

The Effect of Green Servitization on Malaysian Manufacturing Firm Sustainability: A Moderating Role of ISO 14001:2015 Environmental Management System

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ABSTRACT

Growing concerns by leading innovative firms is leading to the transition of new value-based sustainable production processes for resource and environmental sustainability. This is due to manufacturing firm's contribution of energy, air and water emission from production operations and invariably affecting overall performance in the form of cost of pollutant. Consequently, little or no study in Malaysia has captured the dynamic nature of the factors determining the implementation of green initiative (green servitization strategy) favorable in adopting MS:ISO14001. Thus, the need to investigate the profitability of using green servitization as an alternative to current manufacturing firm production process.

Keywords

Servitization; Green Servitization; ISO14001; Sustainable Performance

INTRODUCTION

Rapid population growth world-wide will be an issue in the coming decades. Studies have predicted that human population will increase from 6 billion in 2015 to 9 billion by 2050. This has consequently led to massive urbanization and industrialization of manufacturing firms. The massive urbanization and industrialization could pose a threat to manufacturing sustainability issue vis a vis achieving environmental performance of a country. Globally, the United Nations Food and Agriculture Organization (FAO) said that around one-third of world food produce is lost (in the production phase). In 2015, Indonesia economic losses were \$16 billion from manufacturing firms' waste management. Also, is the case of China, manufacturing activities recorded a loss of approximately \$62.5 billion attributed to environmental pollution from various industry, especially manufacturing firms. These, among others show the challenges that could be faced in the future in terms of the survival of manufacturing firms if they do not change their traditional production process as the current method is already affecting their firm performance and causing environmental challenges. Servitization comprehends the innovation of the capabilities of firms as well as processes of shifting from selling and producing tangible products to the integration of selling services and goods. Previous study on servitization showed some categorization of several types of services, such as base, intermediate as well as advanced. Firstly, the base service focuses on the provision of product while the intermediate service is focused towards the maintenance

condition of the product (Baines & Lightfoot, 2014). The third one is the advanced service which is the outcome that focuses on the delivery capability via the product performance. The capabilities of green servitization will serve as resources that will enhance service provision as well as product that are consumed as a single offering. Typically, the advanced service has a feature of revenue via the use of contracts (known as pay per-use), rental agreements as well as risk and revenue sharing contracts.

Similarly, recent occurrences in developing nations, such as Malaysia have shown that the country is facing challenges in sustainable waste management from production process of manufacturing firms which is causing low sustainable and environmental performance, thus requiring the need to have a new production process, such as green servitization that is conventional in nature to tackle the future challenges that could affect their sustainability and environmental performance. The green servitization will be in the form of a service solution aiming at reducing environmental impact vis a vis cost of production during production process via implementing waste reduction, energy efficiency, water conservation as well as green technology. Its main idea is to provide intangible solutions in place of tangible ones in enhancing product as well as to serve as alternative for traditional production process mainly to generate additional revenue for organization.

Accordingly, Malaysia is facing high air and water pollution, largely attributed to poor waste management of manufacturing firm. This can be confirmed with the recent environmental performance index which shows that the country was doing well as of 2015 at a ranking of 63 (74.23% score), but in 2018 came down to 75 (59.22% score). Although, the country's ranking has move up in 2020 to 68, the score is only 47.9% score, which confirmed that the reason was merely because other countries were not performing well in that particular year. These cases among others, show the need for the industry in the country to adopt cleaner production process that will reduce waste and combat environmental challenges faced by the manufacturing firms so that the country can again be able to achieve higher firm and environmental performance in the future.

Another reason why there is the need for the adoption of green servitization is because of the proactiveness or reactiveness of firms towards the perceive need or risk of having or not having green initiative. At the moment Malaysia Standard adopts the ISO 14001 which is an international environmental standard that all manufacturing firms must follow to meet with the required environmental performance. But its adoption and implementation coupled with the process of its certification have been a huge challenge for quite a number of manufacturing firms in Malaysia to meet with. Hence the need for the present study to investigate the profitability of using green servitization as an alternative production process.

PROBLEM STATEMENT

In recent years, there are a number of cases from Malaysian firms that have been subjected to pay huge penalty due to the pollutants produced by their firms because the lack of modern waste management system. These issues consequently led to low production output or performance which affect their profitability gains. With regards to sustainability performance, the Gardenia Bakeries (KL) Sdn Bhd's waste management issue as well as Kim Kim river incidents in 2017 and 2018 respectively, had cost the later RM 6.4 million as penalty of

producing the pollutants and the earlier up to RM 2 million leading them to increase overhead cost of their operations. Some of the companies involved in the issues also had to close down their business activities. Those are some of the example of huge impact that the cost of pollutant could have on the overall company profit from production activities. Thus, both cases could serve as an indication that the survival of Malaysian manufacturing firms could be at a risk in the future if a cleaner production process, such as green servitization which is capable of reducing cost of production and increase environmental performance is not adopted as proposed in the present study.

Additionally, the successful implementation of green initiative, such as green servitization towards achieving sustainable performance has also faced challenges in recent time as most Malaysian manufacturing firms have failed in the adoption in aligning green practices to the Malaysian Standard ISO14001 which is the standard that should be used by organizations to comply with environmental performance. Previous study showed that only 19% of the Malaysia manufacturing firms comply with this standard due to its certification requirement (Khan et al., 2019). Based on this, there is a dire need for a more sustainable production process, such as green servitization that will encourage the successful adoption and implementation of ISO14001 of the Malaysian Standard as proposed in the present study.

OBJECTIVE OF THE STUDY

The general objective of the present study is to determine the effect of green servitization on manufacturing firms in Malaysia via the moderating role of MS: ISO14001.

LITERATURE REVIEW

The term servitization serves as transformation process of a manufacturer mainly from selling a product-oriented activity towards a more service oriented one. The study by Vandermerwe and Rada (1988) identified that servitization evolved in three overlapping stages that is encouraged by fierce competition, forces of technology, as well as globalization pressure, such as product or services, product + services as well as product + services + self-service + support+ knowledge. Baines and Lightfoot (2014) stated that servitization serves as the innovation of firm's capabilities vis a vis processes to migrate from selling mere goods to integrated ones along services that offer value when being used. Also, it is a strategy used by firms that perceive service provision as major or important to their future. Nevertheless, the main aim of servitization is shifting the value chain in order to generate revenue streams over the entire product lifecycle. Additionally, the concept of servitization involves the innovation of firms' capabilities as well as processes to better create mutual value by moving away from selling products to what is known as Product-Service Systems (Turunen & Neely, 2012). The study by Ahamed et al. (2013) suggested that a servitized offering involves bundling of product as well as services mainly to meet customers' requirements. On the other hand, the process entails transition face to the stage where firms perpetually innovate new services as well as to add value to its core product, which will in turn reveals a firm to be a value provider. More so, the servitization of industrial firms indisputably has consequences on key competences and human resources management (Lay, 2014).

Servitization strategy has been suggested to favour the achievement of environmental performance. As such, there is need for firms to change their business models in order to reduce the adverse impact of manufacturing firms on environment. Therefore, in order to reduce environmental impact of products, firms need to change their business model for better sustainable environmental performance (Habidin et al., 2015; Pistoni & Songini, 2017). More so, there have been studies that have identified problems associated to traditional utilities, and as such the service utility has been penned to provide adequate solutions to the transition of the energy (Helms, 2016).

On the other hand, Product-Service System (PSS) concept evolution can be said to be a combination of productization as well as servitization. As identified by S.D.S.R et al. (2016)) who started the idea of Hybrid value creation as the concept of generating more value through innovatively attributing services and products together. Furthermore, integrated solutions, as well as manufacturers service strategy (Kowalkowski et al., 2017; Mastrogiacomo et al., 2018), service infusion (Kowalkowski et al., 2012) and integrated solutions (Brady, Davies & Gann, 2005) are commonly employed to explain the concept of combining the service and product in order to offer competitive offering to the customer.

Green servitization is defined as the process of introducing environmentally friendly service or solution in place of tangible production processes that is capable of reducing emission, energy, waste as well as remediation of site and restoration, recycling of raw materials, repair and maintenance management as well as water conservation (Marić & Opazo-Basáez, 2019). Green servitization is a form of a service solution which aims at reducing environmental impact through cost of production during production process through implementing waste reduction, energy efficiency, water conservation as well as green technology. The main purpose of this is to provide intangible solutions in place of tangible ones in order to enhance product and also serve as alternative for traditional production process so as to generate additional revenue for the organization.

Green resources have often been suggested to provide better environmental performance when implemented successfully in the operations procedure of the firm (Singh *et al.*, 2020). Similarly, a firm with green resources capability will possess better solutions in solving green operational issues and have new ideas that can provide green practices which will improve and sustain the performance of the firm (Fernando *et al.*, 2019).

METHODS

This section explains the methodology used in this research. It involves an extensive review of the literature to determine scholarly views on the effect of servitization as well as green servitization on manufacturing firms in the Malaysian context. From this, a conceptual framework is developed to show the direction in which the realisation of green servitization can be achieved.

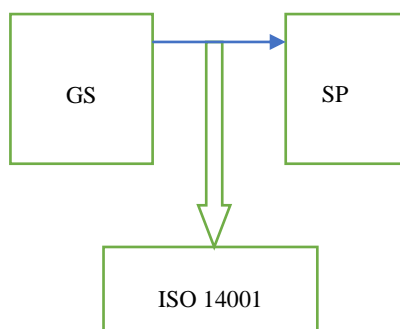


Figure 1. Conceptual Framework

The conceptual framework of this study is depicted in Figure 1 to show the variables independent (Green-Servitization) and dependent (Sustainable Performance) as well as explaining the relationship that exists between them (Review Criteria, 2001) with a moderating variable of ISO14001. There are positions from past literature which believed that the successful adoption and implementation of ISO14001:2015 standard operational as well as evaluation standard at every level of organization is important in developing firm's internal competence and capabilities for green initiatives (Campos *et al.*, 2015). It is believed that the regulation requirement will force firms to align its operation to the certification process of ISO14001 (DSM, 2009) as well as the management of employees to achieve sustainable performance (Johl & Khan, 2020; Singh et al., 2020).

DATA ANALYSIS

Secondary data are used for the present study. Previous studies on servitization as well as green servitization and other closely related topics were studied to determine the effect of green servitization on manufacturing firms in the Malaysian context.

DISCUSSIONS

Based on the preliminary review carried out in the present study, it is found that the government of Malaysia is focused towards employment of green technology optimisation which is capable of assisting the manufacturing industry to innovate products attributed with less environmental impact as well as improving socio-economy of the society (Fernando & Yahya, 2015). However, the manufacturing firms possess limited capabilities to manage green technology, such as renewable energy (RE) internally, so they are currently gaining suppliers' supports or trust to help the manufacturing firms towards the implementation of green initiative and energy management. Thus, it is confirmed that there is a need for the implementation of green services such as green servitization as proposed by the present study in order for them to be sustainable in the long run.

Conversely, the activities of manufacturing firms have always involved delivering of services that includes supplying spare parts, training employees, installing equipment, or providing customer support. Majorly, firms seek new ways to differentiate their business in competitive markets by increasing their focus on services as well as product-service systems, which are

often regarded as servitization. Despite the focus, previous literature revealed that manufacturers frequently struggle to servitize. This is due to the fact that while many PSS or new service concepts are developed, but the implementation fail once they are delivered to the market. While manufacturers often struggle to launch new offerings, they fail to achieve servitization's strategic aims. Many times, the business model and logic of manufacturers may often be sound enough to benefit from product-based opportunities but may not be sufficient enough to take advantage of current market opportunities for servitization, even if those are evident. As such, there is need for firms to reconfigure elements of their business model, ranging from conventional business development. Hence, it is evident that servitization as a term is multi-dimensional, and organization-wide challenge to the managers which charged them with its design as well as implementation, thereby require a comprehensive conception in the form of a business model perspective.

CONCLUSION

The present study concludes that services combination along products are seen as important aspect to industrial success in the 21st century. As such, green servitization could become the strategy needed for service integration into the core production of manufacturing firms in order to enhance the competitive position, thereby enabling the firms to improve their performance. Conversely, increasing competition in the market as well as narrowing down in product and technological differences among manufactures have created an opportunity for servitized strategy in manufacturing activities to generate competitive advantage as well as differentiation. In light of this, the present study attempts to show the green servitization related constructs where strategy service infusion and integrated solutions could serve as alternative for manufacturer's effort in adding services to their core offering of production process via the successful implementation of ISO14001. Furthermore, profitability and business growth are key expectations or essentials of servitized manufactures, therefore green initiatives in the form of green servitization could be seen to achieve this objective. Lastly, existing literature argues that green servitization is positively linked with the business growth, but profitability enhancement becomes inconclusive. As such, green servitization can be used to generate competitive advantage and differentiate the manufacturers from the competitors. Nevertheless, there could not be any indices in existing literature to measure the green servitization as most previous studies only measured servitization. Hence, further study could attempt to develop empirical indices to measure green servitization.

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