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THE EFFECT OF INNOVATION IN BUSINESS MODEL, SERVICES AND TECHNOLOGY ON FIRM SUSTAINABILITY: AN EXAMINATION USING TRIPLE BOTTOM LINE THEORY

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ABSTRACT

Recent studies have suggested one way to strengthen firm sustainability is through innovation. Innovation can be very flexible as it can be applied to many different aspects, such as the innovations in products or services, technology, marketing, or the business model itself. This study examines the effect of innovation on firm sustainability. Specifically, this study examines the effect of innovation in the aspects of business model, services, and technology on the sustainability of a company in the retail and merchandise industry. Using a questionnaire survey distributed to the employees of the company as the research instrument, this study shows that innovations in services and technology do impact firm sustainability. However, the findings also show that innovation in the business model does not impact firm sustainability. The findings of this study contribute to the literature and provide further evidence of the importance of innovation in increasing firm sustainability. In addition, the findings may also provide companies with a broader perspective on how innovation can affect their sustainability.

Contribution/Originality: This study is one of few studies to examine the link between innovation in the aspects of business model, services, and technology on the sustainability of a company in the retail and merchandise industry.

1. INTRODUCTION

The challenges of operating a business are frequently viewed from the perspective of the efficiency and effectiveness of the management process. To those who are not directly involved in business, the challenges are usually seen to revolve around the outcome of making money. However, for those who are involved, profit is not the only element to be focused on; there are other important elements, such as a strategic management process, the uniqueness of services or products, customer satisfaction, and research and development, to name a few. One of the most important elements in operating a business is firm sustainability.

Innovation can contribute to firm sustainability. In business, the meaning of innovation is flexible; it can be applied to many different aspects, such as innovations in products or services, technology, marketing, or the business model itself. The lifespan of an organization does not merely depend on how much profit it makes, it also depends on how the organization is managed and the continuous flow of ideas and strategies to keep the business in operation. As innovation is a great tool for boosting a firm's performance and reputation, it can strengthen the firm's value and

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help to ensure sustainability. However, not all companies will succeed in their innovation strategy. In order to succeed, companies need to achieve proper planning and implementation, regardless of the nature of their business.

The retail industry is a growing industry that contributes significantly to the economic growth of Malaysia. In 2018, the retail sales growth was 4.5% (RM108.3bil) higher than in the previous year (The Star, 2019). This shows that the retail industry contributes to strengthening the nation's economy. Retailers include various types, such as convenience stores, specialty stores, department stores, supermarkets, discount stores, catalog showrooms, non-store retailing, chain stores, shopping malls/centers, and superstores. One company in the retail industry is ABC Sdn Bhd.

ABC Sdn Bhd is a clothing retail company that was established in 2015. The nature of its business is to retail garments and related accessories and merchandise its products. All its products are imported from overseas, and ABC Sdn Bhd sells its products in its outlets all across Malaysia. At the end of 2018, the company underwent a big change when it introduced a new innovative platform in their business that they marketed as a cost-efficient and environmentally-friendly way to allow customers to co-create or customize their own apparel.

According to the CEO of ABC Sdn Bhd, they took this innovative step in parallel with the growing economy of Malaysia as they are moving towards embracing industry 4.0, as well as the digital economy. The innovative platform utilizes digital technology by providing printing and imaging services to customers so they can design their own shirts. However, this innovative step was not well-implemented, as the company's sales dropped drastically in early 2019. Consequently, some outlets were forced to shut down, the machines that had been bought for the printing services remained unproductive, and, even worse, the company was having difficulties paying their staff due to their high liabilities. Innovation drastically changed the sales pattern and caused ABC Sdn Bhd to suffer complications. This raised the question of how innovations can impact firm sustainability.

This study examines the impact of business model innovation, service innovation, and technology innovation on a firm's sustainability. The findings provide a deeper understanding of the importance of the business model, services, and technology to firm sustainability. The remainder of this paper is organized as follows. Section 2 presents a review of the literature relevant to this study. This is followed by Section 3, which explains the research design. Section 4 presents the results, and Section 5 concludes the paper.

2. LITERATURE REVIEW

Sustainability can be defined as the ability to maintain something in the long term without risking being unable to meet people's future needs (Garbie, 2016). It requires the management and coordination of financial, environmental, and social demands to ensure responsible, ethical, and ongoing success.

The three pillars that form the triple bottom line (TBL) of sustainability are economic, environmental, and social demands – informally known as profits, planet, and people. The earliest studies on sustainability frameworks focused only on the economic benefits of firms without considering the environmental and social issues involved in the firm's life cycle (Cui, Zhai, Dai, Liu, & Zhang, 2019). The concept of the TBL was first proposed by Elkington (1997) to ensure the environmental and social values of firms were taken into account, rather than focusing solely on the economic value (Elkington, 1997). Subsequently, TBL became a common theory to guide the construction of corporate sustainability frameworks (Cui et al., 2019).

Since the theory was introduced in 1995, it has been used in various studies to measure the sustainability of organizations in different industries, such as manufacturing (Garbie, 2016), the horse industry (Rantala, Ukko, Saunila, & Havukainen, 2018), the hospitality industry (Njoroge, Anderson, & Mbura, 2019), high-tech firms (Cui et al., 2019), and various other types of companies (Islam, Hossain, & Mia, 2018; Tasleem, Khan, & Nisar, 2019). Based on this theory, three elements determine the sustainability of an organization: economic, social, and environmental issues. Many scales can be used to measure sustainability, such as overall performance, market development, and efficiency of resource management, to name just a few. Previous studies have also indicated that many different

factors affect the sustainability of organizations, such as innovation, strategic alliances, product life cycle (PLC), total quality management, technology management, and many more. In this study, the effect of innovation on the sustainability of a firm is explored. Innovation is separated into three aspects: business model innovation, service innovation, and technology innovation. Meanwhile, this study will use the overall performance of the firm as the measure of firm sustainability.

Business model innovation is the transformation from an existing business concept to a new concept. The system that a business or a firm regularly uses is exchanged for a new approach to the business moving forward. It occurs when an existing company revises its business model to impact its consumers in a different way, either by increasing loyalty and consumption among its current customers or by attracting new customers (Aghighi, 2015).

Business model innovation does not create new products or redesign them but focuses on redesigning the way the company presents its existing product. Business model innovation has also been described as adopting a new approach that is totally different from the current approach as a strategic move for the future of the business. Such innovation is critical to success in today's increasingly complex and rapid-changing environment (Giesen, Riddleberger, Christner, & Bell, 2010). Sustainable business models consider a wide range of stakeholder interests, including society and the environment. They are essential in motivating and applying corporate innovation for sustainability, incorporating sustainability into business determination, and they serve as a key element that provides a competitive advantage (Franceschelli, Santoro, & Candelo, 2018).

Franceschelli et al. (2018) studied the food industry in Italy. They suggested that business model innovation consists of several elements, including business management methods and a new value proposition, which are vital to enhancing the competitiveness and sustainability of a firm. Rantala et al.'s (2018) study of the horse industry confirmed that the more an operator values economic sustainability and institutional sustainability, the more likely it is to adopt business model innovation. Previous studies have thus shown that there is a significant relationship between business model innovation and sustainability in different industries and contexts. Hence, the following hypothesis is developed:

H1: Business model innovation has a significant impact on firm sustainability.

The service sector can be considered a country's major source of economic growth. This sector is growing consistently, and its growth results in value creation that differs from that of manufacturing organizations. The difference in value creation makes service innovation very relevant for future development (Rantala et al., 2018). Grocery retailers, for example, have become the largest market share of the retail industry in Turkey and contribute significantly to Turkey's economic growth. Because retailers have power over many aspects of business, including the supply chain, packaging choices, and the distribution system, retail companies have the capacity to significantly affect sustainability. In the context of the increasing digitalization of the market, people tend to evaluate the service they receive more than the product itself. For instance, a growing number of food delivery services, such as *Food Panda*, *Grab Food*, and *Dah Makan*, offer fast food delivery to customers. Instead of rating the food they have delivered, customers tend to prioritize the service they receive. On the other hand, the increase in online shopping has also increased the number of competitors and tightened the market in the service industry. These facts show that the service sector has become important and contributes significantly to economic growth around the world.

Tseng, Wu, Chiu, Lim, and Tan (2018) revealed five factors that positively affect firm performance and thus create a sustainable advantage. One of these factors is service innovation competitiveness. According to Tseng et al. (2018), a product or service can satisfy the needs of its potential customers by generating product benefits; hence, it can significantly affect the firm and contribute to continuous improvement, which, in turn, enhances the firm's sustainable competitiveness in the marketplace. According to Islam et al. (2018), when innovation is measured based on product, process, and services, the result reveals a positive relationship between innovation and sustainability.

The findings of Enquist and Sebhatu (2018) showed that service innovation and quality improvement are interdependent because both factors are part of overall sustainability practice. The results of the discussed studies

suggest that service innovation and sustainability have a significant relationship. Hence, the following hypothesis is proposed:

H2: Service innovation has a significant impact on firm sustainability.

Technological innovation is a part of technological improvement that allows for the assessment and trial of new concepts or ideas at speeds and prices that were previously impossible (Goi, 2017). According to Cavaleri and Shabana (2017), in terms of innovation, there are two types of technology development. Sustaining or incremental innovation is about improving current technology and maintaining its progress, whereas disruptive or radical innovation offers new ideas and alternative solutions to the current technology. Technological innovation is considered key to various sustainability challenges, such as the circular economy, utilization of renewable power supplies, and climate change (Rantala et al., 2018). There are many real-world examples where great technological innovations were implemented, which, in turn, boosted firms' performance and enhanced the businesses' good name and reputation. The CEO of Huawei, Ren Zhengfei, recognizes "technology" as a vital aspect of Huawei's success. As an entrepreneur and an engineer, Ren has his own ideas on how to blend the technological element with business sustainability. Ren focuses on technological innovation by recruiting more research-oriented staff; 48% of his employees are situated in research and development (R&D) departments spread across over 40 countries (Li-Hua & Lu, 2013).

A study by Singh, Murty, Gupta, and Dikshit (2012) provided an overview of several sustainability indices, which included knowledge, innovation, and technology. One of the dimensions of the Technology Achievement Index is the proportion of high- and medium-technology exports in goods exports and the diffusion of recent innovations (Singh et al., 2012). This is in line with the concept of technological innovation affecting the sustainability of performance. Cui et al. (2019) studied the assessment of sustainability performance in high-tech firms using a hybrid approach. They found that the strongest influence of technological innovation was on the socio-environmental aspect that reflects the measuring level of corporate sustainability performance. Hence, the following hypothesis is developed:

H3: Technological innovation has a significant impact on firm sustainability.

3. RESEARCH DESIGN

3.1. Sample Selection

The target respondents for this study were employees of ABC Sdn Bhd from various departments, including accounts, sales, marketing, products, merchandising, and IT. Since ABC Sdn Bhd had made a big change and innovated aspects of the company including its services, technology, and even business model, the whole organization was involved, whether directly or indirectly. With their different job scopes, employees could provide responses regarding the impact of innovation on the company. The employees were suitable respondents for this study as they understood the innovation implemented by the company and how it affected the sustainability of the firm, including the economic, social, and environmental elements.

Sekaran and Bougie (2016) provided a table that listed suitable sample sizes for specific population sizes. According to the table, a suitable number of respondents for a sample size of 124 would be between 80 and 108.

3.2. Research Instrument

This study utilized a questionnaire as the research instrument. The questionnaire consisted of five sections. Section A requested the respondents' demographic information, such as gender, age, religion, education level, working experience, position level, and their department in charge. Section B required the respondents to provide their perception of the overall performance of the firm's sustainability. The questions covered the three elements of sustainability, namely the economic, social, and environmental aspects, with nine questions in total. This part used a five-point Likert scale ranging from '1' (strongly disagree) to '5' (strongly agree).

In Section C, the questions related to the first independent variable: business model innovation. This section required respondents to provide information and opinions regarding to what extent they thought the business

model innovation affected their firm's sustainability. There were five questions in this section, and each question used a five-point scale ranging from '1' (strongly disagree) to '5' (strongly agree). Next, questions on the second independent variable – service innovation – were asked in Section D. In this section, respondents were required to provide information about their perception of the effect of service innovation on their firm's sustainability. There were four questions in this section, and the respondents' answers were based on a five-point scale that ranged from '1' (strongly disagree) to '5' (strongly agree).

Lastly, in Section E, the respondents were asked about the last independent variable, technology innovation. Respondents were required to provide information regarding their perception of the effect of technology innovation on the firm's sustainability. This section consisted of five questions and also used a five-point Likert scale ranging from '1' (strongly disagree) to '5' (strongly agree).

3.3. Data Collection Procedure

The questionnaires were distributed to the respondents using Google's online survey form, as well as by email and the *WhatsApp* application. Of the 124 respondents who were contacted, 90 responded.

4. RESULTS

Table 1 describes the results of the descriptive statistics of the dependent variable, firm sustainability. Firm sustainability was measured based on the overall performance of the firm in terms of economic, social, and environmental aspects. The descriptive statistics included the means, which display the average score of each item, and standard deviations (SD), which measure the spread of the data from the mean.

Table 1. Descriptive statistics of firm sustainability.

List of Items	Mean	SD
1. Our product's cost is comparative to that of similar units of competitors (or service providers).	3.58	0.783
2. There was a decrease in the proportion of the total cost to net sales (services or products) after innovation.	3.13	0.786
3. Most of the new products we have introduced are successful.	2.98	0.812
4. Despite focusing on profit, our innovation of products/services also focuses on customer satisfaction.	4.00	0.826
5. Our organization chose a perfect time to market new products to the public.	3.96	0.706
6. Our organization provides an adequate training and development program for its employees.	3.67	0.826
7. The company's projection budget includes a significant amount of funds for waste management.	3.73	0.915
8. There is a decrease in the percentage of waste and rework processes.	3.47	0.894
9. Most of our new and existing products/services include environmentally friendly elements.	3.69	0.763
Firm Sustainability	3.58	0.578

Based on the result, only one item, which was "Despite focusing on profit, our innovation of products/services also focuses on customer satisfaction" achieved a mean of 4.00. The means of the remaining items ranged from 2.98 to 3.96. On average, the mean score was 3.58, indicating that the respondents had a neutral perception of the company's overall performance. Table 2 provides the descriptive statistics regarding business model innovation. As the table shows, the highest mean was 4.62 for the item "Business model innovation is designed in response to the market circumstances," while the lowest mean was 3.69 for the item "Our organization is able to identify new opportunities in order to maintain its position in the market." The average mean score was 4.08, and there were no missing values for this variable. Hence, it shows that the respondents agreed with the perception that business model innovation was one of the most important types of innovation for their organization.

Descriptive statistics of business model innovation.

List of Items	Mean	SD
1. Business model innovation is designed in response to the market circumstances.	4.62	0.614
2. Business model innovation is designed to gain competitive advantages.	4.38	0.614
3. Our organization aims to implement multiple innovations annually.	3.93	0.780
4. Our organization introduces innovations that are completely new to the market.	3.80	0.726
5. Our organization is able to identify new opportunities in order to maintain its position in the market.	3.69	0.733
Business Model Innovation	4.08	0.476

Table 3 presents the descriptive statistics for service innovation. The results show that the highest mean score for service innovation was 3.93 for the item "Service innovation also emphasizes meeting customer needs and ensuring satisfaction," which shows that the respondents agreed with this item. The mean scores ranged from 3.31 to 3.93, with an overall mean score of 3.66. This result indicates that the respondents somewhat agreed that service innovation was an important type of innovation for the organization in embracing sustainability.

Table 3. Descriptive statistics of service innovation.

List of Items	Mean	SD
1. The development of new products or services is one of the organization's goals.	3.64	0.857
2. Service innovation also emphasizes meeting customer needs and ensuring satisfaction.	3.93	0.720
3. Service innovation helps to create a competitive advantage for the organization.	3.76	0.712
4. Higher prices through service differentiation create a competitive advantage for the organization's advancement.	3.31	0.949
Service Innovation	3.66	0.577

Table 4 shows the results of the descriptive statistics for the third independent variable, technology innovation. The highest mean was 3.71 for the item "There is an increase in the use of the latest technological innovations in our current and/or new products," meaning that the respondents somewhat agreed that there was an increase in technology innovation in their organization. The lowest mean was 3.36 for the item "The processes are designed, maintained, and upgraded with technological solutions to cope with the business needs at all times." The overall mean for this variable was 3.56, which indicates that the respondents had a neutral perception of the importance of technology innovation in embracing organizational sustainability.

Table 4. Descriptive statistics of technology innovation.

List of Items	Mean	SD
1. The organization continuously raises the level of newness (novelty) to compete for market advancement.	3.64	0.743
2. There is an increase in the use of the latest technological innovations in our current and/or new products.	3.71	0.757
3. The organization has developed technological competitiveness in its operations and processes.	3.58	0.690
4. The organization constantly incorporates technological innovations in its processes to improve product quality and reliability.	3.49	0.787
5. The processes are designed, maintained, and upgraded with technological solutions to cope with the business needs at all times.	3.36	0.773
Technology Innovation	3.56	0.609

Table 5 presents the results of the reliability test for all variables. The results show that the values of Cronbach's alpha for firm sustainability, business model innovation, service innovation, and technology innovation are all above 0.70; specifically, they are 0.876, 0.724, 0.707, and 0.870, respectively. Therefore, Cronbach's alpha results in this study indicate that the items are reliable to measure each variable examined.

Table 5. Reliability test.

Variables	Cronbach's alpha	Number of items
Firm sustainability	0.876	9
Business model innovation	0.724	5
Service innovation	0.707	4
Technology innovation	0.870	5

Table 6 presents the results of the normality test of this study. As the table shows, the values of skewness and kurtosis for this study range from -0.318 to 0.739. This shows that the mean scores of firm sustainability, business model innovation, service innovation, and technology innovation are normally distributed.

Table 6. Normality test.

Variables	FS	BMI	SI	TI
Skewness	-0.318	-0.0275	0.677	-0.244
Std. Error of Skewness	0.354	0.354	0.354	0.354
Kurtosis	0.660	0.680	-0.266	0.739
Std. Error of Kurtosis	0.695	0.695	0.695	0.695

Note: FS: Firm Sustainability; BMI: Business Model Innovation; SI: Service Innovation; TI: Technology Innovation.

Table 7 presents the results of the correlation analysis that was used to examine the relationship between business model innovation and firm sustainability. Table 7 reveals a Pearson correlation result of 0.375, which shows that business model innovation has a moderate positive relationship with firm sustainability ($r = 0.375$, $p < 0.05$). This implies that an increase in business model innovation would result in a moderate increase in firm sustainability and vice versa.

Table 7. Business model innovation and firm sustainability.

Variable		Firm Sustainability	BMI
Firm Sustainability	Pearson Correlation	1	0.375[*]
	Sig. (2-tailed)		0.011
BMI	Pearson Correlation	0.375[*]	1
	Sig. (2-tailed)	0.011	

Note: * indicates significance at 0.05; BMI: Business Model Innovation.

Table 8 shows the results of the correlation analysis between the second independent variable, service innovation, and the dependent variable, firm sustainability. The result shows that service innovation has a significant positive relationship with firm sustainability ($r = 0.550$, $p < 0.001$). This implies that an increase in service innovation would result in a considerable increase in firm sustainability.

Table 8. Service innovation and firm sustainability.

Variable		Firm Sustainability	SI
Firm Sustainability	Pearson Correlation	1	0.550[*]
	Sig. (2-tailed)		0.000
SI	Pearson Correlation	0.550[*]	1
	Sig. (2-tailed)	0.000	

Note: * indicates significance at 0.001; SI: Service Innovation.

Table 9 presents the results of the correlation analysis between technology innovation and firm sustainability and indicates that technology innovation has a significant positive relationship with firm sustainability ($r = 0.500$, $p < 0.001$). This implies that there is a strong relationship between technology innovation and firm sustainability and that an increase in technology innovation would result in a considerable increase in firm sustainability.

Table 9. Technology innovation and firm sustainability.

Variable		Firm Sustainability	TI
Firm Sustainability	Pearson Correlation	1	0.500*
	Sig. (2-tailed)		0.000
TI	Pearson Correlation	0.500*	1
	Sig. (2-tailed)	0.000	

Note: * indicates significance at 0.001; TI: Technology Innovation.

Table 10 summarizes the multiple regression results of the model and the statistics for its overall fit. As the table shows, the R^2 value is 0.405. This indicates that 40.5% of the variation in firm sustainability is explained by the variations in business model innovation, service innovation, and technology innovation. An F-test was used to assess the overall significance of the model and indicate whether there was a linear relationship between the independent variables and the dependent variable. Based on the F value, the model is deemed significant [$F_{(3,41)} = 9.312$, $p < 0.001$], indicating that at least one of the independent variables has a significant linear relationship with firm sustainability.

Table 10. Multiple regression.

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	**Std. Error**	**Beta**		
1	(Constant)	0.503	0.667		0.753	0.456
	BMI	0.178	0.162	0.147	1.099	0.278
	SI	0.356	0.143	0.355	2.488	0.017
	TI	0.294	0.127	0.310	2.318	0.026
R-Square (R^2)		0.405				
Adjusted R Square		0.362				
F Value		9.312				
Sig.		0.000				

Note: BMI: Business Model Innovation; SI: Service Innovation; TI: Technology Innovation.

The results in Table 10 reveal that the p-values of service innovation (p-value = 0.017) and technology innovation (p-value = 0.026) are both less than 0.05, providing evidence that service innovation and technology innovation affect firm sustainability at the 5% significance level ($\alpha = 0.05$). Therefore, H2 and H3 are supported. Meanwhile, business model innovation has a p-value of 0.278, which is higher than 0.05, which implies that business model innovation does not significantly affect firm sustainability. As such, H1 is not supported. The multiple regression equation of the model is as follows:

$$\text{Firm Sustainability} = 0.503 + 0.178\,(\text{BMI}) + 0.356\,(\text{SI}) + 0.294\,(\text{TI}) + \varepsilon.$$

5. CONCLUSION

The main objective of this study was to examine the effect of innovation on firm sustainability. This study has specifically narrowed the scope of innovation to three types, namely business model innovation, service innovation, and technology innovation. The results of the descriptive statistics for firm sustainability indicated that the respondents had a neutral perception of the firm's overall performance. The initial prediction of this study was that innovations in the areas of business model, service, and technology would all significantly affect firm sustainability.

The results showed that business model innovation did not have a significant effect on firm sustainability. According to Bocken, Short, Rana, and Evans (2013), the existing framework for business model innovation tends to focus only on specific dimensions of sustainability (i.e., environment and economic value). Likewise, it fails to stimulate a holistic view that includes all three dimensions of sustainability within the business planning process. Another possible reason for the insignificant result was the company's current condition. At the time of the study, the company was not in a strong position, mainly due to changes in its business model. Hence, the responses from

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the respondents might have been influenced by the situation.

The results further revealed that service innovation had a significant impact on firm sustainability. This indicates that when the company implemented service innovations, it positively affected sustainability. Innovation, including new products, services, and processes, may reduce environmental impacts by focusing specifically on the environmental dimension of sustainability (Silvestre & Tirca, 2019). In this study, the measurement of sustainability included all three elements. Thus, service innovation affected not only the environmental element but also the economic and social elements.

Finally, the results showed that technology innovation had a significant impact on firm sustainability. This implies that when the company implemented technology innovations, such as that involving machines, software, applications, and others, it had a positive impact on firm sustainability. Atalay, Anafarta, and Sarvan (2013) stated that technological innovation comprises product and process innovation and has a significant effect on firm performance. In addition, the result may be explained by the characteristics of the industry, which might be a contributing factor to the success of technological innovation and the strengthening of a firm's sustainability. In this study, ABC Sdn Bhd implemented the use of machines and sophisticated technology to design its product. Thus, the implementation of new technology affected the operation and performance of the company as a whole.

This study has contributed additional findings to the existing literature relating to innovation and sustainability. It has focused on a single industry – retail and merchandise. Moreover, this study has found that the difference in its results is due to contributing factors such as the research gap, the current condition of the firm, and the evaluation of each element of sustainability. This study will prove useful to various parties, including academicians, existing businesspeople, and those aiming to start a business. It provides them with a bigger picture of many aspects of firm sustainability.

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