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## Contributory role of innovative capabilities in Malaysian small and medium enterprises performance

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**Abstract:** Despite a growing body of literature focusing on business performance enhanced by innovation capabilities, empirical research examining its impact in Malaysia remains scarce. Adopting the view that monitoring and analysing business performance through innovation is necessary for strategic planning and business survival. This study surveyed 124 businesses in peninsular Malaysia via two-stage e-mail and telephone calls, supplemented by survey questionnaires. The findings indicate that SMEs should prioritise strategic planning, marketing innovation, and learning capability to improve business performance, particularly in Malaysia's manufacturing and export sectors. While this study makes no claim to be exhaustive, it demonstrates that understanding of the relationship between innovation capabilities and business performance is incomplete and that this area of research warrants further examination. Nevertheless, the discovery contributes to the body of knowledge by demonstrating how innovative strategic planning, marketing, and learning capabilities can enhance successful business performance.

**Keywords:** innovation diffusion; strategic planning; marketing orientation; business performance; learning capability.

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**Biographical notes:** R. Ganesh is an Assistant Professor with UCSI University, Kuala Lumpur, Malaysia. He has more than 18 years of teaching experience and he has published articles in international journals and conferences. His research interest includes service quality and marketing research with perceived performance for satisfaction and retention to build brand image loyalty on organisation. In addition, he is also involved with cross-disciplinary research including water conservation, entrepreneurship, marketing, international business, strategic management and social capital.

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## **1 Introduction**

In today's ever-changing business environment, innovation is critical. It is a value-added organisational performance and competency that results in business success by meeting new needs and market demands in novel ways (Alharbi et al., 2019; Al Darmaki et al., 2019). Innovation is defined as the creation and dissemination of products, processes, and methods that are components for inventing new sources of growth and laying the groundwork for the formation of new industries in a systematic business function (Rubera and Kirca, 2012). From an ideological standpoint, innovation can be defined as the implementation of non-routines that necessitate a shift in thinking and working methods. It may have been invented years ago, but if people perceive it as new, it can still be considered an innovation in a specific industrial dimension (Kim, 2015; Rogers, 2003; Hung et al., 2020).

Fundamentally, business rewards are known to be a driving force for innovation, and a plethora of studies back this up (Alharbi et al., 2019; Al Darmaki et al., 2019). There are two types of incentives that are thought to have an impact on innovation. Extrinsic rewards, such as financial benefits, are one type of reward, while intrinsic rewards, such as praise and recognition, are another (Alharbi et al., 2019; Al Darmaki et al., 2019). Despite the fact that these two rewarding practises are frequently used interchangeably, they are distinct procedures with distinct advantages. Each type of reward has an impact on the success of innovative programmes within organisations, and their ability to influence innovation is still a debated topic (Alharbi et al., 2019; Al Darmaki et al., 2019; Gunday et al., 2011; Choshaly, 2019).

According to research (Li, 2020), small and medium-sized enterprises (SMEs) with innovative experience are also more likely to export their products. Innovation adoption decisions in an organisation, whether made by the organisation or by individuals within it (voluntary or forced), are valued as profitability and play a critical role in achieving long-term competitive advantage (Li, 2020; Choshaly, 2019). In addition, terms like relative advantage, complexity, trialability, and observability may be important aspects of innovation adoption (Rogers, 2003). Depending on the adopter's capacity and how the change is communicated, a specific adoption may take a different path. Most importantly, the anticipation of direct or desirable consequences drives the innovation outcome (Kim, 2015).

Organisational adoption and diffusion of innovations (DOIs) are linked by communication among members of a social system over time (Rogers, 2003). In an organisation, communication takes place through various networks that are linked to one another in departments or organisational operation systems. If the diffusion reaches a point where future adoptions become self-sustaining due to self-reinforcing dynamics, it

is most likely to succeed (Kim, 2015; Kolluru and Mukhopadhaya, 2017). Importantly, businesses are discovering that innovation is a necessary capability for better manufacturing processes, improved market performance, and a long-term competitive advantage (Gunday et al., 2011; Choshaly, 2019; Li, 2020; Akoum, 2016). These points of view are not clearly expressed in Malaysian SME studies.

In Malaysian economics, SMEs are regarded as the most important pillars (Radam et al., 2008), especially in the manufacturing sector (Khalique and Shaari, 2011). The impact of innovation capabilities on business performance is significant, but the growing importance is not clearly identified in Malaysia's SME operations according to industry specifications and operating systems. This gap is revealed in the Eleventh Malaysia Plan 2016-2020, which purports to be the new model's features, indicating that a shift from focusing solely on national-level initiatives to innovation targeted at both the enterprise and societal levels is required (Akoum, 2016).

According to studies, SMEs in Malaysia have a low absorptive capacity for acquiring new technological knowledge, resulting in a significantly lower level of innovation when compared to other countries (Yuen and Ng, 2021; Udriyah et al., 2019). The poor performance of innovation has been attributed to a lack of innovative activities and innovative capabilities (Yuen and Ng, 2021; Fernando and Wah, 2017). More than a quarter of Malaysian SMEs (26%) still rely on non-local workers and almost half (49%) of SMEs' employees have an immediate need to improve their innovative skills and abilities (Yuen and Ng, 2021).

Many SMEs in Malaysia believe that technology is not a necessity and that it adds no value to their industries, according to the findings (Yuen and Ng, 2021; Burhanuddin et al., 2009). Furthermore, studies show that Malaysian SMEs have low levels of R&D and productivity. Another factor is knowledge sharing, which shows that about a quarter of employees in SMEs (44%) are either poor or very poor at sharing knowledge (Yuen and Ng, 2021), and more than 20% of them ignore the importance of knowledge sharing (Yuen and Ng, 2021; Fernando and Wah, 2017). Furthermore, studies have revealed that in SME Malaysia, very few companies cultivate and implement knowledge sharing (Yuen and Ng, 2021).

Based on the findings, this study aims to close the gap by developing and validating the key elements affecting innovation and business performance in Malaysian SMEs, focusing on the following variables: product innovation capability, marketing innovation capability, service innovation capability, research and development capability, human resources allocation capability, strategic planning capability, learning capability, and manufacturing capability.

Another contributing factor is the theoretical aspect of innovation adoption. From the existing descriptive literature on theoretical analysis, some previous studies adopted the technology acceptance model (TAM) to explain user acceptance of technologies and behavioural intentions. Others have suggested using the DOI theory to explain why some products are more successful than others (Choshaly, 2019; Kim, 2015). The DOI theory is regarded as the permanent theory of innovation acceptance, and it is applicable to both individual and organisational settings (Askarany and Smith, 2008). However, in Malaysia, the DOI theory has not been widely explored in order to establish its capacity in SMEs' operations, and there has been little attempt to translate it systematically into a comprehensive knowledge resource for business performance. As a result, this study tries to fill the gap by using DOI theory to predict the relationship between capabilities put forward and business performance in Malaysian SMEs.

The following is the order in which the study is organised: First, it provides a brief synthesis of the literature on the DOI theory. Second, it correlates SEMs' business performance with their innovation capability across eight variables (product innovation, marketing innovation, service innovation, R&D capability, resource allocation, marketing capability, strategic planning, learning capability, and manufacturing capability). Finally, consider the implications, limitations, future research, and conclusion.

## 2 Literature review and hypotheses development

### 2.1 Innovation and business performance

In a systemic framework, innovation and business performance can be defined as internal, societal, and commercial performance (Hung et al., 2020), with a multidimensional construct for sustainable performance (Rubera and Kirca, 2012). It is indicated as a kind of attribute to output: the quantity of new items produced, the improvement in the quality of work; the impact of innovation: changes in competition, market expansion, greater productivity, profit, and environmental effects are concentrated (Hung et al., 2020; Aryanto et al., 2015). In the contemporary environment, the features of innovation that influence adoption rate include relative advantage, compatibility, complexity, trialability, and observability of adopting innovation, as well as value provided through learning attitude and implementation (Hung et al., 2020; Cheng, 2017; Aryanto et al., 2015). A relative advantage arises when users realise the innovation's benefit, resulting in a faster adoption phase. Compatibility refers to innovations that are likely to be adopted because they are consistent with the values, norms, and perceived needs of the intended user. Complexity is a term that relates to inventions that are considered simple to use and therefore more likely to be embraced. Trialability refers to the opportunity to evaluate or experiment with an innovation prior to adoption. Observability refers to the simplicity with which an innovation's benefits may be identified and perceived by others, which encourages adoption (Cheng, 2017). The value provided by learning mindset and implementation relates to the fact that the more knowledge is acquired, digested, and embraced, the more capable an organisation is of innovation (Hung et al., 2020). From the circumstances around these traits, it is possible to infer that innovation helps with business performance and sustainability.

### 2.2 Diffusion of innovation theory

Everett Rogers formalised the theory of innovation diffusion in his book "Diffusion of Innovations" (2003). It is one of the earliest theories in social science. It is, without a doubt, a comprehensive socio-psychological theory that aims to predict how people adapt to innovations (Rogers, 2003; Ko, 2017). The theory has been widely applied to describe innovation adoption patterns, the mechanism by which innovations are adopted, and the level of prediction of innovation success. It contributes a set of innovation characteristics that may influence adoption by guiding an individual through the stages of knowledge acquisition, attitude formation toward a particular innovation, and a decision to adopt or reject the new idea's implementation (Bianchi et al., 2017; Wang and Sun, 2020).

According to the literature, certain factors have the greatest impact on product diffusion: relative advantage, compatibility with existing values and products,

complexity, divisibility, and observability of results, and positive word-of-mouth from early adopters drives adoption by subsequent buyers. Recent research indicates that written and virtual word-of-mouth have a greater influence on shaping an innovation's perceived usefulness (Kawakami and Parry, 2013) and credibility (Parry and Kawakami, 2015) than personal word-of-mouth.

The DOI theory was developed to explain how, over time, an idea or product gains momentum and spreads through a specific population or social system with an individual or organisation and how the media plays a role in presenting information that fosters awareness and subsequent adoption of an innovation (Bianchi et al., 2017; Wang and Sun, 2020).

The theory is composed of four components (Rogers, 2003). The first is innovation; the second is communication channels; the third is time; and the fourth is the social system. To begin with, innovation was defined as an idea, practise, or project that an individual or other adoption unit perceives as novel (Rogers, 2003). Additionally, there are technology clusters, which are composed of distinct technological elements that are perceived to be closely related (Rogers, 2003). Second, communication is a process in which participants generate and share information in order to arrive at a common understanding. According to the theory, a source is an individual or an institution that originates a message, and communication channels can be classified as localite or cosmopolite, depending on whether they communicate between individuals within a social system (Scott and McGuire, 2017; Celik et al., 2004).

Thirdly, the time dimension can be thought of as the movement of information for diffusion;

- 1 the individual passes through from initial knowledge of an innovation to adoption or rejection
- 2 adoption (individuals/units that are early or late adopters of an innovation) in comparison to other members of a social system
- 3 innovation adoption as measured by the number of system members who adopt the innovation in a specific era (Rogers, 2003).

The social system is the final stage of the diffusion process. It views the social system as a collection of interconnected units engaged in problem-solving in order to achieve a common goal. Because innovations occur within the social system, they are influenced by the social system's social structure. The nature of the social system is the primary criterion for categorising adopters (Scott and McGuire, 2017; Celik et al., 2004).

The theory is effective because it is consistent with the majority of effects survey and persuasion experiment findings. It established the groundwork for a plethora of promotional communication and marketing theories pertaining to product or brand launch campaigns (Vaccaro, 2004; Choshaly, 2019). Additionally, it is applicable to the intention of sustainability innovation, in which individuals gather and synthesise information about the innovation; this information processing results in the formation of perceptions about the innovation's outcomes (Choshaly, 2019; Li and Sui, 2011).

### *2.3 Product innovation capability*

According to studies, product innovation is the introduction of a new or significantly improved good or service in terms of its functional characteristics or intended uses. This

is manifested through advancements in technical specifications, components and materials, and any other functional characteristics, as well as through product proliferation, a strategy by which a business expands the number of products it offers in order to meet the diverse needs of its customers (Hill et al., 2014).

Product innovation is critical to reestablishing a company's image and achieving market penetration success (Vaccaro, 2004). In comparison to other types of innovation, product innovations will provide unprecedented customer benefits and will likely result in superior organisational performance and market leadership. Product innovation capability may enable an organisation to maintain direction in high-velocity environments characterised by rapidly changing customer needs (Holten et al., 2020; Cherchem, 2012; Cohen and Levinthal, 1990; Fouad et al., 2017).

From this vantage point, an integral part of the capability for product innovation may be based on new knowledge or technology, or on novel applications or combinations of existing knowledge and technology.

Thus, this study proposes the following hypothesis based on these arguments:

- H1 Product innovation will have a positive influence on Malaysian SMEs' business performance.

#### 2.4 Marketing innovation capability

It has been argued that an organisation's success is highly dependent on its ability to innovate in marketing, particularly in the areas of market research, pricing strategy, market segmentation, advertising, sales promotions, supply chain information systems, and distribution channels (Xu et al., 2020; Fouad et al., 2017; Vorhies and Harker, 2000; Weerawardena, 2003; Vorhies and Morgan, 2005). These will eventually have an effect on the ability to meet customer expectations and the rate of product/service adoption.

There are two broad categories of innovative capabilities: incremental and radical. While incremental innovative capability reflects a firm's ability to generate innovations that refine existing products or services at the operational level, radical innovative capability reflects a firm's ability to generate innovations that are significantly different from existing products or services and transform them for strategic positioning (Trott, 2017; Chandy and Tellis 1998).

Typical marketing innovation approaches typically focus on a single marketing capability, such as brand or innovation (Bianchi et al., 2017; Choshaly, 2019), as a potential key driver of SMEs' business performance. However, a business that can anticipate market needs and forecast market conditions typically enjoys a significant competitive advantage and, eventually, higher profit margins (Day, 1994). That way, the company will be able to provide supervisory services, which will have a significant impact on the innovative output. Businesses that invest heavily in research and development develop a strong marketing capability. The marketing capability of an organisation has an effect on the breadth of an innovation's applicability. From these perspectives, marketing innovation capabilities can be a critical factor in generating a distinct competitive advantage and achieving long-term survival (Bianchi et al., 2017; Choshaly, 2019; Day, 1994; Al Darmaki et al., 2019; Ding and Huang, 2019).

Given their criticality to business success, marketing and innovative capabilities have been shown to have a significant impact on an enterprise's profitability and performance (Trott, 2017; Morgan et al., 2009), new product performance (Moorman, 1995), and

customer performance (Moorman, 1995; Vorhies and Morgan, 2005). Thus, this study proposes the following hypothesis based on this argument:

H2 Marketing innovation capability will have a positive influence on Malaysian SMEs' business performance.

### 2.5 *Service innovation capability*

Customers' loyalty is not determined by price or product; rather, how they feel following an interaction with customer service has a much greater influence on future purchase decisions (Wirtz and Lovelock, 2018). A rewarding interaction can help maintain customer satisfaction and retention levels. Today's businesses compete on the basis of customer experience, and marketers have an incredible opportunity to leverage effective customer problem resolution to boost loyalty through innovative service (Wirtz and Lovelock, 2018).

The elements of service performance that contribute to a positive customer experience can be both physical and intangible. Categorically, a holistic view of the overall performance of the service on the customer experience is critical. As such, the marketer's value proposition must address and integrate three primary components:

- 1 the core product
- 2 supplementary services
- 3 delivery processes (Wirtz and Lovelock, 2018).

According to Wirtz and Lovelock (2018), facilitating supplementary services is necessary for either service delivery or to assist in the use of the core product. Enhancing supplementary services provides additional value and appeal to customers. These are reflected in the flower of service elements: information, order taking, billing, and payment as auxiliary services; and consultation, hospitality, safekeeping, and exceptions as auxiliary services (Wirtz and Lovelock, 2018).

In essence, it is a comprehensive model that distinguishes between two types of services that an organisation should provide to its customers: core services and supplementary services. The core products are the central components that deliver the primary benefits of problem solving. Additionally, these products are complemented by ancillary services. These supplementary services make it easier to use the core services, increase their appeal, and add value to the products (Storey and Easingwood, 1998; Lovelock, 1992; Bitner et al., 2000; Wirtz and Lovelock, 2018).

In today's turbulent business environment, it is critical to have an excellent and unique method of providing services that satisfies customers' desires, demands, and needs, with a touch of innovation that contributes to reward from

- 1 core products
- 2 supplementary services
- 3 delivery processes (Wirtz and Lovelock, 2018; Leonidou et al., 2014).

From these perspectives, a service-based strategy can help an organisation excel in service offerings, cost structure, delivery system, and technology for efficient and effective business (Grönroos, 2007; Miles, 2005; Tipu, 2011).



Service innovation is more radical and discontinuous than product innovation, and it merits attention to business performance due to perceived performance and customer perception (Kolluru and Mukhopadhaya, 2017; Xiao et al., 2019; Ganesh et al., 2018). Service innovation can occur in any industry. Additionally, new and improved services can occur in non-services sectors, such as manufacturing firms seeking to diversify their supply portfolio by adding value-added features to meet customer expectations (Durst et al., 2014). Implementing appropriate service innovation will have a positive incremental effect on firm performance.

Primarily, achieving service innovation requires acquiring the knowledge and abilities necessary to transform the customer experience into a satisfying one (Xiao et al., 2019). According to empirical findings (McManus and Ardley, 2019), firms are increasingly incorporating new knowledge into their strategies, particularly knowledge about co-creation processes, innovation, and service design for business performance.

Thus, service innovation capability is critical for businesses to maintain their competitive advantage, as it enables them to meet customer expectations and elevate customer satisfaction to the level of customer delight (Xiao et al., 2019; McManus and Ardley, 2019; Kolluru and Mukhopadhaya, 2017; Xiao et al., 2019). The following is hypothesised in light of this context:

H3 Service innovation capability will have a positive influence on Malaysian SMEs' business performance.

## 2.6 *Research and development capability*

Numerous studies have established a causal link between a firm's research and innovative development activities and profitability, as well as the fact that firms that invest in research and development successfully obtain patents, and the government-granted protection improves their profitability (Zhang et al., 2014; Farzaneh et al., 2020; Hung et al., 2020; Yam et al., 2004). These have evolved into the primary competencies and survival motivations for profit maximisation in organisations (Hung et al., 2020).

Additionally, studies have asserted that a firm's research and development capability is related to its absorptive capability (Cohen and Levinthal, 1990). This means that firms' research and development activities contribute to the generation of new information and can help the firm better assimilate and exploit existing data. Thus, research and development can be viewed as a critical component of a firm's innovation performance (Cohen and Levinthal, 1990). On the basis of these arguments, it is reasonable to assume that research and development performance will have an effect on an organisation's impact on the industry.

From this vantage point, the requirement to establish a critical link between research and development capability and positive company performance provides a critical conceptual and theoretical framework for SMEs (Zhang and Hartley, 2018; Raphael and Priscilla, 2019; Hossein et al., 2013; Noya and Narula, 2018; Liu, 2016). As a result, the following hypothesis is formed:

H4 Research and development capability will have a positive influence on Malaysian SMEs' business performance.

## 2.7 *Human resources allocation capability*

According to empirical evidence, human resource allocation capability refers to a firm's ability to mobilise and expand its resources, particularly its human capital, in order to renew, augment, or adapt employee skills or expertise during the innovation process (Noya and Nalura, 2018; Ding and Huang, 2019; Yam et al., 2004; Maritan and Lee, 2017; Wright and McMahan, 1992; Wright et al., 1994). It is critical to recognise that innovation cannot occur in a vacuum. Additionally, several studies have thoroughly examined the resource-based view and demonstrated its ability to manage innovation through the interaction of firm resources (Hafeez et al., 2012). The resource-based perspective emphasises the importance and role of a firm's distinct resources and competencies in determining the magnitude of a firm's capacity to manage innovation (Hafeez et al., 2012; Yam et al., 2004; Ding and Huang, 2019). As a result, the capability of human resources will have a significant impact on the performance and sustainability of businesses. The following hypothesis is advanced based on these conceptual and empirical understandings:

- H5 Human resources allocation capability will have a positive influence on Malaysian SMEs' business performance.

## 2.8 *Strategic planning capability*

According to studies, strategy is defined as a plan that integrates an organisation's goals, policies, and operational activities (Mintzberg and Waters, 1982). Whereas strategic planning is defined as the process of identifying and implementing activities that aim to improve an organisation's long-term performance by establishing direction and fostering ongoing compatibility (Mintzberg and Lampel, 1999). Strategic planning capability is defined in this context as a firm's ability to identify internal strengths and weaknesses through analysis and management of external opportunities and threats through the formulation of plans consistent with the firm's vision and mission (Yam et al., 2004; Purser and Cabana, 1997; Asaari, 2004).

Essentially, strategic planning is a critical factor in determining the impact of a firm's performance. Scholars have demonstrated that it functions as a managerial toolkit for business management processes and, additionally, that it can perform the appropriate business stimulation in uncertain situations (Yam et al., 2004; Purser and Cabana, 1997; Asaari, 2004). Strategic planning is a systematic approach to defining and achieving the firm's objectives. Most importantly, strategic planning can help an organisation close the gap between where it is now and where it wishes to be in a particular business (Nzewi and Ojiagu, 2015).

Innovation requires both skills and knowledge, as well as deliberate decisions about the direction of the business (Salkic, 2014). As a result, it is argued that failing to plan strategically can result in poor performance and decreased chances of survival (Falshaw et al., 2006; Andersen and Nielsen, 2009; Salkic, 2014).

Strategic planning capability improves management practises in all aspects by connecting the firm's long-term goals to its operational plans in order to maximise efficiency and effectiveness for innovative organisational performance (Falshaw et al., 2006; Andersen and Nielsen, 2009). From this perspective, organisational strategic planning capability is associated with a resource-based strategic approach because it

integrates multiple competencies (O'Regan and Ghobadian, 2005) and resources, both internal and external (Chen et al., 2008; O'Regan and Ghobadian, 2005). The following is hypothesised in light of this finding:

H6 Strategic planning capability will have a positive influence on Malaysian SMEs' business performance.

## *2.9 Learning capability*

The ability of a business to recognise, absorb, exploit, and share knowledge is referred to as its learning capability (Farzaneh et al., 2020; Lin and Wu, 2014; Hsu and Wang, 2012). It serves as the foundation for increasing operational efficiency, stimulating innovation, and increasing organisational agility in order to ensure the survival of the business. Additionally, it is the capacity of organisations to generate impactful ideas across multiple boundaries and through targeted management initiatives, as well as the capacity of organisations to learn from their experiences and progress across boundaries and time (Rao et al., 2018; Wang et al., 2010; Qiu et al., 2015; Li, 2020). Additionally, learning capability emphasises the psychological characteristics of organisations that facilitate knowledge sharing through experimentation, risk-taking, interaction, dialogue, and decision-making (Qiu et al., 2015).

The degree to which an organisation is learning-oriented can be determined by its view on the importance of learning, and it contributes to the competitive advantage paradigm by reflecting as an investment in the organisation's strategic direction (Li, 2020; Suliyanto and Rahab, 2012). Thus, the evidence indicates unequivocally that learning capability has a positive effect on a company's ability to innovate through knowledge acquired both internally and externally. On the basis of these facts, the following hypothesis is developed:

H7 Learning capability will have a positive influence on Malaysian SMEs' business performance.

## *2.10 Manufacturing capability*

Changes in consumer demand dominantly underpin industries, and businesses innovate to supply the desired products. These data demonstrate that industries follow a theoretically predictable cycle of change dubbed the industry life cycle curve (ILC) (Aherne, 2006; Levitt, 1965). Typically, the industry's life cycle curve is divided into four distinct phases: introduction, growth, maturity, and decline (Aherne, 2006; Levitt, 1965).

Besides, the information technology-driven market position on technology research and growth has shifted significantly in terms of connecting innovation inputs and outputs for new product development and business performance (Kolluru and Mukhopadhaya, 2017; Chen et al., 2008; Rubera & Kirca, 2012).

Manufacturing capability, in this context, refers to a firm's ability to convert research and development results into products that meet market demand in a particular industry (Chen et al., 2008; Li, 2020; Suliyanto and Rahab, 2012). Customer preferences and expectations fluctuate; innovation enables incumbent firms to defend their market positions while maintaining growth in their market segmentation. In essence, the more dynamic or difficult the target market is to penetrate due to the factors affecting it, the greater the pressure to innovate (Kolluru and Mukhopadhaya, 2017; Nham et al., 2015).

A growing body of knowledge about manufacturing capability has emerged (Li, 2020; Kolluru and Mukhopadhaya, 2017; Rubera and Kirca, 2012). It is widely believed that innovation is critical to a firm's survival and long-term competitive advantage, and that research and development are critical components of a firm's life cycle (Aherne, 2006; Levitt, 1965). As such, the following hypothesis is advanced:

H8 Manufacturing capability will have a positive influence on Malaysian SMEs' business performance.

### **3 Methodology**

#### *3.1 Research design*

To obtain a comprehensive picture that is replete with understanding based on the hypotheses. This study takes a quantitative approach, employing a research survey to ascertain the degree to which SME business performance phenomena exist. A structured questionnaire was developed to assess the following eight variables: product innovation capability, marketing innovation capability, service innovation capability, research and development capability, human resource allocation capability, strategic planning capability, learning capability, and manufacturing capability. The variables were quantified using 5-point Likert scales ranging from strongly disagree (1) to strongly agree (5). The items used to assess the eight innovation capabilities were adapted from Lin et al. (2010), Yam et al. (2004) and Rahman (2001).

#### *3.2 Sampling frame*

The sampling frame was obtained from SME Corporation Malaysia. According to the SME Corporation, Malaysia has a total of 61,841 registered companies, with the majority (20,509 companies) located in Selangor and the fewest (79) in the Federal Territory of Labuan. The respondents were the organisation's senior executives. Krejcie and Morgan (1970) recommended a sample size of 382 respondents for a population of 70,000. However, a sample size of 550 respondents was chosen to increase the level of confidence and degree of accuracy.

#### *3.3 Survey procedure and data collection*

At the initial stage, respondents were contacted via e-mail. 27 e-mails were unsuccessful out of 550 sent, either due to an incorrect e-mail address or because the businesses were no longer in operation. The second stage of contact was via telephone to solicit responses to the survey. This approach resulted in the receipt of 146 questionnaires, which equates to a response rate of 26.5%. However, 22 questionnaires were discarded due to incomplete data, leaving a total of 124 completed questionnaires for analysis and conclusion. The majority (50.8%) of respondents were from the manufacturing sector, while the remainder were from the export sector (49.2%).

### 3.4 Questionnaire design and measurement scales

Four sections were included in the questionnaire. Section A contains 22 items containing general information about the company. Section B contains 41 entries pertaining to innovation capabilities. This section is intended to shed light on the role of SMEs in incorporating innovation capabilities into their day-to-day operations.

The eight variables that comprise the innovation capabilities component and business performance were assessed using five-point Likert scales ranging from strongly disagree (1) to strongly agree (5). The items used to assess the eight dimensions of innovation capability and business performance were adapted from Lin et al. (2010), Yam et al., (2004) and Rahman (2001).

### 3.5 Reliability finding – pilot study

The preliminary findings demonstrate a satisfactory output with a value greater than 0.7, indicating good internal consistency and convergent validity (Fornel and Larcker, 1981). Cronbach's Alpha values are as follows: product innovation capability is 0.887, marketing innovation capability is 0.884, service innovation capability is 0.950, research and development capability is 0.888, and resource allocation capability, strategic planning capability, learning capability, and manufacturing capability are 0.901, 0.933, 0.863, and 0.875, respectively. Cronbach's Alpha values ranged between 0.884 and 0.950, all above the value of 0.7; thus, all constructs are deemed to be sufficiently reliable. Additionally, this study followed all necessary ethical guidelines, including not disclosing respondents' identities, not requiring respondents' contact information in the questionnaire, and not obtaining individual preferences.

## 4 Data analysis and results

### 4.1 Product innovation capability

The capability for product innovation is highlighted in Table 1. According to the findings, 67.7% of SMEs have launched new products, while 52.4% have launched customised products in response to market demands. A sizable percentage promotes market innovation. Whereas 8.8% of respondents have not launched any new products, and 6.4% have not begun developing customised products in response to market demands.

Additionally, this study demonstrated that in response to competitor entry, SMEs will either expand or contract their product lines, which explains why 55.7% of SMEs expand their product lines. Apart from the aforementioned findings, there may be some weaknesses, such as cost constraints or potential risks associated with product line expansion, as evidenced by the 7.2% of SMEs that do not expand their product lines.

Besides, only 29% of SMEs recognise the value of engaging in new product development in order to obtain patents, and 8% of respondents do not engage in new product development in order to obtain patents. This low percentage is most likely due to a number of factors. One possibility is that SMEs are unaware of the legal implications. The other reason is that patents can be expensive, and small businesses may have preferred to invest in other aspects of their operations.

However, a sizable majority of SMEs (50.8%) agreed that new product development assisted their businesses in expanding into new markets. Only 4% of Malaysian SMEs do not diversify their markets through new product development. This could be because they are unprepared to deal with the challenges associated with new market expansion.

#### *4.2 Marketing innovation capability*

Four statements are used to assess a small business's ability to innovate in marketing (Table 1). 56.5% of the 124 SMEs use innovative pricing methods in the market, most likely because they recognise that pricing is the only tool in the marketing mix that directly generates revenue. 7.2% of SMEs, on the other hand, do not use innovative pricing methods. They could be concentrating their efforts on other aspects of the business, such as product design, cost leadership, or even sales volume.

Around 49.2% of SMEs agreed that they also used innovative methods of market distribution, while 41.9% of SMEs used innovative methods of market promotion. These findings indicate that SMEs recognise the value of marketing channels in order to provide convenience through distribution channels. A small proportion of SMEs, 7.3% and 8.9%, respectively, do not use novel methods of distribution or market promotion.

This low percentage is likely due to the fact that they are small businesses or newly established businesses with limited innovative distribution and promotion methods. Furthermore, the study found that 45.9% of respondents are constantly expanding the market to meet potential demand. This means that SMEs can be a critical source of market growth and job creation.

A total of 4.8% did not continuously expand potential market demands, owing to their inability to participate in globalisation.

#### *4.3 Service innovation capability*

Table 1 focuses on the capability of SMEs to innovate in the service sector. According to the findings of this study, the majority of SMEs (54%) import innovative warranty and maintenance systems to increase customer satisfaction, demonstrating the critical importance of instilling customer confidence in company products and services. However, 11.3% of SMEs do not import innovative warranty and maintenance systems, owing to high import costs, when adequate local warranty and maintenance systems are available.

While 41.1% of SMEs import innovative claim clearing procedures and methods to improve customer satisfaction, a small percentage (12.1%) of SMEs do not import such procedures and methods. Additionally, there is a significant influence on both pre-and post-sale techniques for increasing customer satisfaction. According to this study, 48.4% of SMEs positively responded to the statement. Only 7.2% of SMEs do not use innovative pre- and post-sale service techniques.

The finding further reveals that 52.4% of SMEs have implemented innovative order management and follow-up systems. There may be a new wave of process and technology innovation that must align with and integrate with order management requirements, particularly for emerging information technology solutions and delivery models. A small (8.9%) of SMEs are likely still attempting to integrate information technology solutions into their operations.

**Table 1** Malaysian SMEs for product, marketing and service innovation capability

<i>Product innovation capability</i>								
<i>No.</i>	<i>Items</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>Mean</i>	<i>SD</i>
1	Our company launches new products.	4.8	4.0	23.4	42.7	25.0	3.8	1.02
2	Our company extends numbers of product lines.	2.4	4.8	37.1	45.2	10.5	3.6	0.84
3	Our company engages in New Product Development to obtain patents.	4.0	4.0	62.9	18.5	10.5	3.3	0.86
4	With New Product Development, our company enlarges new markets.	4.0	-	45.2	30.6	20.2	3.7	0.84
5	Our company launches customised products according to market demands.	2.4	4.0	41.1	24.2	28.2	3.8	1.0
<i>Marketing innovation capability</i>								
1	Our company leads innovative pricing methods in the market.	2.4	4.8	36.3	50	6.5	3.5	0.79
2	Our company leads innovative distributing methods to the market.	-	7.3	43.5	48.4	0.8	3.4	0.64
3	Our company leads innovative promoting methods to the market.	-	8.9	49.2	38.7	3.2	3.4	0.69
4	Our company continually enlarges potential market demands.	-	4.8	49.2	40.3	5.6	3.5	0.68
<i>Service innovation capability</i>								
1	Our company imports innovative warranty and maintenance systems for enhancing customer satisfaction.	3.2	8.1	34.7	40.3	13.7	3.5	0.94
2	Our company imports innovative claim clearing procedures and methods for enhancing customer satisfaction.	3.2	8.9	46.8	29.8	11.3	3.4	0.91
3	Our company imports innovative techniques before-sale and after-sale service methods for enhancing customer satisfaction.	3.2	4.0	44.4	33.1	15.3	3.5	0.91
4	Our company adopts innovative order management and follow-up systems.	2.4	6.5	38.7	37.1	15.3	3.6	0.91

Notes: 1 = Strongly disagree; 2 = disagree; 3 = slightly agree; 4 = agree; 5 = strongly agree; SD = standard deviation.

#### *4.4 Research and development capability*

Three critical statements were used to assess the research and development capability of SMEs in relation to their business performance. According to the findings, 31.5% (Table 2) of SMEs have a rapid feedback system for designing and engineering processes from the manufacturing department. This is probably one of the most effective strategies for acquiring new customers and retaining existing ones. Additionally, the study reveals that 12.1% of SMEs lack a quick feedback system. It is possible that these SMEs are more focused on product development and promotion.

Furthermore, according to Table 2, only 19.3% of SMEs have a mechanism in place to transfer technology from research to product development. This may be because technology transfer requires significant investment and time for research and development. Apart from that, the study reveals that 16.9% of SMEs lack the capability to transfer technology from research to product development.

Nonetheless, 29% of SMEs incorporate rapid customer feedback into their product innovation processes. It demonstrates the critical nature of research and development capabilities. Aside from that, the findings reveal that 14.5% of SMEs do not have a system in place to provide rapid customer feedback during the product innovation process.

#### *4.5 Human resources allocation capability*

The finding in Table 2 correlates the capability of SMEs to allocate human resources with their business performance in Malaysia. According to the findings, 59.7% of SMEs place a high value on human resources, and 48.4% have a human resource programme at various levels within their organisations. These findings indicate that SMEs in Malaysia recognise the critical nature of human resource management in their operations. This is also consistent with previous research indicating that human capital is critical for innovation, particularly in small and medium-sized businesses (Bai and Wang, 2016).

Only 9.7% of SMEs place a low premium on human resources, and 12.9% lack an organisational-wide human resource programme. These SMEs probably do not hire any employees, have a small number of employees, or rely heavily on machinery in lieu of human skills.

Additionally, this study found that 37.9% of SMEs agree that they select key personnel for the innovation process in each functional department. It demonstrates that operational staff receives the necessary training and knowledge in accordance with the firm's innovation process. Only 8.1% of respondents indicated that their organisations do not select key personnel for the innovation process from functional departments.

This study discovered that 91.9% of SMEs maintain a steady supply of human capital for innovation activities, and none of them disagreed. The primary reason could be that SMEs recognise the critical role of innovation in achieving a competitive edge in business.

#### *4.6 Strategic planning capability*

Table 2 summarises the findings regarding the strategic planning capability of Malaysian SMEs. This category contains five statements. More than half of SMEs (62.1%) are adept at identifying internal strengths and weaknesses. The majority of SMEs (61.1%) have a



high capacity for identifying external opportunities and threats. These findings indicate that SMEs are well aware of the importance of business management.

**Table 2** Malaysian SMEs for research and development, resource allocation and strategic planning capability

<i>Research and development capability</i>								
<i>No.</i>	<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>Mean</i>	<i>SD</i>
1	Our company have quick feedback system from manufacturing department on design and engineering.	-	12.1	56.5	31.5	-	3.2	0.63
2	Our company have good mechanisms for transferring technology from research to product development.	0.8	16.1	63.7	18.5	0.8	3.0	0.64
3	Our company generate quick customer feedback into product innovation process.	0.8	13.7	56.5	28.2	0.8	3.1	0.68
<i>Human resources allocation capability</i>								
1	Our company provide importance to human resources.	-	9.7	30.6	46.8	12.9	3.6	0.83
2	Our company have human resource program for various level.	-	12.9	38.7	46.0	2.4	3.4	0.74
3	Our company selects key personnel in each functional department into the innovation process.	-	8.1	54.0	29.8	8.1	3.4	0.75
4	Our company provides steady human capital for innovation activities.	-	-	8.1	75.8	16.1	3.5	0.84
<i>Strategic planning capability</i>								
1	Our company have high capability in identifying internal strengths and weaknesses.	-	-	37.9	47.6	14.5	3.8	0.69
2	Our company have high capability in identifying external opportunities and threats.	-	-	37.9	44.4	17.7	3.8	0.72
3	Our company have clear goals.	-	-	29.0	43.5	27.4	4.0	0.75
4	Our company have a clear plan - a road map of new product and process with measurable milestone.	-	-	48.4	32.3	19.4	3.7	0.77
5	Our company is highly adapted and responsive to external environment.	-	8.9	46.8	39.5	4.8	3.4	0.72

Notes: 1 = Strongly disagree; 2 = Disagree; 3 = Slightly agree; 4 = Agree; 5 = Strongly agree; SD = Standard deviation

Seventy-nine percent of SMEs responded that they have clear goals, and none disagreed. Furthermore, the study discovered that 51.7% of respondents have a clear plan – a road map for new products and processes with measurable milestones – with which they agree. 44.3% of SMEs, on the other hand, are highly adaptable and responsive to their external environment. SMEs that responded positively are more likely to understand the value of strategy and innovation than those that responded negatively.

#### 4.7 Learning capability

According to Table 3, three statements were made about the effect of learning capability on the business performance of SMEs in Malaysia. 84.7% of SMEs encourage work teams to identify opportunities for improvement. It could have occurred as a result of strong leadership and the organisation's need for knowledge-oriented leadership. Only 2.4% of SMEs do not encourage work teams to identify opportunities for improvement. Apart from that, 73.3% of businesses incorporate accessed knowledge into their daily operations, while only 2.4% of SMEs do not.

#### 4.8 Manufacturing capability

According to Table 3, the findings show that 33% of SMEs confirmed that their manufacturing departments were capable of converting research and development output into products. This can be interpreted to mean that these businesses possess sufficient technological, human, and financial resources. On the other hand, only 1.6% of SMEs reported a decline in their manufacturing department's ability to convert research and development output into production.

**Table 3** Malaysian SMEs for learning capability and manufacturing capability

		<i>Learning capability</i>					<i>Mean</i>	<i>SD</i>
<i>No.</i>	<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>		
1	Our company encourages work teams to identify opportunities for improvement.	-	2.4	12.9	69.4	15.3	4.0	0.62
2	Our company adopts accessed knowledge into our daily activities.	-	2.4	24.2	67.7	5.6	3.8	0.59
3	Our company understands its core capabilities and match them with market needs.	-	2.4	23.4	71.8	2.4	3.7	0.54
<i>Manufacturing capability</i>								
1	Our company's manufacturing department have ability in transforming R&D output into production.	1.6	11.3	61.3	25.0	8.0	3.1	0.67
2	Our company effectively applies advanced manufacturing methods.	0.8	14.5	62.9	21.8	-	3.1	0.63
3	Our company have capable manufacturing personnel.	0.8	11.3	39.5	27.9	10.5	3.5	0.86

Notes: 1 = strongly disagree; 2 = disagree; 3 = slightly agree; 4 = agree; 5 = strongly agree, SD = standard deviation.

Additionally, the study found that 21.8% of respondents used advanced manufacturing methods effectively, while 15.3% did not. These findings demonstrate the organisation's reliance on its resources (technological, human, and financial) to implement advanced manufacturing methods effectively. Finally, 38.4% of respondents report having capable manufacturing personnel, which is likely the result of a thorough recruitment process or an effort on the part of the company to train its employees. Whereas 12.1% of SMEs lack skilled manufacturing personnel, this is most likely due to the fact that they are not in the manufacturing industry.

## **5 Discussion with Pearson product-moment correlation and multiple regression findings**

The Pearson product-moment correlation coefficient is first used, followed by multiple regressions to interpret the relationship between the eight variables of innovation capabilities and the business performance of SMEs in Malaysia.

### *5.1 Product innovation*

Table 4 summarises the correlation scores for the variables' relationships. Preliminary analyses are conducted to ensure that the normality, linearity, and homoscedasticity assumptions are not violated. Product innovation capability was found to have a weak positive correlation with business performance,  $r = .392$ ,  $n = 124$ ,  $p < 0.01$ . It is a term that refers to a high capacity for product innovation that is associated with a gradual but positive increase in business performance.

As a result, the more advanced and sophisticated the product innovation capability applied to SMEs' business performance, the more positive and gradual the increase in business performance outcome rate among Malaysian SMEs. In terms of the variance shared by the two variables, the coefficient of determination ( $r^2 = 15.37$ ) indicates that product innovation capability contributes to nearly 15% of the variance in business performance. This is a minuscule amount of variance. Indeed, there is a positive and linear relationship between capability for product innovation and business performance. The findings indicate that the more product innovation capability is employed and encouraged in SMEs, the better their business performance will be. The findings of this study corroborate previous research demonstrating that product innovation can leverage and manipulate new knowledge and technologies, as well as improve new uses, for business success (Pett and Wolf, 2009; Gunday et al., 2011).

### *5.2 Marketing innovation*

The relationship between marketing innovation capability and business performance was examined, and Table 4 summarises the correlation scores for the variables. The correlation between product marketing innovation capability and business performance is moderately positive,  $r = .575$ ,  $n = 124$ ,  $p < 0.01$ . It refers to a high capacity for marketing innovation in conjunction with a high level of business performance.

As a result, the better and more sophisticated the marketing innovation capability applied to SMEs' business performance, the higher the rate of business performance outcome in Malaysia's business innovation. With regard to the variance shared by the

two variables, the coefficient of determination ( $r^2 = 33.06$ ) indicates that marketing innovation capability contributes nearly 33% of the variance in business performance. It is a relatively small amount of variation. Indeed, a positive and linear relationship exists between marketing innovation capability and business performance. The findings indicate that the more marketing innovation capability is applied to SMEs' business performance, the more innovative and profitable the business is. This study confirms previous findings that SMEs' marketing capability includes market research, service marketing, price setting strategy, market segmentation, promotion, and distribution that are all related to business performance (Vorhies and Morgan, 2005).

### 5.3 *Service innovation*

The correlation score between service innovation capability and business performance is highlighted in Table 4. A weak, positive correlation exists between service innovation capability and business performance,  $r = .194$ ,  $n = 124$ ,  $p < 0.05$ . These are associated with a high level of service innovation capability and a gradually increasing level of business performance for SMEs.

The result indicates that the more service innovation capability is used in SMEs' business performance, the higher the rate of business performance outcome, but at a slower rate than in Malaysian SMEs' business performance. With regard to the variance shared by the two variables, the coefficient of determination ( $r^2 = 3.76$ ) indicates that service innovation capability contributes nearly 4% of the variance in business performance. It is a negligible amount of variance.

Between service innovation capability and business performance, there is a positive and linear relationship. The findings indicate that as service innovation capability is increased in SMEs, business performance improves, but at a relatively slow incremental rate. In a general context, the findings of this study support the notion that understanding customer needs and requirements is critical for sustaining competitiveness through services (Deshpandé et al., 1993; Johnson, 1998; Martin and Horne, 1995).

### 5.4 *Research and development*

The relationship between research and development capability and business performance is illustrated in Table 4. It demonstrates that the relationship is insignificant, with  $r = .071$ ,  $n = 124$ ,  $p > 0.05$ . The study concludes that there is no statistically significant relationship between research and development capabilities and business performance.

It asserts that research and development capability has no bearing on the performance of Malaysian SMEs. This study contradicts previous research indicating the critical role of research and development in establishing a competitive advantage for SMEs (Yam et al., 2004). It demonstrates that SMEs in Malaysia must raise awareness of research and development within business operations and functional areas, as there appears to be a correlation between research and development and business success.

### 5.5 *Human resources allocation*

The relationship between capability for human resource allocation and business performance was examined. The correlation score for the relationship between human resource allocation capability and business performance is highlighted in Table 4. The

finding shows that there is a strong, positive correlation between the two variables,  $r = .619$ ,  $n = 124$ ,  $p < 0.01$ . It is associated with a high level of human resource allocation capability and a high level of business performance for SMEs.

The result indicates that the more effectively and efficiently human resources are allocated in SMEs' businesses, the higher the rate of business performance outcome among SMEs' return on investment in Malaysia. With regard to the variance shared by the two variables, the coefficient of determination ( $r^2 = 38.32$ ) indicates that human resource allocation capability accounts for approximately 38% of the variance in business performance. This is a sizable amount of variation. Between human resource allocation capability and business performance, there is a positive and linear relationship. The findings indicate that as human resource allocation capability is increased in SMEs, business performance improves at a relatively high incremental rate.

The findings reveals that the business performance of SMEs in Malaysia is strongly related to their ability to allocate human resources effectively. Additionally, the result is consistent with prior research indicating that human resources and technology resources have a critical role in determining a firm's product and service competitiveness, innovation rate, and sales growth (Yam et al., 2004).

### 5.6 Strategic planning

The correlation score for the relationship between strategic planning capability and business performance is highlighted in Table 4. The correlation between the two variables is strong and positive, with  $r = .749$ ,  $n = 124$ ,  $p < 0.01$  respectively. It is associated with a high level of strategic planning capability and a high level of business performance for SMEs.

As a result, the better and more sophisticated the strategic planning capability employed by SMEs, the higher the rate of business performance outcome among Malaysian SMEs. In terms of the variance shared by the two variables, the coefficient of determination ( $r^2 = 56.10$ ) indicates that strategic planning capability contributes nearly 56% of the variance in business performance. This is a significant amount of variation. Between strategic planning capability and business performance, there is a positive and linear relationship. The findings indicate that when SMEs employ a greater degree of strategic planning capability, their business performance will improve significantly. The findings of this study corroborate those of previous research, indicating that strategic planning capability has a significant and beneficial effect on firms' business performance (Yam et al., 2004; Guan and Ma, 2003; Asaari, 2004).

### 5.7 Learning

Table 4 summarises the correlations between learning capability and business performance. The correlation between the two variables is strong and positive, with  $r = 0.561$ ,  $n = 124$ ,  $p < 0.01$ . It is associated with a high level of learning capability and a high level of business performance for SMEs.

As a result, the higher the learning capability utilised by SMEs, the higher the business performance. In terms of the variance shared by the two variables, the coefficient of determination ( $r^2 = 31.47$ ) indicates that learning capability contributes nearly 31% of the variance in business performance. It is a comparatively small amount of variation. There is a positive and linear relationship between learning capability and

business performance. The findings indicate that if SMEs employ a greater degree of learning capability, their business performance will improve incrementally.

### 5.8 Manufacturing

The correlation score for the relationship between manufacturing capability and business performance is highlighted in Table 4. The findings show a weak, positive correlation between the two variables:  $r = .295$ ,  $n = 124$ ,  $p < 0.01$ . It relates to a high level of manufacturing capability associated with a positively slow level of SME business performance.

**Table 4** Pearson's correlation finding on business performance of SMEs in Malaysia

		<i>Business performance</i>	<i>Relationship</i>
Product innovation capability	Pearson correlation	0.392**	Weak
	Sig. (two-tailed)	000	Sig at 0.01
	N	124	
Marketing innovation capability	Pearson correlation	0.575**	Moderate
	Sig. (two-tailed)	000	Sig at 0.01
	N	124	
Service innovation capability	Pearson correlation	0.194*	Weak
	Sig. (two-tailed)	0.031	Sig at 0.05
	N	124	
R&D capability	Pearson correlation	0.071	Not supported
	Sig. (two-tailed)	0.433	Not significant
	N	124	
Resources allocation capability	Pearson correlation	0.619**	Strong
	Sig. (two-tailed)	000	Sig at 0.01
	N	124	
Strategic planning capability	Pearson correlation	0.749**	Strong
	Sig. (two-tailed)	000	Sig at 0.01
	N	124	
Learning capability	Pearson correlation	0.561**	Moderate
	Sig. (two-tailed)	000	Sig at 0.01
	N	124	
Manufacturing capability	Pearson correlation	0.295**	Weak
	Sig. (two-tailed)	0.001	Sig at 0.01
	N	124	

Notes: \*\*Correlation is significant at the 0.01 level (two-tailed).

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

As a result, as manufacturing capability is increased in SMEs, business performance improves, but at a slower rate. With regard to the variance shared by the two variables, the coefficient of determination ( $r^2 = 8.70$ ) indicates that manufacturing capability

accounts for approximately 8% of the variance in business performance. It is a small amount of variance. The findings indicate that as SMEs increase their manufacturing capability, their business performance will improve, but at a slower rate.

### 5.9 Multiple regression finding and model analysis

The standard multiple regression analysis finding confirmed the study's predictability. The assumptions of linearity, normally distributed error, and uncorrelated error was checked and fulfilled. The finding was assessed from the model summary (Table 5) with  $R^2$  equal to 0.5 or higher (Hancock and Mueller. 2001).

Manufacturing capability, market innovation, learning capability, service innovation, product innovation, R&D capability, strategic planning, and resource allocation were used in predicting business performance.

The prediction model was statistically significant,  $F(9, 114) = 43.743$ ,  $p < 0.001$ , and accounted for approximately 76% of the variance of business performance ( $R^2 = .775$ , Adjusted  $R^2 = .758$ ) (Table 5). Since the adjusted  $R^2$  statistic corrects the value in the findings and reveals a better estimation of the true population value, it is used for model evaluation. Accordingly, the model explains 76% of the variance in business performance,  $F(9, 114) = 43.743$ ,  $p < 0.001$  (Table 5).

**Table 5** Model summary

<i>Model summary<sup>b</sup></i>				
<i>Ym</i>	<i>R</i>	<i>R Square</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>
1	.881 <sup>a</sup>	.775	.758	3.83989

Notes: <sup>a</sup>Predictors: (Constant), manufacturing capability, market innovation, learning capability, service innovation, product innovation, R&D capability, strategic planning, resource allocation

<sup>b</sup>Dependent variable: business performance

**Table 6** Anova

<i>ANOVA<sup>a</sup></i>						
<i>Model</i>		<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
1	Regression	5804.778	8	644.975	43.743	.000 <sup>b</sup>
	Residual	1680.900	114	14.745		
	Total	7485.677	123			

Notes: <sup>a</sup>Dependent variable: business performance

<sup>b</sup>Predictors: (constant), manufacturing capability, market innovation, learning capability, service innovation, product innovation, R&D capability, strategic planning, human resource allocation

The adjusted  $R^2$  of 0.758 implies that the eight predictor variables (product innovation, marketing innovation, service innovation, research & development, learning, human resources allocation, strategic planning, and manufacturing) explain about 76% of the variation in business performance SMEs Malaysia. It is quite a reasonable and respectable result. The ANOVA (Table 6) revealed that the F-statistics ( $F = 43.743$ ) low and the corresponding p-value (Table 7) is only significant with (marketing innovation capability ( $\beta = 0.283$ ,  $p < 0.001$ ), strategic planning ( $\beta = 0.540$ ,  $p < 0.001$ ), learning capability ( $\beta = 0.189$ ,  $p < 0.05$ ) and R & D capability ( $\beta = -536$ ,  $p < 0.001$ ). From this

finding, the following hypotheses are not rejected: *H2. Marketing innovation capability has a positive effect on Malaysian SMEs business performance, H4. Research and development capability will have a positive influence on Malaysian SMEs' business performance, H6. Strategic planning capability has a positive effect on the Malaysian SMEs business, and H7. Learning capability will have a positive influence on Malaysian SMEs' business performance.*

**Table 7** Regression coefficients and significant levels

Model	Unstandardised coefficients		Standardised coefficients	t	Sig.
	B	Std. error	Beta		
(Constant)	25.377	3.336		7.606	.000
Product innovation	.034	.137	.017	.249	.804
Marketing innovation**	.912	.194	.283	4.703	.000
Service innovation	.163	.138	.072	1.181	.240
R&D capability**	-2.358	.298	-.536	-7.920	.000
Human resources allocation	.374	.229	.133	1.632	.105
Strategic planning**	1.295	.195	.540	6.644	.000
Learning capability*	.953	.373	.189	2.558	.012
Manufacturing capability	.340	.285	.085	1.195	.235

Notes: Dependent variable: Business performance

\*\* P < .001

\* P < .05

## 6 Limitation and future research

This study focused exclusively on one aspect of diffusion theory: the DOI characteristics. Future research could expand the application of diffusion theory's other components. Additionally, this study generated only eight key innovation propositions. Therefore, the variables are constrained. Due to the respondents' diverse backgrounds in the SME business sector and educational attainment, the responses become extremely heterogeneous.

This research is limited to SMEs operating in peninsular Malaysia; the respondents do not represent the entire industry in Malaysia and excluded comparisons to other countries with comparable levels of operation and organisational structure. If this sample size had been used, the findings might have produced different results, providing additional evidence for the theory's underpinnings.

Apart from that, the research was unable to take into account the innovation capability of more established firms, as the study focused exclusively on the manufacturing sector. The other limitation is that this study used a cross-sectional design and a quantitative approach. This leads to the gap between the current research and its findings. Future research should include more homogeneous subjects as well as variables moderating the competitive environment. These will improve the model's accuracy. However, it is also possible to do so by including moderating variables such as the business environment and company size.



In addition, future research can examine other diffusion characteristics suggested by Gatignon and Robertson (1985), Frambach (1993), and variables such as organisational psychographics (Robertson and Wind, 1980). Also, research by Wind et al. (1982) found separate diffusion patterns among different target markets adopting industrial innovations. Further, research can also test diffusion characteristics with green marketing strategies targeting personal consumers with variables such as global consumer values, consumer trust of marketers, and consumer perceived risk of products and services. Finally, a longitudinal study with a qualitative approach would be beneficial for clear judgement on innovation capability because time comparison can reveal behaviour modification and other uncertainty.

## **7 Conclusions**

This study reveals the contributory effort in providing a systematic understanding of innovation capability for Malaysian SMEs' business performance. Based on the findings and discussion, the innovation element affects business performance and generates sustainability.

Multiple regression findings indicates that, innovations play a critical role in Hypothesis 2 (marketing innovation), Hypothesis 6 (strategic planning), Hypothesis 7 (learning capability), and Hypothesis 4 (research and development capability). The finding reveals that strategic planning capability is the most significant variable in innovation capability among SMEs in Malaysia for business performance, followed by marketing innovation and, finally, learning capability.

It emphasises that innovation has a beneficial effect on strategic planning orientation or that strategic orientation combined with innovation has a beneficial effect on firms' business operations. Strategic orientation combined with innovation can guide SMEs to be more aggressive, adaptable, and responsive to change, as well as to deal with environmental uncertainties. It is critical to note that businesses must foster entrepreneurial qualities at both the individual and corporate levels. Strategies are critical to achieving superior business performance, and with the possibility of an external alliance, business models for targeted market segmentation could be enhanced.

In the aspect of marketing innovation, the study shows the need for SMEs to coordinate and plan an integrated set of commitments and execute the design to exploit the core competencies to gain a competitive advantage. It views innovation as a requirement for renewal, redesign, and realisation in order for SMEs to maintain a competitive edge in a turbulent market environment.

The learning capability reveals a central role in motivating business performance because innovation will transform a firm's internal capabilities by making them more adaptive to change. It suggests that SMEs need to develop and structure their capacities towards innovation capability by hiring a technically qualified workforce or developing training methods that can act as a catalyst to enhance the staff's creativity and innovativeness. Having a clear understanding of the exact nature of innovations will help firms prioritise their market, production, and technology strategies.

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