

## Article

# An Analysis of Eco-Innovation Capabilities among Small and Medium Enterprises in Malaysia

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**Abstract:** The objective of this study is to look at how Malaysian small and medium enterprises (SMEs) are applying eco-innovation capabilities in order to sustain their business performance. Eco-innovation capabilities are represented in this study by five different types of practices, with the indication of unexpected circumstances: eco-product innovation, eco-process innovation, eco-organisational innovation, eco-marketing innovation, and eco-technology innovation. The qualitative research approach was used in the study, and the content analysis was based on in-depth interviews with six top-level managers/owners of Malaysian manufacturing SMEs. According to the data, more than half of SMEs acquired eco-innovation capabilities in order to continue their business performance and thrive in the business sector, while having to confront certain hurdles due to unforeseen situations. According to the findings, eco-innovation capabilities encourage SMEs to engage in waste management, recycling or reusing resources, research and development, sustainable goods that utilize customer requests, and the use of environment management machines. Thus, the findings of this study may aid the efforts of government agencies, policymakers, and top-tier manufacturing SMEs in building an exceptional innovation platform on which SMEs may rely for assistance and support in preserving their business performance in the future and beyond.

**Keywords:** eco-innovation capabilities; sustainability; small and medium-sized enterprise; business performance; Malaysia



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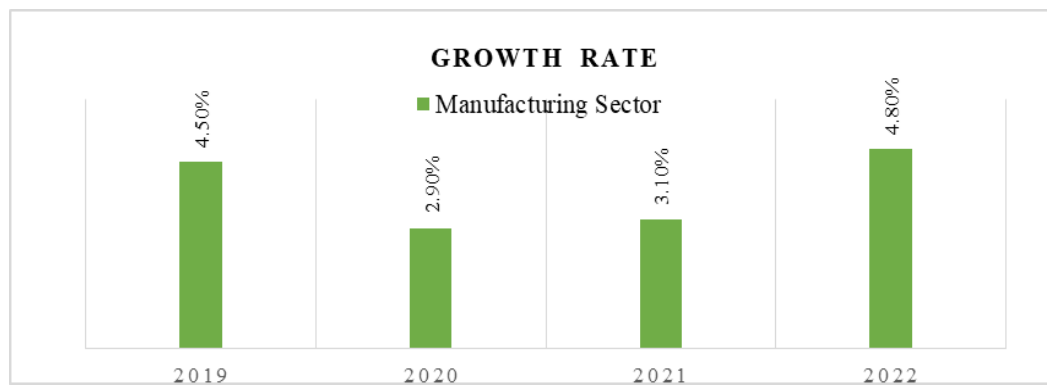
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## 1. Introduction

Recent environmental and economic developments, as well as disease outbreaks, are examples of risks that will have a significant impact on the globe in the next years (Kumar and Ayedee 2021). During this contagious outbreak, most firms throughout the world have taken steps to reduce their environmental effect while maintaining their business performance. Yet, due to the risks that have long-term impacts and ramifications, small and medium-sized firms (SMEs) are challenging to achieve market sustainability in terms of environmental and business performance. Entrepreneurs should produce innovative ideas for the survival of their operations in this sector without relying solely on government agencies or suppliers, who have also been harmed by this circumstance. The development of new ideas may result in expertise for SMEs' top management since they will know what to do with past talents in the future under unforeseen circumstances. It is critical for SMEs to be willing to assist policymakers with their environmental legislation in order to deal with the issues and negative consequences of the current scenario. It is a fact that SMEs dominate the economy and contribute significantly to national income and growth rates.

SMEs have traditionally been seen as the majority of businesses in Malaysia. The local and global economies depend on SMEs, which contribute more than 50 percent of the gross domestic product of Malaysia, along with other sectors and services (OECD 2021). According to the 2021 SME Annual Report, 97.4% of all businesses established in 2021 will be classified as SMEs. As a result of an unexpected circumstance in March 2020, the amount of total business was slightly lower than in 2019, which was 98.5% (Zulkiffli et al. 2022). The disease spread quickly, and Malaysian SMEs face certain challenges to overcome the impact of the risks and sustain business performance over a long period of time.

According to NSDC (2016), the level of technology in manufacturing companies is still classified as low-tech, inefficient, and outdated. In addition to that, because of the uncertainty of their financial situation and their inability to pay workers as usual, SMEs often decide to reduce the number of employees and terminate non-potential ones from their organisation. Limited workforce capacity also has an impact on the growth rate of economic activity in the manufacturing industry for SMEs, as they need to restrain their production and process according to the daily production schedule. This restriction has affected Malaysia's growth rate year by year. Figure 1 shows the percentage growth rate of the Malaysian manufacturing sector for the years 2019 to 2022.



**Figure 1.** The percentage of growth rate of the Malaysian manufacturing sector for 2019, 2020, 2021, and 2022; Source: Department of Statistics Malaysia (2021) and Department of Statistics Malaysia Official Portal (2022).

Figure 1 shows that the growth rate decreased to 2.9 percent in 2020 compared to 2019, which was before the unpredictable pandemic began. In 2021, businesses that make personal care products, medical equipment, food and drinks, and other things that humans need every day went back to business as usual, and the growth rate went up slightly to 3.10 percent. The contribution of SMEs was limited as they needed to go along with all of the government's rules, such as the movement control order (MCO). Manufacturing SMEs were told to close their factories and stop doing business as usual because they were not allowed to do their normal production tasks. In 2022, all sectors were given permission and allowed to work, which contributed to the growth rate going up to 4.80 percent. Despite the fact that SMEs are struggling to stay in business, they must develop new ideas and strategies to remain competitive in the industry and to enhance Malaysia's growth rate in the future. During the current pandemic, SMEs can develop eco-innovation capabilities in their manufacturing operations to become more competitive and improve business performance while also reducing their environmental impact.

According to Kemp and Pearson (2007), the definition of eco-innovation is the firm's capabilities in developing a product, a production process, or the adoption of organisational management that results in a reduction in environmental risk, negative impacts on the firm's resources, pollution, or any other relevant outcome. The development of new technologies that focus on controlling pollution, waste reduction, and sustainable environments is also considered an aspect of eco-innovation capabilities (Kemp and Pontoglio 2011).

This definition of eco-innovation capabilities has also been supported by the OECD (2009), which mentioned the ability in the expansion of products, processes, marketing strategies, and organisational management. The eco-innovation capabilities were also expected to play a role in enabling businesses to continue longer in the local and global sectors. In the previous study, eco-innovation has been highly emphasised as a crucial factor for manufacturing businesses in achieving environmental sustainability and business performance (Keshminder and Chandran 2017; Ch'ng et al. 2021; Ahmad and Wu 2022; Zulkiffli et al. 2022). SMEs have been focusing on developing eco-innovation capabilities within their businesses in order to achieve their goals and objectives. This is why developing eco-innovation capabilities is so important and has such a positive impact and value on manufacturing SMEs. Implementing eco-innovation capabilities that prioritise environmental sustainability increases SMEs' chances of competing with large businesses (Yan et al. 2022). In addition, local support, high flexibility, and exceptional resources are the most relevant factors for SMEs to develop eco-innovation capabilities during daily manufacturing operations (Pacheco et al. 2018).

According to Larbi-Siaw et al. (2022), eco-innovation capabilities is defined as the development of new or existing products, processes, organisational structures, and technologies that reduce pollution and risks to the environment. SMEs may pursue eco-innovation capabilities as a business strategy (Klewitz and Hansen 2014), aiming to improve manufacturer production efficiency and financial performance. Budgeting is important for SMEs in developing their business strategies, because without proper financial management, the business may go bankrupt and discontinue its operations. Investment in research and development (R&D) in a company becomes a necessary activity while implementing eco-innovation capabilities as it can improve environmental sustainability for products manufactured in the business (Cheng et al. 2014). It also becomes a tool for reducing gaseous carbon from the manufacturer's activities that may pollute the surrounding area (Gu and Wang 2018). According to observations, putting R&D into practice will win over society, as people today are conscious of the value of using environmentally friendly products. Customer suggestions or complaints direct SMEs to conduct R&D to meet what society wants. Ceptureanu et al. (2020) described how working together with organisations that care about the environment may help develop essential eco-innovation capabilities within the businesses and may sustain corporate performance.

The application of eco-innovation capabilities is expected to improve the management of liquid or solid waste and resource availability, as well as to reduce pollution during daily operations (Hojnik and Ruzzier 2016a; Sun et al. 2021). The contribution of SMEs to material recycling or reusing, as well as efficient processes, is regarded as a starting point for eco-innovation (Sehnem et al. 2022). This practice aims to minimise the usage of raw materials and primary energy, abandon solid or liquid waste, and improve the efficiency of daily production (Triguero et al. 2022). Recycling waste offers the potential for profit and reduces the amount of waste that must be handled or disposed of, thus lowering its environmental impact. Improved operational effectiveness and long-term sustainability can be achieved by implementing eco-innovation capabilities, which could also serve as a crucial indicator for carrying out a strong environmental strategy (Fethi and Rahuma 2020).

Previous research has found that recycling and reusing, research and development, and waste management are strongly related to the five dimensions of eco-innovation capabilities (Dong et al. 2014; Peng and Liu 2016; Liao and Tsai 2019; Toha et al. 2020). These practices are intended to guide SMEs towards a more sustainable environment and reduce pollution during the manufacturing process. SMEs may enhance well-structured firm production, business performance, process quality, and revenue generation for firm sustainability. Moreno-Mondéjar (2019) mentioned that "the most successful eco-innovators are the ones who have better performance in terms of their sales growth or profitability". The skills of employees in producing eco-friendly products and supplying them to consumers will allow for an increase in sales and guide SMEs to survive in this post-pandemic era.

Nonetheless, some manufacturing business managers were unaware of the positive outcomes of implementing eco-innovation capabilities, which can help an organisation become more environmentally responsible while improving business performance (Fernando et al. 2019). This study was conducted since few businesses or organisations have explored the eco-innovation capabilities of Malaysia's industrial sectors (Toha et al. 2020). The majority of businesses are still employing inefficient methods for innovation, which has a negative impact on business performance and creates an unsustainable environment. Thus, the focus of this research is on how SMEs in Malaysia's manufacturing sector can use eco-innovation as a way to improve business performance and protect the environment during the pandemic outbreaks. This study also highlights the following questions: "What type of eco-innovation capabilities have been adapted in the business?" and "How are SMEs in Malaysia implementing eco-innovation capabilities within their organisations to sustain their business performance?" The capabilities in adopting eco-innovation may support manufacturing companies in overcoming the challenges of environmental or economic changes. The development or upgrade of a firm's operating system may help it stay ahead in today's competitive world. It can also foster business growth, leading to increased market share, revenue, and customer satisfaction.

Six top-level managers/owners were interviewed to understand more about their opinions on the subject and to share their experiences with it. Additionally, the findings of this study will serve as a basis for recommendations to policymakers, government agencies, stakeholders, and top-level management of manufacturing SMEs to support their businesses by implementing eco-innovation capabilities as one of the strategies to sustain their business performance while facing the unexpected pandemic.

The structure of this article is as follows. Section 2 reviews the literature on SMEs in Malaysia, eco-innovation capabilities, and the use of resource-based view theory (RBV) as well. Section 3 discusses the step-by-step procedure and methodology used to create the content analysis. Section 4 presents the results of the analysis, a summary of the findings, and the relevant responses of the participants. Section 5 concludes and summarises the research and presents the study's limitations, which serve as a foundation for future research directions.

## 2. Literature Review

### 2.1. Small and Medium Enterprises (SMEs)

SMEs contribute significantly to global economic growth (Obi et al. 2018). According to commercial establishment reports, 99% of economic growth is contributed by SMEs (Adan and Hussain 2021). Along with offering support services and serving as a supplier to big businesses, SMEs also encourage the populace to develop their entrepreneurial abilities and help local businesses become big ones (Leonelli et al. 2019). SMEs also play a critical role in increasing business market competitiveness and helping to increase job opportunities while enhancing the corporate performance. This could reduce the level of unemployment in developing countries, especially among middle-class people who struggle due to the heightened cost of living and daily expenses. Gage (2012) reported that SMEs in the United States serve as incubators for employment and support innovations that function well in an economic environment. SMEs also relate to how well firms can expand into international trade and incorporate the novelty of innovations into their business operations (Luo et al. 2016). In responding to sustainability issues during the production process, SMEs have recognised the need to pursue green innovation (Alshebami 2023) and have also been dedicated to defining eco-innovation, which has been broadened and even used in scientific publications with different notions or terms such as "green", "eco", and "environmental innovation" in the literature (Díaz-García et al. 2015).

Green innovation is necessary for businesses such as SMEs to achieve sustainable development and success. The effectiveness of productivity within the firm can improve business performance and strengthen an organisation's business plan and strategy. Many SMEs are devoting their internal resources, such as employees, raw materials, and financial

resources, to implementing innovations in products, processes, organisation, and technologies (Kim and Hur 2021). However, developing innovation practices is not always successful due to limited resources or lack of budgeting, which can cause a company to stumble significantly and go bankrupt (Eisenmann 2021).

Therefore, previous studies have discovered a variety of practices that generate SMEs for successful green innovation, such as R&D investment (Yu et al. 2020; Taques et al. 2021); innovation planning and knowledge management (Kesidou and Wu 2020); and contribution with external investors (Alshebami 2023). Due to the disease outbreak and economic changes, government initiatives and encouragement in collaborating with SMEs make them vulnerable to surviving and remaining competitive against their competitors in the local and global market (Safari and Saleh 2020). SMEs tend to have a simpler business structure to ensure that innovation practices fit with the organisation's systems and plan. SMEs with a sharper green innovation orientation can employ the innovativeness of product, process, organisation, marketing, and technology to reduce negative environmental impacts and foster green entrepreneurship (Muangmee et al. 2021). Studies suggest that policymakers and manufacturing SMEs can refer to a decision-making model that may help to achieve superior environmental performances and a firm's proactive position (Jiang et al. 2018). Based on the above arguments, this study believes that SMEs will efficiently deliver green innovation that aims to minimise the impacts of the production process in the manufacturing industry as well as to increase business performance.

## 2.2. Eco-Innovation Capabilities

As a method of resolving environmental issues, eco-innovation capabilities have been proven to be successful (Zhang et al. 2017; Jin et al. 2022). Innovations that generate ecological improvements and help maintain a sustainable environment and performance are also classified as eco-innovations. The implementation of eco-products, eco-processes, eco-organisational, eco-marketing, and eco-technology implemented by manufacturing businesses is also examined as part of its eco-innovation capabilities (Rennings 1998; Hojnik et al. 2018; Nguyen and Adomako 2021). Firms are encouraged to protect the environment from the damaging effects of their manufacturing activities due to the current public pressure to meet consumer expectations and fulfil their desires for eco-friendly products (Zhang and Zhu 2019).

Eco-innovation is a process that involves not only the generation of new ideas but also the integration of existing resources able to capture the attention of customers in terms of their needs and desires for an eco-friendly product or innovative products. The manufacturing sector should constantly innovate their business processes, as customer needs are constantly changing according to current trends to move toward societal and environmental efficiency through eco-innovation (Yun and Zhao 2020). However, firms need to have strong and competent resources to face difficulties while implementing eco-innovation capabilities due to the high risk of an uncertain pandemic in the future. Before undertaking any innovation project, businesses must be aware of the resources they have available. This will help them prevent wasting any resources before, during, or after the production process (Sund et al. 2016). Understanding a firm's resources, such as capital, raw materials, and both skilled and unskilled labour, is crucial to the success of the company in the manufacturing industry since these three elements work together to produce high-quality production and corporate human resources (Ishola 2019). When the proper resources are supplied, overproduction and processing, and material, cost, and time waste, can be avoided. Businesses also need to grab any opportunities and transform them into business solutions to enhance productivity and profitability for their organisation (Wicaksono et al. 2021). Reduced environmental effects and risks, as well as improved internal business performance and management systems for businesses, are the goals behind eco-innovation capabilities (Zulkiffli et al. 2022).

The manufacturing sector in Malaysia is responsible for and must take action on 30 percent of the emissions of harmful and dangerous gases (Ch'ng et al. 2021). Adam and



Alarifi (2021) declared that a company's strategy and the innovation practices implemented by SMEs aim to tackle the challenges presented by any unexpected circumstances in the near future and beyond. To increase the quality of green products, manufacturing companies must implement eco-innovation capability in every process or product they manufacture. These practices will aid in sales growth and profitability, allowing SMEs to remain competitive in the market and industry sector while performing better in the industry. In fact, business performance has a significantly positive relationship with eco-innovation. This was proven in previous studies regarding the relationship between business performance and eco-innovation (Cheng et al. 2014; Dong et al. 2014; Geng et al. 2021; Yin et al. 2022). Eco-product innovation, eco-process innovation, eco-organisational innovation, eco-marketing innovation, and eco-technology innovation were classified as the main findings of the study, as Malaysian SMEs were shown to be capable of adapting any of the capabilities within their organisation.

Implementing eco-innovation in products may help with the eco-friendliness that many of today's consumers value. SMEs that have implemented eco-product innovation can boost sales and profit margins because consumers nowadays prefer to consume eco-friendly products. As a result of the authenticity of the manufacturing process and raw materials, there has been an increase in the number of people recommending eco-products (Johnstone and Tan 2015; Zhang et al. 2020). Individuals in Malaysia frequently consume manufactured organic foods from popular brands such as Biogreen, Love Earth Organic, and others that take sustainability and environmental awareness into consideration. It is obvious that increasing consumer willingness to commit is necessary to boost the use of eco-products (Wei et al. 2018). In fact, the quality of eco-products enables SMEs to become more successful and perform better.

Innovation practices can be achieved by adapting efficient eco-product innovation within the business firm (Maldonado-Guzmán and Garza-Reyes 2020). The manufacturing sector needs to produce a high-quality output that is less harmful to the environment and safe to be used by consumers. According to Yao et al. (2019), companies engaging in eco-product innovation may regard it as an opportunity and potential source of income for their company. For SMEs that experience financial limitations, innovation can be a preventative solution without restricting their economic activity. The findings of eco-product innovation revealed that firms are making extensive use of existing resources to reduce waste and save raw materials for the next daily operation. SMEs can still innovate environmentally friendly products as long as they have faith and confidence in the quality of their eco-friendly offerings.

To develop eco-product innovation, eco-process innovation can support companies in producing high-quality goods while also minimising pollution during the manufacturing process. Process innovations are generally associated with technological changes and the development of eco-product innovation for Malaysian SMEs. Negny et al. (2012) stated that eco-process innovation can reduce the cost of the production process, in addition improving the efficiency of eco-product innovation. Manufacturers have also focused on improving eco-process innovation to ensure the optimal use of existing resources within the organisation and minimise waste and pollution in their production processes (OECD 2018). The results of this study described how eco-innovation is developed in relation to resource-saving and recycling or reusing practices. The idea of recycling and reusing a product can also be considered an eco-product or eco-process innovation (Rama et al. 2022). For example, Apple uses recycled and also reused materials from existing products to process new products for their brand, as well as to practice sustainability in their businesses (Newsroom 2022). The efficiency of the process can assist SMEs in developing effective eco-products that attract consumers' satisfaction and awareness. This will increase the range of purchasing power among consumers.

A great innovation will not be achieved without a brilliant team in an organisation. A further form of eco-innovation capability is eco-organisational innovation. This eco-innovation emphasises the roles that a company's top-level management play in guiding

employees' decisions, distributing work among clients, and implementing environmental policies and guidelines to improve business performance and environmental impact. According to Novitasari et al. (2021), to reduce environmental impacts, entrepreneurs must participate in gathering information, provide training and education programmes to guide their firm's management in implementing green practices, and obtain environmental certification. It is a company's responsibility to build a great organisation that can achieve production targets, financial goals, human resource goals, and marketing goals with an eye to expanding resources and the firm's capabilities efficiently (Abeysekara et al. 2019). Sustainability requires action and involvement by researchers, governments, consumers, and others to promote eco-innovation for manufacturers to remain a priority and expand the production that minimises the environmental impacts (Tang et al. 2020).

Eco-organisational innovation refers to various ideas from owners and managers in developing any business strategies for the firm, such as product, process, marketing, or technology innovation, and others that may guide SMEs to meet value and advantages for the internal and external environment (Rodriguez et al. 2021). In a responsible business, the entire manufacturing staff must be aware of the pollution created by the manufacturer's processes and ensure that the liquid or solid waste from production is managed efficiently without causing any harm to the surrounding area. According to Zulkiffli et al. (2022), management and motivation from the owner or top level of management towards materials and wastes must continue indefinitely until Malaysian SMEs support and enable the development of eco-innovation capabilities within their organisations, which aims to decrease the pollution or damage to the natural environment.

Globally, the business sector is concerned about the techniques that can lead people to consume their products. Many business owners decide to invest more in eco-marketing innovation in order to achieve optimal business performance and repurchase by the consumer while maintaining awareness of the green environment (Katsikeas et al. 2016). The decision making in changes to pricing strategy, product design, branding, promotion, and packaging increases the value offered to fulfil the customer's demand (Varadarajan 2018; Islami et al. 2020). Marketing innovation also plays an important role in changing consumer behaviour and raising awareness about eco-innovation. The effects of eco-marketing innovation can also increase the manufacturing industry's competitive advantage. Customers are now more conscious about their needs and priorities for environmentally friendly goods (Ho et al. 2021). Green product awareness is essential for Malaysian manufacturing to rise above other manufacturing countries in terms of environmental sustainability. Hence, the level of sustainability pursued by the manufacturing sector can help to control pollution.

Innovation activities can also be boosted by developing a new technology that can modify and improve any eco-product or eco-process. Before proceeding with these innovations, entrepreneurs must understand their company's ability to identify the appropriate technologies they require in order to avoid resource waste, particularly in the financial aspect (Diaconu 2011). Malaysian SMEs are frequently disrupted when deciding to continue with their technological innovation, due to the high costs involved. However, there are some SMEs that have accepted this kind of challenge and continue pursuing their technological innovations. From January to December 2020, Malaysian Investment Development Authority (MIDA) received more than 900 applications for green technology projects that were in line with sustainable development goals (MIDA 2020). The adoption of eco-technology innovation intends to direct worker safety and health while using the machines during the manufacturing process. This can lower the number of workplace accidents and encourage workers to continue working and create the greatest environmentally friendly products for their clients' consumption. However, these eco-technology innovation activities can also enhance the process of producing high-quality products and ensure the efficiency of the manufacturing process. By concentrating on this, SMEs will be able to pursue innovative technologies and boost their competitiveness, even in the face of severe pandemic conditions in the future.

### 2.3. Business Performance

Since unexpected circumstances such as the COVID-19 pandemic broke out, the Malaysian government has put limits on business, letting only the most important and essential products go on. Manufacturing SMEs have seen their business performance go down because they cannot process the product well enough. Given how hard it is to work from home, SMEs have to accept that they have to limit their daily productivity in the factories. According to [Caputo et al. \(2019\)](#), business performance can be evaluated by accessing the application of financial measurement such as sales growth and net profit margin. To maintain business performance, SMEs may be able to increase profitability and sell their products more effectively by fostering, directly or indirectly, their resource capabilities towards eco-innovation. This point of view was supported by [Mouzas and Bauer \(2022\)](#) and delivered in a similar way in terms of increasing opportunities to make more profit to ease worries about long-term business growth. Business performance will be achieved with the support of the employees who work in market orientation and monitor businesses for environmental changes and consumer needs.

Therefore, in order to maximise profits, firms need to ensure the productivity of eco-product and eco-process innovation while simultaneously increasing customer satisfaction. In order to keep the business performance in good condition, environmental, economic, and social factors are considered. These three factors enable businesses to monitor their internal and external resources, allowing them to further their firm's sustainable planning ([Bacinello et al. 2021](#)). The stakeholders of all companies have a significant responsibility to fulfill in guaranteeing the long-term survival of businesses in manufacturing and other industries during the post-pandemic period. [Suroso et al. \(2017\)](#) described how knowledge and information are important to maintaining operations and assisting manufacturing firms in allocating resources effectively while maintaining performance. Every firm, particularly those in the manufacturing industry, should prioritise sustainability since it can help businesses succeed over the long term while also minimising their negative effects on the environment during the production process.

In fact, a lot of manufacturing firms have used eco-innovation approaches to maintain their business performance while also protecting the surrounding ecology. Previous research indicates that eco-innovation capabilities have a strong link to both environmental sustainability and better business performance ([Fernando et al. 2019](#); [Ch'ng et al. 2021](#)). There is also a study showing how important it is to evaluate business performance during the pandemic ([Oladimeji et al. 2020](#)). This can help businesses stay open longer during this time. Besides keeping an eye on how a manufacturing business process is going, firms need to take action as well as sustain environmental conditions.

### 2.4. Resource-Based View (RBV) Theory

This study thinks that the RBV can help companies understand how their competitive competencies can help them stay ahead of the competition and keep their business performance high over time. A previous study says that the RBV figures out and focuses on the best way for a company to manage its resources in order to build long-term competitive advantages and capabilities ([Wernerfelt 1984](#)). To develop and expand their unique resources, products, or services, manufacturing businesses need to have great ideas, since doing so can get the attention of the local and global market ([Pace 2016](#)). In this study, the RBV theory was applied to analyse how manufacturing SMEs in Malaysia sustain their business performance and competitiveness. RBV also assists SMEs to gain more sustainable competitive advantages along with a better understanding of the firm's management, which allows them to stay in the market for a longer period of time, especially during unceremonious outbreaks. For the purpose of this research, RBV theory will assist SMEs' performance as a measurement for the companies to explore more in their ability to have better business performance than their competitors. The commitment among the top management can have a bearing on the development of any changes that can assist the organisation in building up their abilities to comply with environmental regulations and



provide the necessary financial resources to enable firms to apply any innovative activity in their businesses.

In addition to that, according to Barney (1991), competitive advantage in terms of RBV can be measured through a firm's capabilities, which are enhanced by valuable resources such as skills, knowledge, assets, and expertise. Barney also stated that a company that meets the criteria of uniqueness, rarity, value, and non-substitutability can maintain long-term competitiveness. Employing RBV during this unpredictable phenomenon can help businesses find better and more appropriate resources to put new business practices into place. Manufacturing businesses, such as SMEs, must look for a chance or find a way to turn the problems caused by this unplanned pandemic into opportunities if it wants to keep its business performance up and stay competitive. SMEs can find out about all of the resource recognition capabilities before putting eco-innovation capabilities in their businesses. Moreover, SMEs must secure all the capable and qualified resources available within the organisation in order to increase their competence. The study of eco-innovation capabilities was supported by the RBV of the previous study, which had a significant positive result that eco-innovation can assist organisations to achieve business performance (Portillo-Tarragona et al. 2018; Zulkifli et al. 2022). This study can be accomplished with the assistance of the RBV and all of the factors of eco-innovation capabilities that lead to sustainable business performance among Malaysian manufacturing SMEs.

### 3. Results

As mentioned above, the data for this study are based on online interviews with six top-level managers of manufacturing SMEs in Malaysia. They were the participants who responded to the study inquiry presented on the topic. This study divided the content analysis into five major themes. The first theme examined the implementation of eco-product innovation. The second theme analysed the implementation of eco-process innovation, while the third theme analysed the implementation of eco-organisational innovation. The fourth theme considered the implementation of eco-marketing innovation, and the last one was the analysis of the implementation of eco-technology innovation.

#### 3.1. The Implementation of Eco-Product Innovation

The participants spoke about how the eco-product innovation was implemented because they wanted to fulfil customers' needs and wants. Innovation in green products was conducted almost every day, as it has become one of the main parts of their operations. Customers today are more loyal to products that are friendly to them and safe to use. Superior and unique products may help companies to retain their market position and profitability. They also help SMEs implement innovations in their products that reduce pollution to the environment. Two of the participants stated:

*"Our cake decoration powder is made from recycled cookies that have been unsold and crushed. We implement existing materials to avoid any waste of our main product, and all of our ingredients are made with natural materials that do not pollute the surrounding areas". (P1)*

One strategy used by the company to produce new products for their line of business is to base these products upon an already manufactured product. This will contribute to reducing the level of waste during the production process. Environmental laws also place responsibility and skills on the managers to comply with environmental performance while having new products in the manufacturing businesses.

*"Our firm is open to the people who did not want any of their old mattresses and sold them to us. We buy the old mattress and recycle it to make a new one. That is one of our specialties because we have a unique strategy to innovate from a rotten product to a new product". (P4)*

The above responses suggest that SMEs used existing materials to produce their new product. Participants further explained about the practices that they developed to produce

the new product within their organisation. The current finding was supported by the previous literature that found that recycling practices are also classified as eco-innovations that can benefit the manufacturing sector's success (Fernando et al. 2021). For these two participants, implementing innovation with the new resources would increase the cost, affecting the financial situation and budget, especially during this kind of pandemic. They thus decided to apply their existing resources to develop new products for their firm.

As the coronavirus continued to spread across Malaysia, SMEs took steps to ensure that they are well prepared to deal with the situation. For this reason, managers have played a critical role in inclusive decision making when developing innovations for their existing resources to produce a new product to gain sales growth and increase their business performance. The innovation of products has received a lot of attention from SMEs all around the globe, including Malaysia, as they believe that by adopting these innovation activities, they will be able to maintain their company's performance and prevent bankruptcy (Kristinae et al. 2020). As the coronavirus continued to spread across Malaysia, SMEs took steps to ensure that they are well prepared to deal with the situation. For this reason, managers have played a critical role in inclusive decision making when developing innovations for their existing resources to produce a new product to gain sales growth and increase their business performance. The innovation of products has received a lot of attention from SMEs all around the globe, including Malaysia, as they believe that by adopting these innovation activities, they will be able to maintain their company's performance and prevent bankruptcy.

### 3.2. The Implementation of Eco-Process Innovation

Feedback from the participants showed that they were more responsible in their production process, especially in terms of the green concept. In every progress step that they made, they utilised strategic and effective eco-process innovation to gain more environmental benefits in the future. With the occurrence of the unexpected pandemic, they decided to make some changes in their production process to meet the wants and needs of their customers as well as to increase the index of sustainability of the internal and external environment and surrounding area. All of these processes and innovative activities have enabled companies to contribute towards reducing environmental risk and other negative impacts of their resources (Triguero et al. 2022). It is also to maximise resource efficiency so that SMEs can contribute more to eco-innovation and generate more value and benefits for their businesses over a longer period of time.

The findings of this study include how SMEs have implemented eco-process innovation in their products through recycling, reuse, and remanufacturing. Because they manage the activity very efficiently and effectively, this process innovation can literally prevent liquid or solid waste and energy leakage. Here are some explanations from two of the participants:

*"Our process is we recycled our existing product to produce another product such as cooking power or cake powder. This is because we did not want to commit to another new raw material as it would increase our production costs". (P1)*

The implementation of waste recycling is regarded as an eco-process innovation. Firms can maximise resource efficiency by utilising their limited resources. Recycling practices can promote firms' ability to manage sustainable production processes, introduce green products, and raise awareness about them.

*"There are several steps to take when producing a new mattress or piece of furniture. So, we decided to accept the rotten product so that we could recycle it, and that is the reason for the changes to our production process. The level of our solid waste can be prevented". (P4)*

Based on the interview data, these two participants agreed that recycling or remanufacturing products had influenced eco-process innovation. The strategy formulated by the SMEs involved in this study can be viewed as a strategy to create a relationship with

eco-innovation that will be worthwhile for business and economic growth (Peyravi and Jakubavičius 2022). These participants are dedicated to improving sustainability in the target areas through their activities. By establishing recycling and reuse practices within their organisation and engaging in research and development (R&D) activity, they put eco-process innovation into operation. Budgeting for R&D and manufacturing operations investments places a strong emphasis on attaining cost effectiveness while achieving community and customer objectives for environmental sustainability. Their responses provide a summary of these findings:

*“Regarding the process, we actually invested more in R&D regarding our product to ensure that it was eco-friendly for our customers to use. It would seem that, like our customers from the medical institute, it is our responsibility to develop research toward our product to improve its effectiveness”. (P2)*

*“We received numerous complaints and suggestions about our product from our customers due to the COVID-19 pandemic. So, we decided to do some research on our ingredients because we want to develop and add anti-bacterial ingredients to our main product”. (P3)*

According to one participant, their company conducted responsible research and development of their product to ensure it would have advantages and value for the company as well as other external and internal consumers. The founders decided to implement changes and innovations to their process as they wanted to maintain production performance, as well as the quality of their products. Process innovation is literally a critical aspect for them, and it has a significant impact on their manufacturing activities. During this pandemic, the goal of process innovation is to provide a competitive advantage to the firm so that it can produce as many end goods as the market requires and desires. Process innovation has a positive effect on the firm’s economic performance, as proved by Geng et al. (2021), that integrating traditional green techniques with process innovations plays an essential role in the economic and environmental performance of SMEs.

### 3.3. The Implementation of Eco-Organisational Innovation

Entrepreneurs all over the world are currently under pressure as a result of the unexpected circumstance pandemic. Therefore, a strong relationship between first-level management, middle-level management, and lower-level management is very important in discussions about business strategy and the sustainability of impacts on the environment caused by daily production operations. The participants in this study stated that they had a favourable relationship with all of their employees, because they practiced good manners such as tolerance, communication, and cooperation. Entrepreneurs’ business knowledge is critical to the rise in eco-organisational innovation outcomes that are associated with eco-innovation within their company. A good eco-organisation’s management and innovation activities will be modified to achieve environmental goals (Pacheco et al. 2016).

*“The idea of implementing recycling practises in our organisation comes from myself, the founder of this company. It is my responsibility to ensure that these practises are successful, as well as our ideas for any other innovation activity in the future”. (P1)*

Long-term environmental responsibility is essential for future generations, as is the continuous reduction of environmental impacts from production. The implementation of a green organisational helps SMEs contribute to superior environmental performances and obtain the benefits of unusual profits from the investment from the external linkages.

*“As the company’s leader, I make motivation a top priority and share it with all of my employees to ensure that green environments and sustainability plan can be achieved. We discussed in our weekly meeting the status and techniques for handling our raw materials, liquid and solid waste, and any other harmful materials in our firm”. (P2)*

*“A great organisational chart that constantly reminds us of the importance of sustainability in every operation. It is critical to ensuring that our organisation is always on the*

*right track in planning when it comes to protecting the environment while manufacturing products". (P3)*

Guidance and direction can aid in better company management in terms of the working environment, leadership, and staff functions, all of which contributed to the increased efficiency of environmental management plans.

*"Managers always closely supervise our employees as they handle and manage solid waste. This is to ensure that our waste is located in one specific place. We used this technique because unmanaged waste can be found anywhere in our area and will harm everyone in our firm". (P4)*

As shown above, organisational gestures have an important role in ensuring that the employees are able to contribute to developing eco-innovation very effectively for the firm. Top management has the responsibility to balance and recover the organisational functions that are affected by the pandemic to ensure normal operations can resume. The participants said that a meeting was held once a week and once a month with the staff to verify that all the production processes were running well and to ensure that there was awareness regarding the preservation of the environment without polluting it. Top-level management guidelines and instructions are critical in fostering and assuring eco-organisational innovation in manufacturing enterprises, in order to ensure that a manufacturer's operations remain focused on environmental sustainability (Janahi et al. 2021).

#### 3.4. The Implementation of Eco-Marketing Innovation

Eco-marketing innovation has received a lot of attention and interest from SMEs for the purpose of sustaining their business activities. Feedback from the participants revealed that innovation in a product had a significant relationship with marketing innovation, as they needed to promote their new green product as well as attract their existing and new customers. The interviewees also explained that they used social media and word-of-mouth as a marketing tool to reduce their expenses and attract more interest from their customers. Biscione et al. (2021) noted that companies should place a greater emphasis on green marketing strategies to improve commercial performance and create a positive brand image. The following were the participants' explanations of the specific topic:

*"We do have our own brand name for our product. For the packaging, we also used natural materials, such as boxes and paper bags. We use as little plastic as possible in our packaging". (P1)*

*"Implementing digital marketing is our tool for promoting our product. We also have our own brand name, and we make some changes to our packaging to enhance its sustainability towards nature and the environment. We only use boxes that can be recycled after being used". (P2)*

The contribution from external networking, such as customers, suppliers, investors, and others, can enhance further support towards brand identity stability and a strong corporate image in the future and beyond.

*"The power of word-of-mouth is our main strategy for marketing. Actually, we put the green label and anti-bacterial label on our core product after implementing innovative practices". (P3)*

The effectiveness of pro-environmental products has been demonstrated. It improves consumer valuation of sustainable products, with the potential to increase consumer preferences for green labels.

*"Our coverage was limited, so our promotion relied on word-of-mouth from our customers. Most of our customers are pleased with our pricing range because it is still competitively priced in the furniture industry". (P4)*

*“We have made every effort to keep our pricing as low as possible for our clients. The product design will also be considered as the main reason for us to decide the price for our product”. (P5)*

Manufacturing SMEs use eco-marketing strategies to attract more clients to invest in green products in order to achieve a good market position. Due to the movement control order, social media was the best way that they could use it to engage with the customers and initiate word-of-mouth information sharing between them. This platform was employed to create product awareness which can create demand in the market. According to [Wursan et al. \(2021\)](#), word-of-mouth has a positive impact on green product purchasing decisions and strongly influences business performance. Marketing plays an important role in changing customer perceptions towards green products in the marketplace. The changes in pricing strategy, product design, promotion, and packaging realigned the values offered to fulfil the customers' altered demands during the pandemic crisis.

### 3.5. The Implementation of Eco-Technology Innovation

Technology has a strong connection to an organisation's business performance, along with the innovativeness of the product and the procedures used by SMEs. The participants claimed that they used new technology in their production process to streamline processes and finish products on time ([Hojnik and Ruzzier 2016b](#)). Despite the expense, they chose to pursue new technology as an investment in their organisation because they thought it would provide them with greater advantages and values. Employee safety is also one of the reasons why they implemented eco-technology innovation within the organisation. Additionally, technology innovation is the ideal option for businesses to meet prospect wants, and they can do this by creating green products that are capable of attracting more attention from consumers in the modern market. In pursuit of sustainability, eco-technology innovation also results in a decrease in environmental pollutants ([Sanni 2018; Zhang et al. 2021](#)).

*“We made extra investments in technological innovation because the machine had to manufacture a variety of bottles, adhere to all chemical regulations established by the Malaysian Minister of Health, and guarantee the safety of our clients, including hospital users. All the safety guidelines for chemicals had to be followed”. (P2)*

Firms that commit to investing in technology innovation must ensure that all laws and other requirements are met efficiently. They should also maximise resource efficiency and direct manufacturing businesses towards material-saving plans.

*“We were able to purchase some unique and modern equipment to make sure our employees could operate them safely and continue creating high-quality goods. Without raising utility expenses, our new machines used lower voltage levels”. (P4)*

*“The machine in which we invest is more time-sensitive, and our production level is increasing at the same time. We can process and bulk our product more than usual to meet the demands of our customers”. (P6)*

These three participants agreed that before they adapted a new technology within their organisation, they needed to consider their resources before implementing any innovation activities. They also said that budget and cost were very important considerations before carrying out any activities, including innovation in green technology. According to the participants, companies could still adopt innovation projects during the pandemic, as they converted these challenges into an opportunity for them to grab. Advancement in technology ensures that they can compete with other SMEs all over the world. [Azmi et al. \(2017\)](#) noted that the top management of the organisation must understand green innovation to guarantee that innovation activities are well delivered by the staff. In addition to that, green technology can lead to innovation capabilities within the organisation and generate opportunities to enter new markets. These benefits ensure that SMEs can avoid



bankruptcy and survive in the business industry, as well as compete with other small, medium, and large-sized businesses.

However, two participants in this study (P5 and P6) implemented one of the five eco-innovation capabilities in their businesses. Since their businesses are in the textile industry, they cannot easily employ eco-product innovation, eco-process innovation, and eco-organisational innovation like other businesses. The main reason for their businesses' suitability is their limited ability to incorporate these eco-innovation capabilities into their operations. Their businesses depend on the customer's demand, and thus their sales. The following explanations are from the participants:

*"We cannot easily employ eco-innovation practices due to our product. Our product is an exclusive batik, which we designed one and only for our customer. What can we do for our product innovation? A beg? A shoe? Are you sure you will buy it? We already know that a minority of Malaysian people love to wear batik shoes or beg. So, we stick to one product, which is "Baju Kurung Batik". This is why we cannot adapt eco-innovation like a product or process like others". (P5)*

*"I think my company should not invest more in eco-innovation. It is because we just sew a bulk of clothes and any other fabric materials and make them exactly as our customers' demand. My company was not suitable for implementation because it is simply a clothing factory. We did not use any chemical materials or any harmful resources in our production process". (P6)*

Based on these explanations, the researcher can conclude that not every type of business can employ the five drivers of eco-innovation capabilities in their business. They are aware of the importance of and their responsibility towards environmental sustainability, and they believe and guarantee that their businesses do not cause any pollution to the environment. Another reason may be that they did not want to risk their business, which may lead to financial loss since their product depends on the demand and purchasing power of their customers. Thus, it is impossible for them to implement eco-innovation capabilities like another business. They believe that their existing product will help them survive in this current marketplace and compete successfully with another industry sector. Regarding their business performance, they stated that the only thing they focused on was survival during the COVID-19 pandemic. They still want to improve their business performance, but the survival of their business is more important than everything. However, SMEs' dedication to environmental sustainability meant they did not just forget about it or let it fade away. They still manage to follow and commit to government regulation to continue their daily operations in the industry over the long term.

#### **4. Materials and Methods**

##### *Data Collection*

This study was conducted using a qualitative research approach through online interviews to learn more about how manufacturing SMEs in Malaysia implement eco-innovation capabilities to sustain their business performance. All of the interviews took place in 2021, when Malaysia was under the movement control order (MCO) due to the coronavirus disease (COVID-19), and the researcher could not meet in person with the participants for the interview sessions. [Rahman \(2017\)](#) says that the qualitative method is much better than the quantitative method for obtaining specific information and a thorough understanding of the topic. The qualitative research not only helps researchers focus on the experiences and ideas of the participants but also makes it possible to reveal detailed data in its natural setting.

To be qualified for the research, the manufacturing SMEs must be classified as small and medium-sized enterprises, as defined by the Malaysian National Entrepreneur and SME Development Council's criteria, be registered as a manufacturing organisation in the 2019 Federation of Malaysian Manufacturers (FMM) Directory, and employ between 5 and 200 employees. The researcher may justify the sort of business production produced

by the SMEs through the use of the FMM Directory book, and it immediately assists in identifying the businesses that have developed eco-innovation capabilities within their organisations. The selection of Malaysian SMEs as participants is necessary to ensure that important aspects of the research question are represented.

The confirmation of implementing eco-innovation was made by the researcher during the phone call or via email to the manufacturing businesses. After the confirmation process, the researcher emailed the participants an invitation letter to schedule the interview session. The interview session was conducted in Malay and English based on the participant's preference. The interview took approximately 45 to 90 min. Interviews were recorded with the consent of all participants. All of the transcripts were translated from Malay to English. Next, the transcripts were reviewed by reading them multiple times to identify the potential themes and understand the key words from the quotes described by the participants. Coding frames were created, and the themes were named according to the research question. The data involve coding that allows the researcher to identify the themes, and it continues until saturation is reached. The researcher has used content analysis to draw validity inferences from the responses of the participants in order to investigate the eco-innovation capabilities of their firms in sustaining the businesses performance.

All the participants involved in this study met these requirements. The demographic backgrounds of the participants and the business natures of the SMEs are shown in Table 1.

**Table 1.** Profile of participants from SMEs in the study.

Participant	Position	Number of Employees	Size of the Firm	Production	Post-Pandemic Business
P1	Owner	5	Small	Food and Beverage	Operable
P2	Owner	150	Medium	Medical and Care	Operable
P3	Owner	40	Small	Toiletries and Cosmetics Product	Operable
P4	Sales & Shipment Manager	200	Medium	Furniture	Operable
P5	Owner	30	Medium	Textile and Clothes	Operable
P6	Owner	12	Small	Textile and Clothes	Operable

The data were gathered from the participants, who shared their experiences about their respective companies. The participants were Chinese (P4) and Malay (P1, P2, P3, P5, and P6). Among these six participants, three were from small enterprises and three were from medium-sized enterprises. A small-sized enterprise consists of 5 or more employees, but not more than 75; meanwhile, a medium-sized enterprise consists of 75 or more employees, but not more than 200.

The findings of this study are based on the interviews of all participants (Participant 1, 2, 3, 4, 5, and 6). The participants provided their feedback based on their perceptions, experiences, and knowledge of their organisations and businesses. This study examined how the participants implemented eco-innovation capabilities within their organisations in order to sustain their business performance. However, two of the participants were not willing to implement the five eco-innovation capabilities due to the suitability of their businesses as well as the demand for their businesses. These two participants only implemented eco-marketing innovation instead of eco-product, eco-process, eco-organisational, and eco-technology due to low business management such as financial, resource, and product development. The explanations of these two participants will be discussed further in the Results section.

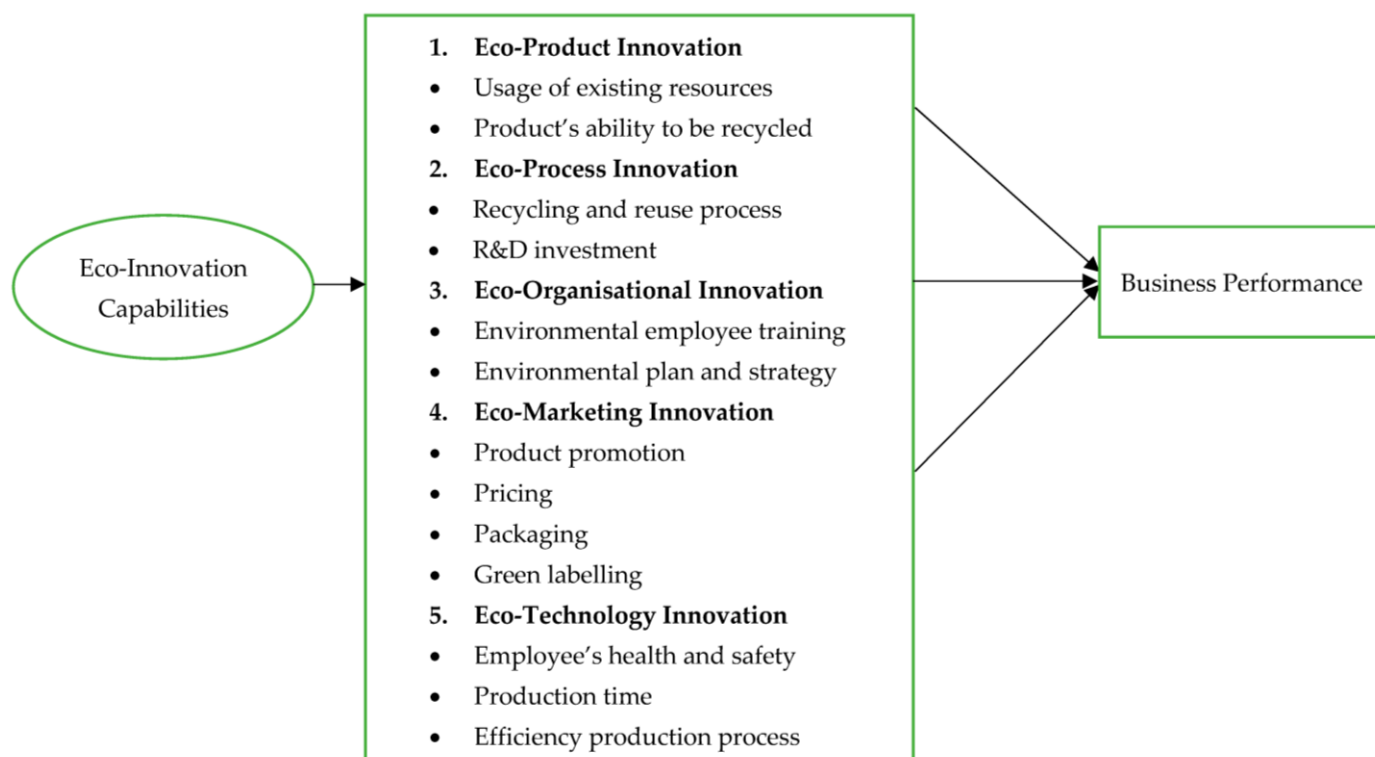
The participants also shared experiences and the impact of COVID-19 on their businesses. This study also shows that despite the SMEs facing this pandemic situation, they can still survive in the business industry. The interviewees stated that their companies encountered some negative effects stemming from this situation; however, they also tried to convert these issues into an opportunity for them to compete with others during this pandemic. They also stated that their companies were operational during the post-pandemic phase due to the manufacturing of existing and new products. These decisions can help

SMEs raise their corporate performance, margin profit, and avoid bankruptcy or permanent closure.

The researchers can conclude from the interview session that not all of the participants were suitable for applying the five elements of eco-innovation capabilities in their business practices. Following the adoption of eco-innovation capabilities within their firm, SMEs in Malaysia consider all the options, including whether it will give them benefits, values, and profits or put them at risk of loss and bankruptcy.

## 5. Discussion

This study highlights how manufacturing SMEs in Malaysia implement eco-innovation capabilities to sustain the business performance. This study found there are five eco-innovation capabilities. The following section details results gained from each of the findings of eco-innovation capabilities such as eco-product innovation, eco-process innovation, eco-organisational innovation, eco-marketing innovation, and eco-technology innovation. The study's findings clearly show that all of the eco-innovation capabilities have influenced SMEs to meet a higher level of environmental sustainability and enhance the corporate performance. The conceptual model developed on the basis of our findings would greatly assist the researchers with the data analysis. Figure 2 represents the conclusion.



**Figure 2.** Eco-innovation capabilities implemented by manufacturing SMEs in Malaysia to sustain the business performance.

To begin with, the implementation of eco-products can increase the effectiveness of a firm's resources (Ceptureanu et al. 2020). Product lifecycle management is used by SMEs to improve new products, which contributes to environmental and sustainable effectiveness. SMEs gather expertise to exploit the existing resources that are associated with the current state of their businesses. However, SMEs must also constantly monitor their existing resources in order to improve their efficiency and secure them for future use. Sustainable eco-product innovation is highly important for SMEs' business success. It will allow them to compete with others in the same industry and may help establish a strong competitive position in an existing market (Jiang et al. 2018).

The eco-innovation process depicted during the manufacturing production process aims to reduce environmental impacts while maintaining sustainability. SMEs in Malaysia tend to invest more in R&D to an effective production process that can minimise production costs. It also promotes recycling as well as reusing materials, which enables firms to benefit from their eco-innovation strategies (Jiang et al. 2018). The development of eco-process innovation practices represents a method of reducing resource consumption and controlling solid or liquid waste generated during the manufacturing process (Rossiter and Smith 2018). The replacement of inefficient materials and equipment may be enhanced by this process innovation, serving as a guide for SMEs seeking to increase production effectiveness.

Determining decision-making organisational practices, management, planning, and procedures with a focus on the environment has been focused on improving the production processes. Such capabilities enable SMEs to gain economic benefits and their contributions to long-term success in exploring the total quality of their sustainability environmental management plan (Siva et al. 2016). Other operational support activities, such as employee training, employee engagement, and green human resources, can prevent the risk of poor management in the daily administration of a firm (Oželiene 2018). Depending on the capability and accessibility of the organisation, SMEs could periodically update their environmental planning and management. This will ensure continuous awareness and contribution towards environmental targets, aligned with common laws and policy.

Moreover, management strategies for dealing with stakeholders, investors, clients, and others must be taken into consideration. Face-to-face product advertising is necessary, and online platforms must develop to capture consumers from numerous locations. Future investment is attracted by marketing strategies that promote a manufacturing company's eco-innovation, such as green packaging, pricing, and eco-labelling. SMEs may be able to increase their revenue while retaining long-term customers. Close relationships with customers need to be maintained to develop new ideas for eco-innovation based on their suggestions, complaints, and sharing of information.

Future cost and time reductions may result from increased SME spending on eco-technology innovation. Green technology adoption can improve the sense of security at workplaces for staff members and direct them to reduce spending on waste, energy consumption, and production time. This practice immediately assists in the development of eco-innovation capabilities with the goal of utilising green technology to both allocate economic growth and preserve the environment during manufacturing. For example, SMEs are responsible for changing a risky, high-voltage machine to a safer one to avoid an accident happening to the employees. Low levels of voltage can save the environment and reduce gas emissions that may be dangerous to people around them.

There are several positive and negative findings about the eco-innovation capabilities of various types of firms in different industries and sectors. This study focused on how SMEs in Malaysia implement eco-innovation capabilities through product, process, marketing, organisational, and technological means. The adaptation of eco-innovation capabilities is intended to maximise environmental sustainability during the production process as well as increase the business performance of manufacturing firms.

This study shows that eco-marketing innovation is widely applicable to the manufacturing firm in Malaysia, which involves product promotion, pricing, green packaging, and green labelling. These capabilities positively increase the revenue of the firm and the awareness of the consumer towards green products and sustainable environmental issues. SMEs not only generate benefits in terms of profit, but they can also save limited resources for the needs of future generations, thereby contributing to sustainability. For requirements in terms of money, time, and effort, a firm's eco-innovation capabilities depend on its ability to apply it. Eco-innovation capabilities have their own positive impact on businesses and will be achieved with well-structured firm management and plans.

On the other hand, eco-innovation is practically applicable, especially to the chemical industry, which is directly allied with toxic materials, recycling waste, and renewable energy (Toha et al. 2020). There are also wide applications of eco-innovation in the production

of food processing, plastic production, pharmaceuticals, beauty and care products, and others. Useful ideas for applying eco-innovation capabilities guide and help SMEs to become proactive and boost their competitiveness in the marketplace. Additionally, since this study demonstrates how eco-innovation is implemented among manufacturing firm in Malaysia, policymakers and top-level manufacturing management can create and establish their environmental legislation and rules.

## 6. Conclusions

### 6.1. Summary of the Study

Based on the participants' feedback, SMEs are aware of their capabilities to implement eco-innovation in their businesses in order to sustain their business performance. SMEs can also continue adapting their innovations to compete against their competitors by fulfilling the needs and wants of their customers. As indicated by the quantity of eco-product purchases, customer satisfaction may serve as a guide for SMEs, helping them to increase their profit margins and achieve high levels of business performance. The contribution of a product's productivity with the help of stable eco-technology innovation supports manufacturing SMEs to continue their businesses.

The findings of the study showed that most of the participants were able to pursue eco-marketing innovation. Other eco-innovation components, such as eco-product innovation, eco-process innovation, eco-organisational innovation, and eco-technology innovation, were implemented by SMEs with strong resources, such as financial, employees, and facilities, because adapting them was extremely costly and high on the budget. This research's purpose was to determine how the manufacturing SMEs in Malaysia implement eco-innovation capabilities to sustain their business performance. These five eco-innovation capabilities have a unique relationship in that they rely on one another in order to sustain SMEs' business performance (Ch'ng et al. 2021).

Furthermore, eco-innovation capabilities are regularly carried out by SMEs since it allows them to obtain financial support for successful eco-product innovation activities. Apart from the participants' feedback, manufacturing SMEs implement innovations within their businesses to avoid losing their existing customers as well as to achieve greater business growth within their organisation (Hojnik et al. 2018; Ceptureanu et al. 2020; Guzmán and Rodríguez 2021; Nguyen and Adomako 2021). The impact of COVID-19 has motivated the participants to rethink their core abilities and seek out new opportunities for adapting innovation activities.

### 6.2. Contribution and Implications

The study's contribution was through measuring the firm's resources in manufacturing SMEs in Malaysia. Additionally, the study also attained the firm's resources for developing eco-innovation capabilities to sustain business performance. The current study enhances knowledge and understanding regarding the implementation of eco-innovation capabilities as a mediator towards business performance in Malaysian manufacturing firms. The resource-based view (RBV) theory was strongly supported in terms of leveraging a firm's resources to implement eco-innovation capabilities, and it may lead to SMEs gaining a competitive advantage for improved business performance. In addition to that, the current study's result expanded the knowledge of RBV theory to conclude that the relationship between the mediation roles of eco-innovation capabilities to sustain business performance among manufacturing SMEs in Malaysia. The findings and analysis of the study are used to explain the relationship between eco-innovation capabilities and business performance, which is appropriate to discuss due to the survival of SMEs in uncertain times, especially during disease outbreaks. Hence, very limited studies apply the same literature to manufacturing businesses, and this is not surprising because previous research was conducted in different aspects of business performance around the world (Fernando et al. 2019). However, the focus of this study was on the manufacturing sector's declining contribution to the country's growth rate.



The impact of eco-innovation capabilities in the manufacturing sector, particularly in Malaysian manufacturing SMEs, was demonstrated in this study. The implementation of eco-innovation capabilities can assist SMEs in improving business performance. Furthermore, the findings and analysis of this study made practical contributions to the mentioned topic. First, the study found that more awareness concerning eco-innovation capabilities in manufacturing SMEs is required. The awareness campaign will help SMEs understand a useful resource for decision making regarding their firm's strategies for implementing and enforcing environmental protection and social development. Knowledge and information regarding eco-innovation capabilities are a must to ensure SMEs can assist the firm in improving other sustainable initiatives without wasting any of the firm's assets or resources. It is also one way to ensure SMEs sustain their business performance, particularly in the face of unpredictable pandemics in the future.

According to earlier studies, business performance is measured based on its employees' high level of thinking, skills, and knowledge regarding upcoming business activities in order to secure the firm's survival during the unpredicted pandemic. The management of an intellectual firm can help to improve the resolutions and decisions made by manufacturing SMEs in order to improve their position in the industry. At the same time, the implementation of eco-innovation capabilities among SMEs in Malaysia will serve future researchers, government agencies, and industrial practitioners in taking further actions regarding the development of innovative practices while enhancing environmental sustainability. This research demonstrated the significant technique enhancement of business performance, notably in the recycling of existing materials, research and development, product design, environmental planning, and others.

Thus, this study provides an extensive number of applications for businesses, as well as the local and global manufacturing sectors, in supporting eco-innovation capabilities in the industry. Since the SMEs are currently active in their daily business operations, they could collaborate with local government institutions such as public universities to handle R&D activities in order to fulfil their commitment to eco-product innovation. A win-win situation for both entities would emerge from this collaboration. For SMEs, this could increase product productivity efficiency and allow them to maintain a better relationship with the same operators in the future product development or operational years. These methods are necessary for SMEs to strengthen their eco-product, eco-process, eco-organisational, eco-marketing, and eco-technology in order to sustain their business performance, especially during future pandemics.

Finally, policymakers who want to explore more about eco-innovation capabilities may go above and beyond what they have to do to support and assist (SMEs) to make sure they do not lose their guidance on the way to achieve business success. The goal of the efforts is to build a strong innovation platform that helps SMEs in the manufacturing sector improve their business performance after unpredictable circumstances such as environmental changes, economic changes, and disease outbreaks in the future. Regarding this, the researcher believes that the government should provide backbone support for marketing, technology assessment, and all business requirements for SMEs that priorities environmental responsibility. The engagement with government agencies encourages manufacturing SMEs to achieve the ideal time for success while competing with other industries such as construction, mining, and agriculture. This study demonstrates a significant relationship between eco-innovation capabilities and business performance of Malaysian manufacturing SMEs. As a result, policymakers can create and modify their environmental rules and regulations based on their comprehension of innovative practices.

### *6.3. Limitations and Future Research Directions*

Although the current study has uncovered information regarding the relationship between eco-innovation and SMEs, it has some limitations. The movement control order affected the data collection activity when reaching out to the participants, because the majority of them refused to participate in the study during this pandemic phase. Additionally,

the interviews were conducted entirely using an online platform. There was an issue with the internet connection during the interview session, and this limitation was overcome by repeating the questions.

Future research can expand upon these conclusions, where managers should pay more attention to the changing environment and transform the challenges into an opportunity to engage more customers and sustain the business performance of the organisation. SMEs also need to increase their collaboration with policymakers, suppliers, or related government agencies in developing eco-innovation capabilities to ensure the innovation will be more easily and effectively adopted. These efforts could potentially enable SMEs in Malaysia to gain more opportunities to survive in these challenging times. This study determined that several SMEs in Malaysia accomplished various types of eco-innovation capabilities, along with improving their prospects, marketing strategies, and financial management. These SMEs also demonstrated that company performance can be maintained and improved through creative activity. In order to help policymakers, government agencies, and top-level manufacturing SMEs who they may rely on for guidance in expanding and sustaining their businesses and performances in the future, this research contributes to the body of literature devoted to eco-innovation by providing in-sights into what to focus on when implementing eco-innovation capabilities.

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