaysia ranked thirty-three out of 240 countries and territories, surpassing Singapore, and Thailand, placed thirty-four and forty-four respectively (SJR, 2020). The development in research produced an abundance of seminars and workshops locally to support knowledge exchange and also to create new knowledge (WASET, 2020). Consequently, local researchers are able to interact with other researchers and expand their knowledge. Multiple event organizing platforms such as conferencemalaysia.com, conferenceindex.org, Eventbrite, and so on are used to promote conferences and seminars.

R&D refers to activities that create and apply the knowledge that is performed by scientific experts (Asmawi and Chew, 2017). As such, the Malaysian government continues to promote innovation by improving R&D structure. For instance, the government provided funds to ministries and public agencies with an allocation of RM 524 million to enhance R&D in the public sector (PwC, 2019). Another approach was providing tax exemption up to 10 years from the income generated via intellectual property (PwC, 2019).

From the human capital development perspective, education and training can create new knowledge and

skills (Schultz, 1963). Malaysian government's continued support for education and training is another strength of knowledge creation. In line with Malaysia's Budget 2020, the Malaysian government has allocated RM 50 million to Human Resource Development Fund (HRDF) to provide training and upskilling workshops to the employees (PwC, 2019). Together with the Ministry of Human Resource Malaysia, HRDF continues to catalyze employee growth to create a knowledge-based economy.

Weakness: A weakness of knowledge creation in Malaysia is shown in the area of innovation capability. Innovation capability is defined as an organization's ability to accumulate, improve, and develop new products or services (Amit and Schoemaker, 1993; Raddats and Burton, 2014; Mohamad et al., 2017). Innovation capability can be identified through new patents or copyright (MOSTI, 2018). In Malaysia, between 2008 and 2018, local patent and copyright applications remained sluggish. This is unlike vigorous foreign patent applications; which averages 5,719 applications per year (MyIPO, 2018). In contrast, the average number of patents for local applications per year is only 22% of the average number of foreign applications annually (MyIPO, 2018). Moreover, Malaysia's lack of abundant innovation capability is also reflected in the Global Innovation Index, a measurement for countries' innovation capacity. The report indicated that Malaysia only ranked 33th out of 131 countries, placing eighth in Asia behind Singapore, the Republic of Korea Hong Kong, and China (WIPO, 2020). However, the abovementioned index might not be an exact indicator of the level of knowledge creation in Malaysia because KC emphasizes innovation through research and development (R&D).

Critics expostulate that Malaysia's R&D remains at infancy level (The Star, 2020, Asmawi and Chew, 2017). This is echoed by Aman (2008) who further suggests that Malaysia's R&D only focuses on specific areas such as infrastructure and construction which are conducted by large corporations. In contrast, 98.5 percent of the Malaysian firms consist of Small Medium Enterprises (SME) (SME Corp, 2018) which have scarce resources, are highly vulnerable to economic turbulence, and lacking-formal R&D pursuits (Adams et al., 2006; Bougrain and Haudeville, 2002).

Contending that R&D was related to knowledge creation, a serious impediment to R&D progress in Malaysia is the lack of capital, human resources, technology, skills, and intellectual property protection (Partanen et al., 2008; The Star, 2020). According to recent press, the ratio of R&D spending based on Gross Domestic Product (GDP) in Malaysia is only 30 percent of South Korea's R&D spending in 2019

(Hamid, 2019). This finding indicates that Malaysia needs an improvement in national R&D prospects and innovation. In Malaysia, only a handful of grants or incentives from the government or private institutions are made available. Without adequate monetary support, it is hard to incorporate R&D in firms. In sum, a lack of R&D is detrimental to knowledge creation development in the nation.

According to scholars, it is undeniable that knowledge creation requires extensive reading or listening to sense the realism and 'know-how' to create new knowledge (Nonaka and Takeuchi, 1995; Nonaka et al., 2000). Therefore, it is proven that reading and knowledge creation are intertwined. Ironically, studies from the National Library shows that Malaysians only read fifteen books on an average per annum (The Star, 2019). Comparatively, citizens from developed countries read an average of forty books annually. Previous studies in Malaysia have found that newspapers are the most popular reading material, followed by magazines and books (Baba et al., 2020). A fundamental question that arises is the effectiveness of only newspapers, which is primarily a leisure read, in generating knowledge. Regardless, it is pivotal to cultivate a better reading culture in Malaysia.

Opportunities: Shared Prosperity Vision 2030 is the next initiative to reprioritize Malaysia's development goals. The nation is slowly adopting high technology from the Fourth Industrial Revolution (IR4.0). Therefore, there exist vast opportunities for creating specialized knowledge associated with high-technologies such as Blockchain, Artificial Intelligent (AI), Internet of Things (IoT), Big Data, and so on. However, the usage of high technology in the industrial and service sectors remains limited at 37% and 20% respectively (EPU, 2019). The nation is targeting an increased adoption rate in the manufacturing and service sectors up to 50% for the former and 30% for the latter by 2030 (PwC, 2019).

According to a survey performed by Malaysia Communication and Multimedia Commission (MCMC), the nation has a total of 28.7 million Internet users in 2018, which is equivalent to 87.4 percent of the Malaysian population (DOSM, 2020). Furthermore, most of the active Internet users are youngsters, who contributed to about 62 percent of the total online content. The online content falls under the categories of education and entertainment through social networking and messaging applications. Malaysian online communities have a huge potential to create new knowledge; owing to diverse ethnic groups with different religious practices and cultures. Therefore, online communities are a useful source of personal tacit knowledge for the market for co-creation and innovation.

Treats: According to Socio-Economic Research Centre (SCRC), political and economic stability in Malaysia is crucial for national growth policy continuity (The Edge Markets, 2020). Recent instability in political powers and the outbreak of the Covid-19 pandemic are predicted to affect the nation adversely in the long run. Moreover, multiple credit rating agencies are apprehensive that the political instability in the nation might cause a negative outlook on long-term foreign direct investment (The Edge Markets, 2020). On the other hand, while resources are channelled to rebuild a nation's economy and combat political uncertainty, knowledge creation outlook will be affected by the lack of funding and support from the government.

In the modern world, the Internet has become one of the largest sources of knowledge (Majid, 2017). People are used to creating content or obtaining information through the Internet. Statistics indicate that Malaysians spend nearly 7 hours a day online (MCMC, 2018). The ease of information flow within the online media in turn amplifies the possibility of spreading misinformation and those who receive such misinformation may not be able to evaluate it critically (Soto-Acosta and Cegarra-Navarro, 2016). Evidently, most Malaysian Internet users do not check the content before sharing it online (MCMC, 2018). Recent research acknowledged that misinformation is harmful because it may foster unlearning and stops the creation of new knowledge (Norri-Sederholm et al., 2020). Therefore, it is necessary to be aware of the impact of misinformation on knowledge creation in the nation.

IV THE WAY FORWARD

The SWOT analysis revealed that there is greater potential for KC in Malaysia. Despite the financial supports provided by the government for R&D, KC growth depends on individual efforts through socialization to facilitate new knowledge. One of the strategies is to create more online communities in various segments such as education, entertainment, and government.

High-technology such as blockchain, artificial intelligence (AI), Internet of Things (IoT), and big data analytics can be made more extensive by increasing expertise and skills through specialization programs. The strategy to materialize this is to improve the current education ecosystem. Furthermore, new knowledge can be captured through the implementation of high-technology in organizations.

Strategies to tackle the lack of innovation include encouraging firms to participate in innovation activities, providing platforms for knowledge sharing between collaborators, holding more innovation

competitions amongst experts, creating expert systems, and conducting hack day.

Moving forward, KC will play an important role in supporting the Shared Prosperity Vision of 2030. Any strategies outlined to address the issues regarding the lack of innovation, R&D, and reading culture will enhance KC under NI4.0. These improvements should be pioneered by the government as the primary driver to develop R&D friendly policies, introduce subsidy, tax reduction, and encourage more intellectual property.

V CONCLUSION

This study presents a review and insights on KC in Malaysia. Besides identifying the strengths, weaknesses, opportunities, and threats, this paper represents the contributions to link knowledge creation theory in Malaysia. Secondly, this study provides useful insights for the public and private sectors in Malaysia. The findings from this study are expected to ignite interest in KC research by filling the existing gaps in literature and theory. Ideally, it is also expected to further extend the opportunity for interdisciplinary discussions. This study acknowledges the important role of knowledge creation in developing competitive advantage for a firm. Finally, KC will contribute to the achievement of NI4 through the collaboration between the government, industries, and universities.

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