

Strategies for Preparing Manufacturing SMEs for Industry4.0: A Case of Malaysia

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Abstract:

The Industry 4.0 offers both opportunities and threats to Malaysian Small and Medium-sized Enterprises (SMEs) and its key effects have begun to prevail. It is apparent that the transformation within SMEs is crucial as Industry 4.0 is at the center of attention by industry leaders, digital service and technology providers, academic researchers, and policy makers. Industry 4.0 poses significant challenges to Malaysian SMEs from the aspects of technological, organizational and operational. Despite its possible benefits Industry 4.0 could offer, there are still many unresolved questions, uncertainties, and challenges to be faced along the journey of this digital transformation as implementation process of Industry 4.0 demands resources, expertise and commitments of SMEs to a great extent. Malaysia is also raising the bar to meet the competitive environment and global waves in Industry 4.0 realization. Therefore, there is a pressing need for more information on how SMEs embrace and oriented themselves to a new way of doing business in moving towards Industry 4.0. The implication and strategies are presented to prepare SMEs in facing the Industry 4.0.

Keywords: Strategies, SMEs, Industry 4.0, Malaysia

Introduction

Digital transformation propelled by Industry 4.0 has become an important agenda for manufacturing industries due to its operational benefits and market opportunities. Industry 4.0 transforms how products are designed, fabricated, produced, operated, delivered, maintained, and serviced. It also transforms the operations, processes, supply chain management, manufacturing power and skill requirement, and energy footprint of factories. Industry 4.0 refers to the idea of smart factories where machines are augmented through web connectivity and become a system that can visualize the entire production chain and make decisions on its own (Bawany, 2018). With the help of new digital technologies, new industrial products with digital features will be introduced, factories will become smart factories where computers and machines talk to each other, collect and share data,

and based on the data, make production more efficient to meet new market demands.

From a macroeconomic perspective, Industry 4.0 is perceived as the new competitive advantage of a nation (Erro-Garcés, 2019). As for the manufacturing firms, Industry 4.0 has the potential to transform manufacturing Small and Medium-sized Enterprises (SMEs) in multiple ways such as improving productivity, efficiency, flexibility, and cost; enhancing production capabilities; enabling better quality and quality monitoring; and reducing waste, delivery time, and machine downtime (Yasanur, 2018; Waibel et al., 2018; Koch et al., 2014). Hence, investing in Industry 4.0 is an important consideration for manufacturing firms, which strive to remain competitive in this global economy (Bosman et al., 2019).

Despite its possible benefits Industry 4.0 could offer, there are still many unresolved questions,

uncertainties, and challenges to be faced along the journey of this digital transformation as the implementation process of Industry 4.0 demands new resources, expertise and commitments of SMEs to a great extent. It also calls for strategic initiatives, a conducive ecosystem, and supporting agencies from the governments of the country that embraces this fourth wave of the digital technology revolution. Without coherent support from the government, manufacturing firms, especially SMEs, will be struggling in their preparation towards Industry 4.0. In this respect, we are proposing the implementation and improvement of strategic initiatives that can be considered by government or policymakers in preparing SMEs for Industry 4.0.

Manufacturing SMEs and Industry 4.0 in Malaysia

In Malaysia, the government has recognized the importance of integrating the Industry 4.0 initiative into the national agenda to keep pace with the global advancements in the Industry 4.0 realization. Therefore, there is a pressing need to assist SMEs to be ready for Industry 4.0. The manufacturing industry is the second largest contributor to Malaysia's GDP at 22.1% in 2019 and SMEs account for 98.5% of the manufacturing firms. Moreover, SMEs make up 41.1% of employment in the manufacturing industry in Malaysia.

Recently, the Malaysian manufacturing industry has been challenged by lower-cost competitors from emerging economies and rapidly changing technologies. Thus, Malaysia needs to move up the value chain towards a higher-end manufacturing base by moving from traditional labor-intensive to one that incorporates technology as a central means of production. As such, it is imperative for Malaysian manufacturing firms, especially SMEs, to embrace Industry 4.0 to sustain its future manufacturing competitiveness at an accelerated pace by digitally transforming their production processes and technologies. Amidst such a dynamic environment, the government is well-

positioned with key strategies to create more global SMEs through assistance in automation, digitalization, and robotization. National Policy for Industry 4.0, named as "Industry4ward" was launched in 2018 with specific attention to the following four overarching goals: (i) drive continuous growth in manufacturing GDP; (ii) increase national productivity; (iii) create higher skill employment opportunities, and (iv) raise innovation capabilities and competitiveness.

Although the Future of Production Report (WEF and Kearney, 2018) highlights that Malaysia is well-positioned to benefit from Industry 4.0, and large firms and MNCs have successfully engaged in the process, most of the SMEs in Malaysia do not seem to be ready yet. Many SMEs continue to struggle to keep pace with the astounding speed of technological change due to their resource-lean nature and operational overheads. Although the Malaysian government has launched initiatives to assist the technological development of manufacturing firms, digital adoption, especially among SMEs, is still at around 20%, and most manufacturing firms apply less than 50% automation (Yatid, 2019).

Moreover, the large manufacturing firms are seen to be aware of the benefit and risk of adopting Industry 4.0 practices, while many SMEs still lack information and knowledge about it. In this context, a better understanding of aiding SMEs to get ready for Industry 4.0 is critical. The next section will present the strategies for the implementation that can be considered by government or policymakers in preparing manufacturing SMEs for Industry 4.0.

Strategies for Preparing SMEs for Industry 4.0

New policy interventions for Industry 4.0 should be innovative as globalization and emergence of the knowledge economy have rendered traditional policy less effective. Industry 4.0 has triggered the digital revolution of technologies, and it becomes part of the DNA of business to gain competitive advantage. One of the key drivers needed to shape the future of the Malaysian SMEs business

ecosystem is technology. Malaysian SMEs should take advantage of digital technologies and advanced automation which will keep Malaysia at the forefront of the latest technological changes. Today, Malaysia is ranked 31st as the most technology-ready nation and Malaysia's future growth will be powered by innovation-driven. There are four key areas to focus on to prepare manufacturing SMEs in the Industry 4.0 and they are (i) enhance digital infrastructure and technological capability; (ii) provide on-going institutional support; (iii) upskilling human capital, and (iv) find model companies that the SMEs can learn from

Enhance Digital Infrastructure and Technological Capability

Malaysian SMEs are still struggling with Industry 4.0 because they lack good digital infrastructure and technological capability. The adoption of smart digital technological capability among manufacturing SMEs in general is relatively low. They often face the problem of inadequate technology infrastructure and professional skills needed to implement new digital technologies. The government agencies must provide adequate digital infrastructures for SMEs to flourish as adequate digital infrastructures are required to enable reliable and secure Industry 4.0 adoption. To enhance digital infrastructure and technological capability among manufacturing SMEs in Malaysia, for example, the government agencies can collaborate with local technology providers to help potential manufacturing SMEs in Malaysia move into Industry 4.0 technology.

One of the potential reason technological capability of manufacturing SMEs is not adequate is that they may see that adoption of Industry 4.0 is a huge investment which is a potential barrier to them before considering Industry 4.0 adoption. It is important for SMEs need to know that they can start small with Industry 4.0 technology. Manufacturing SMEs can have the option to start small with Industry 4.0 technology. Manufacturing SMEs need to know which area had the potential to be

transformed to improve their business productivity and efficiency. After identifying the area for transformation, SMEs must be willing to get ready to invest their time, money and expertise. For example, if manufacturing SMEs identify that they need to build a proper digital infrastructure system, then they need to identify and acquire the right tools to enable the data to be processed.

To bring the awareness to SMEs that SMEs can start small with Industry 4.0 technology instead of the idea that Industry 4.0 is a huge investment, government agencies play important roles to provide technical advice to manufacturing SMEs with two purposes: one to bring awareness and one to provide education. The purpose of awareness session in the form of talk or dialogue is to help to bring a mindset shift of the SMEs business owners/managers to fully grasp the digital transformation. For example, the government agencies can organize small workshops every 2 or 3 months with more catchy titles such as “Why SMEs should consider Industry 4.0 Adoption?” The purpose of education session in the form of talk and seminar or workshop is to help manufacturing SMEs to identify or to know how to strategize or prioritize which area for Industry 4.0 technology to increase their business productivity and efficiency.

Provide On-going Institutional Support

The on-going institutional support for technological capability building is crucial for the technological development of manufacturing SMEs. Manufacturing SMEs have to leverage institutional supports to defray costs that hinder capability building. Manufacturing SMEs need to be equipped more with a vast repository of knowledge, skills, and abilities to digitally transform themselves towards Industry 4.0. The government ministries and agencies could roll out coordination support programs to get more qualified SMEs to avail themselves to the Government-sponsored programs and schemes to upgrade their technological capability competencies, for example, technical know-how, to enhance their technological

capability to implement Industry 4.0. To do this, we suggest that a social constructionist approach which is based on the crucial role of talk, seminar, dialogue, workshop and communication with SMEs owners or managers, could be essential in engaging and developing SMEs, thus breaking away from generalized notions of tool-kits of techniques, a 'one-size fits all' approach to the development of SMEs entrepreneurs. This strategy is important to group Malaysian SMEs in moving towards a common vision for Industry 4.0 and hence prepare Malaysian SMEs readiness in terms of managerial, operational and technological dimensions.

Another institutional support that can be considered is to provide financial support to kickstart the adoption of Industry 4.0. Even though SMEs may aware of the potential benefits of Industry 4.0, they are also aware of the fact that digitalization is not free. In other words, SMEs are aware that Industry 4.0 adoption will require initial investments from them. Malaysian SMEs will evaluate if the investment in digitalization and smart technologies is worthwhile. It is not easy for SMEs to introduce digitalization if the owners or managers cannot see digitalization will bring them a clear return rate. They may see digitalization as a risk-laden project. As some risk-laden projects may not pay off and can even lead to the downfall of their business, SMEs tend to be conservative to innovation, thus leaving building innovation capabilities in the backseat.

Hence, we are proposing financial support is necessary for SMEs to kickstart the adoption of Industry 4.0. Financial support will attract more Malaysian SMEs to Industry 4.0 technologies adoption. As financial support will create a fertile ground to encourage innovation and kickstart a self-sustaining Industry 4.0 ecosystem in Malaysia, hence, government agencies and policymakers need to tailor the need of Malaysian SMEs for funding support. In addition, government agencies should ensure funding accessibility for SMEs who want to move forward for Industry 4.0 technologies adoption.

Upskilling Human Capital

To achieve a high level of readiness of SMEs in Malaysia for Industry 4.0, upskilling human capital is critical and necessary if we want to move SMEs in Malaysia for Industry 4.0 adoption for a faster pace.

We are arguing that even though Malaysian SMEs are aware of the Industry 4.0 potential benefits, SMEs in Malaysia might oversee some potential benefits from Industry 4.0 due to their main focus are on daily operations while others are reluctant to adopt for Industry 4.0 because they do not know the way how to do it and choose to be ignorant. One of the main possible reasons for this phenomenon is that SMEs lack the knowledge to deliver technical know-how. Another possible reason is that SMEs may see that their employees do not have the technical skills if technology or digitalization is employed. Malaysia SMEs are facing a shortage of required talents, skills and knowledge for Industry 4.0, particularly in the areas of IoT, Robotics and Artificial Intelligence.

The drive is not for digitalization itself alone but also stemming from a shortage of skilled and IT professionals in our Malaysian SMEs. Why does this happen? One of the possible reasons is that our existing pool of Industry 4.0 trainers in Malaysia is also trying to cope up with the advancement of technology. Hence, we are suggesting focusing on human capital development so that we have adequate IT professionals in SMEs and to prepare SMEs to get ready for Industry 4.0.

One practical ways is that government agencies can provide funding for upskilling human capital for Industry 4.0. The reason is that adoption of Industry 4.0 technologies also means that some of the jobs will be obsolete and some new job will be created. The new jobs require digital skills! With the transition to Industry 4.0 adoption, technology is changing jobs and we need to ensure our people are to be continuously reskilled and upskilled. Upskilling human capital is to ensure a successful transition for SMEs to Industry 4.0.

Education and training are important to nurture tech-savvy young generations and to cultivate talents through the system. Such training can come from the ministries or agencies or MNCs or large corporations' vendor/supplier development programs or privately held specialized programs. For example

1. To create both “online and offline Platform for Industry 4.0” which is an avenue to organize small dialogue or sharing sessions for SMEs, MNCs, Big firms to share their experience and knowledge about Industry 4.0 (for SMEs to get access to first-hand experience sharing)
2. To establish One-stop Centre that provide financial support, technological advice, technical trainings, guidance for technology service providers, and linkages to sharing platforms (in every state in Malaysia)
3. To develop “Expert Team” with Industry 4.0 Experts who can help SMEs as consultants for free advice and guidance. Experts could be from diverse backgrounds such as IT, Engineering and Operation Management
4. To develop Digital-ready Graduates in collaboration with Universities.
5. To provide more free trainings in collaboration with established institutions.
6. Sector focus sharing/workshop with foreign speakers

SMEs should draw lessons from industry experts, research technology organizations, and universities to enhance their knowledge and wisdom. Government agencies can help with increasing the knowledge level in terms of digital skills for potential and young entrepreneurs and to increase consciousness of technical skills.

Find Model Companies that the SMEs can learn from

Due to firm size and financial constraint, SMEs which are involved in cutting-edge and niche technologies, need to have a good strategic collaboration and integration with MNCs and state-

led research technology institutions for the exchange of expertise, knowledge transfer, technical consultation. SMEs need to identify model companies that the SMEs can learn from to build the right Industry 4.0 ecosystem. Agencies can find model companies that the SMEs can learn from to build the right Industry 4.0 ecosystem via the creation of (i) Create a cluster or SME park and (ii) Vendor Development Program (VDP) to support the SMEs and to build the right INDUSTRY 4.0 ecosystem.

Create a Cluster or hub or SME Park

Government agencies can think of ways to attract SMEs to adopt Industry 4.0 by creating a cluster, hub or an SME park. The Cluster or hub or the SME park needs to be equipped with infrastructure readiness and drive 5G connectivity. This will provide a platform for SMEs to learn from each other and offer opportunities for SMEs to work with each other to foster their technological capabilities. To prepare SMEs for the transition to Industry 4.0, it is necessary to have a cluster/hub/SME park that will cater the needs for MNCs and other Large Corporations. Cluster/hub/SME park will support and enhance the development of the existing supply chain ecosystem of the industries in Malaysia. This strategy is particularly useful for SMEs in E&E, medical device, and semiconductor and it will form a strong ecosystem in Malaysia later on.

Vendor Development Program (VDP)

This allows the existing MNCs to develop the vendor as well as be a player within their value chain. Apart from setting up a business hub, the existing MNCs could expand into areas where they can look at or explore even a single-source vendor for their product. MNCs can create greater value, incorporate themselves and work together with local vendors. The VDP program may assist to develop the local vendors (SMEs), as well as how SMEs can leverage upon the MNCs to improve on their standards and business, as well as their connectivity with the VDP and the whole value

chain of activities. SMEs must consider collaborative networking and mentorship with more established players, trade associations and chambers from the same fraternity for sharing business insights, entrepreneurial opportunities and execution intelligence to strengthen the development of organizational capabilities. Participating in business expositions would offer SMEs industrial contacts, partnership and networks to take advantage of upcoming trends and opportunities. VDP will assist SMEs to learn from MNCs in terms of their technologies as many MNCs would demand their vendor to adopt Industry 4.0 to save cost and time.

Conclusion

To summarize, Malaysian SMEs have to balance between specialization and standardization for meeting customer requirements while maintaining optimal cost-efficiency and frugality. It is not every SME needs to be fully digitalized. government agencies should assist SMEs who are aware that they must leverage new technologies and processes that are rapidly evolving in the Industry 4.0, for example, funding support for SMEs to invest in innovation and technological capability building programs. The setup of the right Industry 4.0 ecosystem will prepare for Malaysian SMEs to be more ready to implement Industry 4.0 and digitalization.

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