

The Impact of Product and Process Innovation on Performance of Small Enterprises

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Abstract

Small enterprises are important for the development of any country as they assist economic growth and create employment opportunities for urban and rural communities. Small enterprises employing low levels of labor productivity and low technology use, shortage of skilled workers and skills mismatches, inability to retain permanent staff due to local talent migration, low financial ability and shortage of capital, management and marketing constraints, poor infrastructure and forging relationships with multinational companies. Innovation is an important factor that small enterprises need to consider in order to keep their company performing well, competitively and innovatively despite all the challenges. This study aims to examine the effect of product innovation and process innovation on small enterprise performance. A total of 53 usable questionnaire responses were returned in this study consisting of small companies represented by the owners of the company. Descriptive results showed a high value of mean scores for all variables. Furthermore, the findings of correlation analysis showed a positive significant value, $r=0.508$ ($p<0.05$) between process innovation and innovation performance, whereas the multiple linear regression model is, $R^2=0.264$ ($p<0.01$). The model was proven a significant impact of process innovation on innovation performance for the small enterprises. While low- or medium-sized companies may lag behind large firms in product innovation, they often excel in process innovation. The combination of product and process innovations significantly enhances performance, with a stronger emphasis on process-oriented improvements aimed at boosting productivity and quality rather than product development.

1. Introduction

Malaysia's economy is predominantly driven by small and medium enterprises (SMEs). These small enterprises play a crucial role in the development of any nation by fostering economic growth and creating job opportunities for both urban and rural communities. Entrepreneurs not only establish new businesses but also enhance employment opportunities, leading to innovations, new technologies, and groundbreaking discoveries (Nadzri, Shamsudin, & Sabri, 2014). Innovation is often perceived as a positive force, contributing to robust growth and

economic development, and enabling some companies to outperform others (Rousseau, Mathias, Madden, & Crook, 2016). This study examines the current trends in product and process innovation and their impact on the performance of small enterprises in Malaysia. There are 907,065 SMEs operating in Malaysia, representing 98.5% of the total number of businesses. Among these, micro enterprises constitute 76.5%, small-sized companies make up 21.2%, and medium-sized companies account for 2.3% (BH Online, 2019). Recognizing the significance of innovation for SME performance, the government allocated 5.1% of its financial expenditure in 2015 to technology application and innovation programs (SME Corporation Malaysia, 2015). Through the National Entrepreneurship Policy 2030 (DKN 2030), the government aims for SMEs to contribute over 50% to the Gross Domestic Product (GDP) and 30% of total exports by 2030. In 2018, SMEs contributed 38.3% or RM521.7 million to the GDP, up from RM491.2 million the previous year, and accounted for 17.3% of the country's total exports (BH Online, 2019).

SME Corporation Malaysia has been tasked by the government to lead, drive, and support the development of SME innovation through the Certification Innovation for Enterprise Rating and Transformation Program (1-InnoCERT), launched in 2010. An incentive worth RM45 million in the form of Innovation Vouchers has been allocated by 1-InnoCERT to certified SMEs to facilitate their business activities, including research and development (R&D), advertising and promotion (A&P), certification and quality management systems (QMS), packaging, as well as product improvement, process, and production capabilities. As of December 31, 2017, SME Corporation Malaysia had issued Innovation Vouchers worth RM19.2 million to 67 SMEs (SME Corporation Malaysia, 2018b). In 2019, the government committed RM13.7 billion for 164 SME and entrepreneurship development programs implemented by various ministries and agencies, including 28 programs focusing on innovation and technology, with financial commitments amounting to RM148 billion (BH Online, 2019). According to the Global Innovation Index 2019, issued by Cornell University, INSEAD, and WIPO, Malaysia's innovation level ranked 32nd globally, up three places from the previous year. However, the assumption that innovation leads to competitive advantage and better company performance is not always valid; for instance, an economic downturn can alter the demand curve for all companies and expected market demand may fail to materialize (Rousseau *et al.*, 2016). Additionally, companies' innovation activities are sometimes driven by external factors, including customer requests, competitor actions, or government policies (Pragojo, 2015). This study aims to investigate the level of innovation among small enterprises and determine whether product and process innovation affect their performance.

One of the major concerns for companies is the impact of innovation on their performance, whether it leads to improvement or not. An extensive review of past and recent literature reveals that the relationship between innovation and the business performance of small enterprises remains unclear. Previous research findings indicate that the results are inconsistent and mixed (Wahab & Ahmad, 2017). It has been found that innovative activities do not necessarily correlate with higher profits (Koellinger, 2008). Small enterprises often face challenges such as low labor productivity, limited technology use, a lack of skilled workers, skills mismatches, difficulty retaining permanent staff due to local talent migration, low financial capacity, capital shortages, weak management and marketing capabilities, inadequate infrastructure, and underdeveloped relationships with multinational companies (Abidin, Suradi, & Mustafa, 2017). However, these weaknesses can be mitigated if management can identify the factors that influence the company's innovation capabilities and performance. The ability to innovate and apply new technologies is crucial for business growth. SMEs can respond and adapt to business changes and new technologies more quickly due to their smaller scale of operations (SME Corporation Malaysia, 2018a). Nevertheless, the primary barrier to innovation for SMEs is the high cost, which can impact their performance positively or negatively. Additionally, SMEs need to be educated about the importance of innovation to transition towards Industry 4.0 rather than remaining in conventional business practices. The benefits of moving towards Industry 4.0 include increased flexibility, productivity, efficiency, and reduced time in market processes (SME Corporation Malaysia, 2018b). While the use of the latest technology can enhance company performance, the associated costs must be carefully considered.

SMEs need to enhance the quality of local products to meet international standards. According to Special Officer of the Deputy Prime Minister and Home Minister, Colonel (K) Datuk Juhari Janan, improving product quality will enable local products to be marketed and compete globally (Utusan Borneo Online, 2016). One key issue to address in achieving food quality standards is product presentation, including packaging that lists ingredients and expiration dates. Additionally, food manufacturers must be creative and continuously diversify their products (Utusan Borneo Online, 2016). This approach aims to boost company performance and facilitate entry into international markets. Therefore, this study examines the influence of product and process innovation on the performance of small enterprises. There are four types of innovation: product innovation, process innovation, market innovation, and organizational innovation (Adnan & Ahmad, 2016). This study focuses on product and process innovation within the manufacturing sector, as these are commonly implemented by SMEs (Adnan & Ahmad, 2016). Performance is categorized into four types: innovation performance, production performance, market performance, and financial performance (Susanto & Wasito, 2017). This study specifically considers innovation performance, market performance, and financial performance, as these are influenced by

product and process innovation (Rajapathirana & Hui, 2018). Small enterprises are chosen over medium-sized and large companies due to the limited research on small enterprises, with most studies focusing on SMEs.

2. Literature Review

2.1 Firm Performance

Performance refers to the outcomes achieved by a company (Kim-Soon *et al.*, 2017). Researchers recognize that performance is a complex and multidimensional concept (Wolff & Pett, 2006). Performance measurement involves assessing the input, output, or activity level of a work process (Saunila, Pekkola, & Ukko, 2014). Company performance can be enhanced through technical and administrative innovations, among other factors (Saunila *et al.*, 2014). The concept of company performance primarily focuses on the ability of a company to efficiently utilize available resources to achieve success in line with its objectives, while also considering its relationship with consumers. According to Kim-Soon *et al.* (2017), performance encompasses all aspects of a company's success and activities. Saunila *et al.* (2014) suggest that effective performance measures can guide managers' behavior to improve critical aspects of company results, such as profitability, cash flow, new product development, and staff development. This is because if managers implement the right and effective strategies, the company's performance will improve over time. The performance of small enterprises is evaluated based on their ability to meet internal and external goals. Typically, a company's capabilities are assessed through its performance (Kim-Soon *et al.*, 2017). For instance, if a company's performance is not satisfactory, its capabilities are considered weak. Companies that innovate tend to perform better compared to those that do not, as innovation helps meet market demands and customer needs, thereby increasing revenue through higher customer purchases (Wahab & Ahmad, 2017). Since product innovation and process innovation have distinct characteristics, each type of innovation may impact company performance differently under various circumstances (Rousseau *et al.*, 2016).

There are four types of company performance: innovation performance, production performance, market performance, and financial performance (Susanto & Wasito, 2017). These performance types help determine whether small businesses are in good, medium, or poor condition. Additionally, firm performance can be categorized into three main areas: innovation performance, market performance, and financial performance (Rajapathirana & Hui, 2018). Innovation performance is a composite construct based on various related metrics such as new patents, new product announcements, new projects, new processes, and new organizational arrangements (Kim-Soon *et al.*, 2017). It also includes new product sales, market share of new products, timely launches of new products, and the percentage of new product sales in total sales (Susanto & Wasito, 2017). Market performance is measured by the extent to which small enterprises achieve market-related results compared to their competitors, including customer satisfaction, new customer acquisition, and customer loyalty (Rajapathirana & Hui, 2018). Financial performance refers to sales value, sales growth, and gross profit (Susanto & Wasito, 2017). The performance of small enterprises can be classified into financial and non-financial performance (Kim-Soon *et al.*, 2017).

2.2 Innovation

Innovation involves transforming new knowledge into new products and services, applying creative solutions to problems and opportunities to enhance or enrich human life (Jamaludin *et al.*, 2017). It is a sequential process encompassing idea generation, utilization, implementation, creation, selection, development, and marketing (Abidin *et al.*, 2017). Innovation is perceived as the creation of new products or processes, offering better quality or value for products and services (Wahab & Ahmad, 2017). It also involves creating new ideas and implementing them, as the best organizations acquire creative ideas and utilize them effectively. This ensures that companies maximize their advantages and innovate efficiently. In a competitive and ever-changing market, companies that fail to innovate struggle to survive and compete (Susanto & Wasito, 2017). This is because they do not create new products or enhance product quality to attract customers. Employee involvement in idea generation provides management with better opportunities to improve the company's innovation capabilities (Abidin *et al.*, 2017). Management should consider and highlight ideas from all employees, not just dismiss them as ordinary contributions. Innovation aims to achieve new developments or practical applications of new ideas, extending beyond mere idea generation to achieve organizational objectives in the market (Abualloush, Bataineh, & Aladwan, 2016). Saunila, Pekkola, and Ukko (2014) emphasize that innovation is a crucial determinant of company performance. It is often seen as a positive force, contributing to strong growth and economic development, explaining why some companies perform better than others (Rousseau *et al.*, 2016). Customers seek new features and improvements in products, driving demand and satisfaction.

Innovation can be implemented in various forms, including product innovation, process innovation, organizational innovation, and market innovation (Kim-Soon *et al.*, 2017). This study focuses on product and process innovation. Adnan and Ahmad (2016) found that among SMEs, product innovation is the most

commonly implemented type, with 74.4% (206 companies) adopting it. Process innovation is implemented by 56.3% (156 companies), marketing innovation by 47.7% (132 companies), and organizational innovation by 11.6% (32 companies). It can be concluded that product and process innovations are the most recognized types that enhance company performance (Rousseau *et al.*, 2016). These innovations have dominated previous studies due to their strategic value in providing a competitive advantage (Pragojo, 2015). Innovation is crucial not only for large companies but also for small enterprises (Rosli & Sidek, 2013). Small companies are ideal for developing innovations that do not require substantial capital (Susanto & Wasito, 2017). However, some small enterprises struggle to innovate due to the need to allocate capital for other purposes. At the company level, innovation refers to the acceptance and implementation of new ideas leading to the development and launch of new products (Kim-Soon *et al.*, 2017). This innovation enables companies to respond to and adapt to environmental changes, finding new market opportunities and exploiting their capabilities more effectively than competitors (Wahab & Ahmad, 2017). Developing stronger SMEs requires significant innovation and change in the manufacturing sector, where over 90% of SMEs in Malaysia operate (Kim-Soon *et al.*, 2017). Researchers agree that innovation in the manufacturing sector differs from other sectors, involving changes in products or goods and the methods of production and delivery, which are interpreted as product and process innovations (Rajapathirana & Hui, 2018). Both technical and company-level innovations are essential for improving performance and increasing company value (Saunila *et al.*, 2014). In the food and beverage sector, innovation is a complex process from raw material use to the final product supplied to consumers. Therefore, small enterprises have significant potential to implement innovation along the supply chain (Adnan & Ahmad, 2016).

2.2.1 Product Innovation

Product innovation aims to alter the physical and performance characteristics of commodities or services by improving, developing, or producing alternatives or entirely new products (Abualloush *et al.*, 2016). It involves creating new products from new materials and modifying existing products to meet customer satisfaction, such as upgrading existing product versions (Kim-Soon *et al.*, 2017). Abualloush *et al.* (2016) describe product innovation as activities related to developing new commodities and services or enhancing existing ones. This type of innovation is crucial as it is a primary strategy for achieving competitive advantage and improving company performance (Wahab & Ahmad, 2017). Product innovation includes changes in the products and services offered by a company, such as new car designs and new insurance packages for vulnerable babies (Rajapathirana & Hui, 2018). Companies can implement product innovation by expanding existing products, increasing product value, and adding new elements and technical specifications (Rajapathirana & Hui, 2018). These activities impact company performance, potentially leading to either success or failure and affecting performance positively or negatively. In the food industry, product innovation can be achieved by introducing new flavors, expanding existing product lines, and changing product packaging to attract customers (Adnan & Ahmad, 2016). Product improvements and new products developed by small businesses can open doors to new customers and markets (Wolff & Pett, 2006). This demonstrates that product innovation in enhancing product quality can create opportunities for new markets. Product improvements and new products help maintain company momentum, becoming market leaders and driving sales growth (Wolff & Pett, 2006). Therefore, adding new elements and technical specifications to products can enhance company performance by maintaining momentum at a certain level. One competitive advantage of product innovation is that customers can perceive clear value, prompting them to make purchasing decisions (Pragojo, 2015). Generally, product innovation attracts more attention in innovation studies compared to process innovation, as it is more visible to customers and has the potential to open new markets, especially in the manufacturing sector (Pragojo, 2015). In conclusion, product innovation plays a vital role in ensuring that products continue to be accepted by consumers.

Previous studies have examined the impact of innovation on the performance of small enterprises (Saunila, Pekkola, & Ukko, 2014). Research focusing on the innovation-performance relationship generally provides a positive assessment, indicating that higher innovation leads to improved performance in small enterprises (Kim-Soon, Ahmad, & Ibrahim, 2017). However, this research is often conceptual and tends to focus on a single type of innovation rather than considering both product and process innovations together to investigate their combined impact on small enterprise performance. The application of innovation can provide economic benefits, competitive advantages, and positively impact the performance of small enterprises (Wahab & Ahmad, 2017; Rajapathirana & Hui, 2018). The success of new product innovation is typically judged by its ability to meet sales objectives and drive stock market growth (Rousseau, Mathias, Madden, & Crook, 2016). New products can increase sales by offering better performance, such as enhanced reliability or durability, improved features like integrated convenience, and superior aesthetics compared to existing products offered by competitors (Pragojo, 2015). Through innovation, product quality can be further improved, contributing to the company's performance and ultimately making it more competitive (Rosli & Sidek, 2013). Since product and process innovations have different characteristics, each type can affect a company's performance in distinct ways (Rousseau *et al.*, 2016). Rajapathirana and Hui (2018) found that product innovation increases profitability.

Additionally, research on SME firms in Dubai has confirmed a significant and positive relationship between innovation and business performance, with other researchers supporting this finding (Wahab & Ahmad, 2017). Based on previous studies and findings on the relationship between product innovation and firm performance, the hypothesis of this study is constructed as follows:

H₁: Product innovation has a significant relationship with small enterprise performance.

2.2.2 Process Innovation

Process innovation involves developing new processes or improving existing ones in the production of goods and services, leading to cost reduction, time savings, and enhanced quality and flexibility (Abualloush, Bataineh, & Aladwan, 2016). Jamaludin, Ahmad, and Ibrahim (2017) describe process innovation as changes in the way products and services are created and delivered, such as modifications in manufacturing methods and equipment used to produce cars, or changes in office procedures and sequencing in insurance cases. Process innovation encompasses fundamental changes in manufacturing, production, distribution, and management methods within a company (Abualloush *et al.*, 2016). Examples of process innovation include adopting the latest technology, investing in new facilities, owning patents or proprietary information, and innovating in the manufacturing process (Wolff & Pett, 2006). Additionally, process innovation involves implementing new or significantly improved production or delivery methods, including changes in techniques, equipment, and software. For instance, installing new or improved manufacturing technologies such as automation equipment or real-time sensors that can adjust processes, and computer-aided product development (Kim-Soon, Ahmad, & Ibrahim, 2017). Process innovation also includes introducing new elements like systems, equipment, materials, information, and work practices used to produce products or services (Rousseau, Mathias, Madden, & Crook, 2016). By enhancing the production process, companies can develop new products and practices, improving their ability to acquire and create new knowledge for future innovation cycles (Abidin, Suradi, & Mustafa, 2017).

The objective of process innovation is often to improve efficiency and reduce operating costs within a company. This suggests that the benefits of such innovation are more evident in financial measures, such as return on assets and net profit, rather than market-facing measures like revenue growth (Rousseau, Mathias, Madden, & Crook, 2016). Empirical evidence shows that process innovation positively impacts production efficiency and productivity. One advantage of process innovation over product innovation is its concealment within the company, making it difficult for competitors to imitate (Pragojo, 2015). In other words, process innovation remains private and undisclosed to the public. Companies that innovate tend to have higher productivity and economic growth compared to those that do not (Saunila, Pekkola, & Ukko, 2014). In this study, innovation refers to a company's ability to find new or improved ways to identify, acquire, and perform tasks related to processes, products, services, management systems, organizational structures, and marketing methods (Wahab & Ahmad, 2017).

Process innovation is an effective driver for improving the innovation and business performance of small enterprises (Rajapathirana & Hui, 2018). Enhancing the performance of small enterprises through innovation strategies is closely linked to process innovation (Susanto & Wasito, 2017). Therefore, it is expected that profits from process innovation will positively impact company performance (Rousseau *et al.*, 2016). This demonstrates that process innovation influences company performance. It increases profitability and efficiency, revealing that the key drivers of both product and process innovation significantly impact profitability (Rajapathirana & Hui, 2018). Process innovation has advantages over product innovation because the production process is confidential and hidden, making it difficult for competitors to replicate (Pragojo, 2015). Process innovation has a positive relationship with company performance, significantly impacting financial and innovation performance (Kim-Soon, Ahmad, & Ibrahim, 2017). However, some studies have shown opposite findings. For example, research on 23 sectors of the manufacturing industry in Taiwan found a significant negative relationship between process innovation and business performance. Other studies have found no significant relationship between process innovation and business performance (Wahab & Ahmad, 2017). Based on previous studies and findings on the relationship between process innovation and the performance of small enterprises, the hypothesis of this study is constructed as follows:

H₂: Process innovation has a significant relationship with small enterprise performance.

Figure 1 shows the relationship between product innovation and process innovation with the performance of small enterprises. The framework of this study is adapted from Wahab and Ahmad (2017).

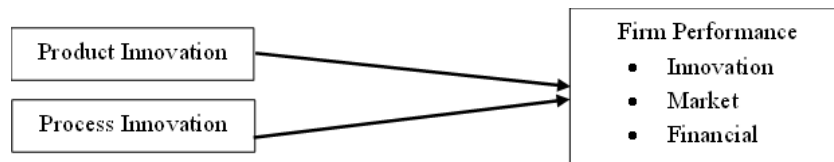


Fig. 1 Research framework

3. Methodology

This study focuses on small enterprises at the organizational level, with respondents represented by the owners of these enterprises. The population consists of 80 small manufacturing enterprises around Parit Raja, Johor. The researcher employed purposive sampling, a method chosen to fulfil the study's specific objectives, which could not be achieved using other sampling techniques (Noah, 2002). This technique is not considered random sampling; instead, the researcher selects respondents based on specific criteria (Lim, 2007). The study exclusively includes small enterprises around, justifying the use of purposive sampling. Survey questionnaires were distributed to small business owners through direct delivery and the drop-and-collect method. Some companies were contacted prior to face-to-face questionnaire submission. The questionnaire, constructed in Bahasa Malaysia, was distributed over three months from February to April 2020. It comprised three sections: Part A - demographics, Part B - product and process innovation, and Part C - firm performance. A 5-point Likert scale was employed for measurement. The items for product innovation were adapted from Rajapathirana and Hui (2018), while those for process innovation were adapted from Wolff and Pett (2006). Respondents answered four questions regarding their beliefs about product and process innovation in small enterprises. The scale for product and process innovation ranged from 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly Agree. As for the firm performance, items were adapted from Rajapathirana and Hui's study (2018) where respondents rated their company's performance over the past three years on a scale from 1=Very Unsuccessful, 2=Unsuccessful, 3=No Change, 4=Successful, and 5=Very Successful.

The collected data were processed using the Social Science Statistical Package (SPSS) software to analyze the frequency, percentage, mean score, correlation, and impact of the studied variables among small enterprises. The analyses included descriptive statistics, reliability analysis, normality tests, correlation analysis, and multiple linear regression. The mean score values were categorized using Konting's (1990) scale: low (1.00-2.33), moderate (2.34-3.67), and high (3.68-5.00). The reliability of the research instrument was assessed by determining the reliability coefficient, which ranges from 0.00 to 1.00 (Lim, 2007). A high reliability coefficient indicates high reliability, with a coefficient approaching 1.00 signifying that the instrument accurately measures the variable of interest. Conversely, a coefficient approaching 0 suggests questionable reliability (Lim, 2007). The reliability coefficient scales used in the study were: 0.90-1.00 = Very Good, 0.80-0.89 = Good, 0.60-0.79 = Medium, 0.40-0.59 = Doubtful, and 0.00-0.39 = Denied. Normality tests were conducted to determine if the data were normally distributed, which is necessary for parametric tests such as ANOVA, Pearson Correlation, and T-Tests (Utah, 2013). Normality tests were conducted using SPSS. The figures and visuals displayed must be investigated using either the Skewness and Kurtosis methods, Kolmogorov-Smirnov and Shapiro-Wilk tests, or histograms, Q-Q plots and box plots.

Correlation analysis is used to measure the strength of the linear relationship between two variables represented by the letters x and y and whether the relationship is positive linear correlation, negative linear correlation and no correlation (Utah, 2013). There are two types of correlation tests namely Pearson and Spearman. The strength of the relationship between the two variables studied is determined through the coefficient r which takes a value between -1.00 to +1.00 and the signs (-) and (+) indicate the direction of the relationship where (-) indicates an inverse relationship and (+) indicates a direct relationship (Lim, 2007). The strength magnitude of coefficient r can be interpreted by using the following scales; 0.80-1.00 (Very Strong), 0.60-0.79 (Strong), 0.40-0.59 (Medium), 0.20-0.39 (Weak), and 0.00 - 0.19 (Very Weak). Regression analysis is statistical procedures used to predict and explain the value of a dependent variable based on the value of one or more independent variables (Noah, 2002). Regression is a method that makes it possible to make assumptions about dependent values between two variables and is done when there is a less than perfect relationship between the variables involved (Yahya *et al.*, 2007). This test allows to predict the values of one variable if it is known or can be estimated from other variables (Utah, 2013). The accuracy of the assumption depends on the strength of the relationship between the two variables (Yahya *et al.*, 2007). Multiple linear regression is a statistical technique that allows to guess the score on one variable as a basis for the score on several other variables (Utah, 2013). A pilot study, also known as a feasibility study, is a small-scale preliminary study conducted before the main research to evaluate the feasibility, time, cost, risk, and adverse events involved in a research project. Conducting a pilot study is essential as it helps identify potential issues in the research design, refine data collection procedures, and improve the overall study protocol, thereby increasing the likelihood of success in the main study. Pilot studies also provide preliminary data that can help in estimating the appropriate

sample size and budget for the full-scale study. The Cronbach's Alpha for the pilot study from 30 respondents for product innovation, process innovation and innovation performance scored the values above 0.70 (0.733, 0.799, and 0.748 respectively) while market performance and financial performance were below 0.60 which are 0.103 and 0.246 respectively. Due to their low values, these two items were discarded from further analysis. After carrying out the reliability test, this study needs modification to the model because the market performance and financial performance were found to have very low Cronbach's Alpha values. Therefore, market performance and financial performance were released from the framework and the new modified framework is shown in Figure 2.

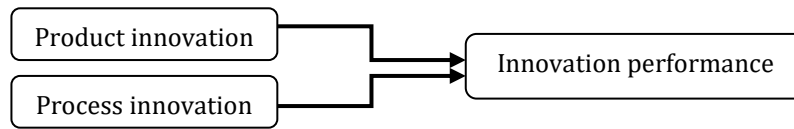


Fig. 2 Modified research framework

4. Results and Findings

4.1 Demographic Statistics

The response rate is the percentage of respondents who fully-answered and returned the distributed questionnaire. 80 sets of questionnaires were distributed to small business owners and the total number of questionnaires that could be returned and re-collected was only 64 sets. Therefore, a total of 16 sets of questionnaires were not returned to the researcher. The final usable returned questionnaires are 53 which represents 66 percent of response rate. The percentage of questionnaires that cannot be used is 14 percent that equals 11 responses, because they do not meet the criteria required in this study such as the position in the company and the number of full-time employees. The questionnaire cannot be used if the position in the company is other than the owner of a small enterprise and the number of full-time employees is less than 5 people because it is categorized as a micro enterprise. All of the respondents are small business owners who answered the questionnaires that have been distributed and there is no involvement from small business employees. The demographic profile shown in Table 1 of the 53 small business owners in Batu Pahat reveals that all respondents are owners, with no workers among them. The number of full-time employees varies, with the most common being 5 employees (22.6%), followed by 10 and 50 employees (15.1% and 15.0%, respectively). The majority of businesses are fully owned by Bumiputra (77.0%). In terms of years of operation, 55.0% have been in business for less than 5 years, 26.0% for 5-10 years, and 19.0% for over 11 years. This shows that new entrepreneurs ventured into the field of small enterprises in the last 5 years. Initial paid-up capital is predominantly less than RM 5,000 (47.0%), with equal proportions (25.5%) having RM 5,001 to RM 10,000 or more than RM 10,001. This shows that the majority of small businesses start their business with a small initial capital amounting to RM 5,000. Based on the observation, some owners do not have large capital and cannot get allocation from any party such as help from the government. It can be observed that their company uses old and small machines in the production of products and the quantity produced is not so much. Most respondents (89%) have never received government incentives, while 11% have received them once. Among those who received incentives, 50% received contributions, 33% received government support, and 17% did not specify the type. Specifically, 33 percent, i.e. 2 small enterprises answered the government, 50 percent i.e. 3 small enterprises answered donations while 1 small enterprise i.e. 17 percent did not specify the type of incentive received. Contributions obtained from small business owners from the Department of Agriculture and RISDA.

Table 1 Demographic profiles of respondents

Demography	Item	Frequency (n=53)	Percent (%)
Position	Owner	53	100.0
	Worker	0	0.0
No. of full-time employees	5	12	22.6
	6	1	1.9
	7	3	5.7
	9	1	1.9
	10	8	15.1
	12	1	1.9
	13	1	1.9
	15	3	5.7
	16	1	1.9
	20	4	7.5

	21	1	1.9
	25	3	5.7
	27	1	1.9
	30	4	7.5
	35	1	1.9
	50	8	15.0
Enterprise ownership	Fully owned by Bumiputra	41	77.0
	Non-Bumiputra	12	23.0
Years of operation	Less than 5 years	29	55.0
	5 – 10 years	14	26.0
	11 years or older	10	19.0
Initial paid-up capital	Less than RM 5,000	25	47.0
	RM 5,001 to RM 10,000	14	25.5
	RM 10,001 or more	14	25.5
Receiving government incentive yearly	1 time	6	11
	2 times or more	0	0
	Never	47	89
Types of government incentives received	Government	2	33
	Contribution	3	50
	Not Specified	1	17

4.2 Descriptive Analysis

The responses from small business owners in Batu Pahat indicate a high level of product, process, and innovation performance which can be seen in Table 2, 3 and 4. For product innovation, the average score is 4.11, with high ratings for expanding existing products, increasing value and quality, adding new elements, and making technical specifications. Process innovation also scores high, with an average of 4.14, reflecting the use of the latest technology, investments in new facilities, ownership of patents, and innovations in the manufacturing process. Innovation performance is similarly rated high, with an average score of 4.17, highlighting the creation of new quality products, technological competitiveness, accelerated introduction of new products, and the creation of completely new products. Small businesses globally tend to focus on enhancing existing products and adding new features to stay competitive. High scores in product innovation, like those in Batu Pahat, are common in regions with strong support for small businesses and access to market insights. The adoption of new technologies and investment in modern facilities are crucial for maintaining efficiency and competitiveness. Regions with robust infrastructure and access to technological advancements often report high levels of process innovation. The overall impact of innovation on business performance, such as creating new products and improving technological competitiveness, is a key indicator of a region's innovation ecosystem. High scores in innovation performance are typically seen in areas with supportive policies, access to funding, and a culture that encourages innovation.

Table 2 Descriptive statistics for product innovation

Item	Mean (μ)	Std. Deviation (σ)	Level
PDI1 The company has expanded existing products.	3.89	0.70	High
PDI2 The company has increased the value and quality of existing products.	4.11	0.70	High
PDI3 The company adds new elements to the products it produces.	4.26	0.76	High
PDI4 The company makes technical specifications for the products it produces.	4.17	0.80	High
Total Average Score	4.11	0.74	High

Table 3 Descriptive statistics for process innovation

Item	Mean (μ)	Std. Deviation (σ)	Level
PCI1 The company has and uses the latest technology to produce products.	4.23	0.61	High
PCI2 Companies make investments in new facilities such as technology or new machines to produce products.	4.11	0.70	High
PCI3 The company has made ownership of patents or other proprietary information.	4.15	0.72	High

PCI4 The company has carried out innovations in the manufacturing process	4.08	0.68	High
Total Average Score	4.14	0.67	High

Table 4 Descriptive statistics for innovation performance

Item	Mean (μ)	Std. Deviation (σ)	Level
IP1 Innovation creates new quality products.	4.19	0.62	High
IP2 Innovation helps technological competitiveness	4.08	0.65	High
IP3 Innovation helps accelerate the introduction of new products	4.13	0.73	High
IP4 Innovation creates a completely new product	4.26	0.76	High
Total Average Score	4.17	0.69	High

4.3 Correlation and Multiple Linear Regression Analysis

The Cronbach’s Alpha values for the actual study as a whole are over 0.60. The actual study involved 53 respondents with four items each variable. It was found that the reliability coefficient ranges from 0.60 to 0.79 (product innovation, $\alpha=0.630$; process innovation, $\alpha=0.709$; innovation performance, $\alpha=0.651$), the reliability for this research instrument is moderate. This means that the sample obtained can be considered and reliable for further analyses. The normality testing using skewness and kurtosis proved a non-normally distributed data. The normality testing showed using skewness and kurtosis values did not meet the requirements of the range between ± 2.00 and ± 5.00 respectively with standard error of 0.327 and 0.644 respectively. A non-parametric test using the Spearman Rho Correlation should be used based on the normality test analysis which shows the non-normal data distribution. Table 5 shows the value of the correlation coefficient, r for product innovation is 0.07 and this value is not significant at $p<0.05$. This insignificant value shows the relationship between product innovation and innovation performance for the small enterprises is very weak, but the relationship is found to be positive. While there is a significant relationship between process innovation and innovation performance at $p<0.05$, the correlation coefficient value, $r=0.298$. Therefore, this proves that this relationship is at a weak level and that the relationship is positive between process innovation and the performance of small enterprises.

Table 5 Spearman correlation

	(1)	(2)	(3)
(1) Product innovation	1	.379**	0.07
(2) Process innovation		1	.298*
(3) Innovation performance			1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

In order to answer hypothesis 1 and 2, regression analysis needs to be carried out to test the hypothesis. The multiple linear regression analysis results from SPSS can be referred to Table 6, 7, and 8. Referring to the Model Summary table (Table 6), the statistical report on the measurement of 'goodness of fit' is called the coefficient of determination, expressed in the symbol R^2 which is the $R^2 = 0.264$ and the value of R^2 can be between 0.000 to 1.000. The conclusion shows a 26.4% (0.264×100) change in company performance in the variation of product innovation and process innovation.

Table 6 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.514a	0.264	0.235	0.42449	0.264	8.972	2	50	0.000

The next element is referring to the ANOVA table (Table 7). The regression test refers to the calculation of the estimated slope. The value of the F statistic is 8.972 at a significant level of $p<0.01$. Based on Table 8, it was found that only one variable contributes to the performance of small enterprises and process innovation provides a high contribution to the Beta value of 0.482 with a significant p value at the $p<0.01$ level. This means that process innovation has an impact and effect on the performance of small enterprises. Therefore, small enterprises need to focus on the dominant predictor which is process innovation that affects the performance of small enterprises compared to product innovation. With the findings thus supporting the H_2 , where process innovation has a significant relationship with small enterprise performance specifically innovation performance,

while on the other hand H₁ is not supported, where product innovation hasn't had a significant relationship with small enterprise performance specifically innovation performance.

Table 7 ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.233	2	1.617	8.972	0.000
Residual	9.01	50	0.18		
Total	12.243	52			

Table 8 Multiple linear regression

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	Beta	Std. Error			
(Constant)	1.995	0.563		3.541	0.001
Product innovation	0.042	0.132	0.045	0.320	0.750
Process innovation	0.482	0.137	0.491	3.524	0.001

5. Discussion and Conclusion

The findings indicate that small enterprises exhibit a high level of product innovation, underscoring its significance. Similarly, the mean value for process innovation is also high, highlighting its importance for small businesses. This suggests that small business owners prioritize innovation to enhance their company's performance. This observation aligns with Adnan and Ahmad (2016), who found that product innovation is the most frequently implemented type of innovation among food and beverage manufacturing SMEs, followed by process innovation. Additionally, Kim-Soon *et al.* (2017) reported that SMEs in Johor are proactive in both product and process innovation, which significantly contributes to their performance. These businesses should focus on reforming production and quality management systems, as well as updating routines, procedures, and processes to foster innovation. Developing new products can enhance customer acceptance and satisfaction, while improving the quality of manufacturing components and materials can further refine existing products. Moreover, the study reveals that innovation performance also exhibits a high degree of central tendency, indicating that the performance level of small enterprises is consistently high. This suggests that the innovation performance of these companies has been strong and stable over the past three years. This finding supports the research by Susanto and Wasito (2017), which emphasizes that continuous innovation efforts lead to superior performance in manufacturing SMEs. Overall, innovation significantly influences the performance of these businesses, demonstrating that company innovation can directly enhance performance.

The multiple linear regression analysis demonstrated a significant impact of both product and process innovation on innovation performance. However, only process innovation significantly contributes to the innovation performance of small enterprises. This finding suggests that process innovation is more influential than product innovation, likely due to the critical nature of production processes, such as the choice between human labor and machinery. While product innovation did not show a significant relationship with innovation performance, process innovation did. Rajapathirana and Hui (2018) found that innovation activities positively and significantly affect a company's innovation performance, with both product and process innovations being positively associated with company performance. They emphasized that product innovation is crucial for innovation performance, urging top management to enhance innovation capabilities for successful innovation implementation. Furthermore, Rosli and Sidek (2013) confirmed that both product and process innovations significantly impact company performance, which is beneficial in competitive environments. However, companies must carefully assess the actual impact of these strategic moves to determine their worth. SMEs that have not yet undertaken innovation should consider the costs and benefits, as innovation can be costly in terms of R&D expenditure, personnel, and resource constraints. Therefore, SMEs should invest time and resources in gathering sufficient information about market demand, trends, competitors, and sources of innovation before making decisions. Gunday, Ulusoy, Kilic, and Alpan (2011) also supported the claim that product and process innovations in manufacturing companies positively and significantly impact innovation performance.

Product innovation is a crucial driver of innovation performance, serving as a bridge that amplifies the positive effects of process innovation on overall performance. Understanding the specific nature of innovation helps companies shape their market, production, and technology strategies, guiding subsequent actions. Rousseau *et al.* (2016) found that the combination of product and process innovations significantly enhances performance, with a stronger emphasis on process-oriented improvements aimed at boosting productivity and quality rather than product development. While low- or medium-tech companies may lag behind high-tech firms in product innovation, they often excel in process innovation. Process innovation focuses on refining production methods and techniques, leading to substantial cost savings and increased efficiency. By optimizing processes,

businesses can reduce waste, lower production costs, and improve overall productivity (Hall *et al.*, 2009). Implementing new processes also enhances a business's adaptability to market changes, allowing small businesses to respond swiftly to new opportunities or challenges, thereby maintaining their competitive edge (Hervas-Oliver *et al.*, 2014). Improved processes often result in higher quality products, ensuring consistent quality and enhancing customer satisfaction and loyalty (Martinez-Ros, 1999). Effective process innovation can lay the groundwork for product innovation, as new manufacturing technologies enable the development of more complex or higher-quality products (Marzi *et al.*, 2018). Additionally, process innovations can provide a sustainable competitive advantage by making it difficult for competitors to replicate the efficiency and cost benefits achieved through improved processes (Reichstein & Salter, 2006).

Business owners must be creative and innovative in their product offerings and should attend external courses to generate new ideas for product and process innovation. Additionally, they should consider input from their employees to enhance company performance. Small businesses need to consistently maintain the quality of their products to ensure they remain in optimal condition and retain customer trust. Companies should also innovate in line with technological advancements and market trends to stay competitive. The government should oversee existing small enterprises to ensure smooth operations and provide additional financial assistance or interest-free loan schemes to help them increase their capital for innovation. Furthermore, the government should encourage young entrepreneurs to enter the business field and organize programs to enhance the performance of small enterprises in the future. For future research, expanding the scope and sample size of studies can yield more accurate and comprehensive data. Additionally, focusing on larger industries, such as companies listed on the Malaysian stock exchange, can provide further insights.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Noor, Ahmad; **data collection:** Noor; **analysis and interpretation of results:** Ahmad, Kamaruddin; **draft manuscript preparation:** Kamaruddin, Ahmad. All authors reviewed the results and approved the final version of the manuscript.

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