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Marketing Technology Absorptive Capacity and Performance of Small & Medium Enterprise (SMEs) in Malaysia

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Abstract

The evolution of marketing technology has become a critical driver of success for Small and Medium Enterprise (SMEs) in today's dynamic and competitive environment. However, technology adoption alone does not necessarily impact firm performance directly. In fact, it depends on the ability of a firm to acquire, assimilate, transform, and exploit the technology to improve firm performance. This study aims to examine the impact of marketing technology adoption on the performance of SMEs with the existence of absorptive capacity as a mediator. In addition, the moderating effect of competitive environment and firm size on the direct and indirect relationship between marketing technology adoption and SME performance will be examined. The conceptual framework is drawn from TOE framework and theory of absorptive capacity. This study employs a quantitative survey questionnaire to collect data from a sample of 250 SMEs in Malaysia using stratified sampling. Data is analyzed using the SPSS and SmartPLS statistical tools. The findings are expected to show that absorptive capacity partially mediates the relationship between marketing technology adoption and SME performance. This implies that fostering absorptive capacity in an organization is an important factor that influence the impact of marketing technology adoption on the performance of SMEs in Malaysia. Besides, companies with larger numbers of employees and operate in a highly competitive environment are expected to appreciate the importance of absorptive capacity. This study contributes to the literature by demonstrating the importance of absorptive capacity in the relationship between marketing technology adoption and SME performance, as well as moderating effect of competitive environment and firm size. This research helps practitioners recognize the importance of acquisition, assimilation, transformation and the exploitation of marketing technology knowledge for business performance.

Keywords: Absorptive Capacity, Technology Adoption, Firm Performance, SME Performance, TOE Framework, Competitive Environment, Firm Size.

Introduction

SMEs play an important role in most economies, especially in developing countries. SMEs businesses make up most of the global economy and contribute significantly to job creation and global economic growth. It represents more than 90% of the world economy and more than 50% of employment worldwide (Canalys, 2023). In Malaysia, SMEs contribute to 38.4% of Malaysia's gross domestic product (GDP). Services and manufacturing remain the main drivers of SME GDP activities; these two sectors comprise more than 80% of SME GDP (Department of Statistics Malaysia, 2022). There are total 249,934 SMEs in Malaysia, excluding micro-enterprise, according to Department of Statistics Malaysia (2022). For the past few years, SMEs which form a significant part of Malaysia's economy, have been severely affected by the COVID-19 pandemic. The COVID-19 pandemic has forced SMEs to innovate by accelerating the adoption of new digital technologies for business survival (McKinsey Global Surveys, 2021). In particular, the increased adoption of social media and e-commerce technologies has enabled firms to continue their global sales activities, and even expand their geographical market reach. Despite the growing number of digital business providers such as e-commerce, fintech and marketing technologies in the market (World Bank's Digitalizing SMEs to Boost Competitiveness, 2022) and the acceleration of digital technology adoption among SMEs in Malaysia in recent years, there is still lack of data or evidence to conclude that the adoption of digital technologies improves the business performance of SMEs. The pressure from the competitors in a competitive environment also drives SMEs to embrace technological innovations as a means of gaining a competitive edge. Most firms felt that overall market competition had been rising post-pandemic, 56% of firms felt competition had increased in the past 12 months (Kuriakose, 2022). According to SME Trends Report (Salesforce, 2021), SMEs particularly rely on technologies such as customer relationship management (CRM) system (56%), email marketing software (51%), e-commerce software (51%) and marketing automation (45%). A report shows that 38% of the small businesses surveyed perceived the marketing technology helps increase a firm's sales and revenue, 31% perceived it helps promote brand awareness, and 30% perceived it allows firm to access to new customers (Deloitte, 2017). The marketing technology platform enables marketers to target potential customers and engage with existing customers digitally across multiple channels and mediums. Marketing technologies can help SMEs better understand their customers, target them more effectively, create brand awareness and deliver personalized experiences. This, in turn, will lead to an increase in new customers, improve customer satisfaction, retain existing customers, and build long-term customer engagement and relationships.

Technology adoption is one of the most widely discussed topics in the world of organization, especially with the digitalization and post-covid effect. Many of the previous studies appeared to focus on internal and external factors that impact technology adoption in an organization such as cloud computing adoption (CF Ming, 2018), Facebook adoption (Abdullahi et al., 2021), e-commerce adoption (Sin et al., 2016), ERP adoption (Mayeh et al., 2016), CRM adoption (Chavoshi et al., 2012) and IT/ICT/IS adoption (Asih et al., 2017; Faisol, 2022; Hoti, 2015). These studies have ignored the impacts of technology adoption on business performance which is more critical in the current dynamic and competitive environments. With the acceleration of technology adoption rate, organizations start to evaluate the impact of technology adoption on firm performance, especially for SMEs. Even though several studies shows that technology adoption does have a direct impact on firm performance, suggesting

a significant relationship between the two factors, the studies mainly focus on information technologies or digital marketing technologies (Arifin & Frmanzah, 2015; Giantari et al., 2022; Redjeki & Affandi, 2021). The adoption of technology (IT/ICT) positively affects firm's performance as mentioned by Arifin and Frmanzah (2015), Ma et al. (2021) and Faisol (2022). Besides, Qalati et al. (2021) reveal that the adoption of social media has a significant effect on SMEs' performance. Similarly, Khairuddin (2020) also confirmed that digital adoption is positively related to business performance. Furthermore, the findings of Giantari et al. (2022) show that the adoption of digital marketing can improve the non-financial performance of MSMEs. There was a lack of studies on marketing technology (MarTech). As defined by Scott Brinker, marketing technology stacks consist of six components: - advertising & promotion, commerce & sales, content & experience, data, management, social & relationships (Brinker, 2022). There are more than 9,000 MarTech solution providers available in the market. Thus, it is significant to analyze the adoption of marketing technology and its impact on the performance of SMEs.

With the business environment becoming more dynamic and competitive, solely adopting technology is no longer sufficient to improve a firm's performance. However, the assimilation and implementation of technology will have positive effect on the firm's performance (Deelert, 2020). To address this, firms need to develop their absorptive capacity (ACAP) so that organizations possess the ability to acquire external knowledge, assimilate it, transform it and exploit it for better business performance (Ma et al., 2021). The role of absorptive capacity in most of the studies are related to innovation performance (Munawar et al., 2021; Nabeel-Rehman & Nazri, 2019; Kostopoulos et al., 2011) and firm performance (Raisal et al., 2021; Tzokas et al., 2015). Furthermore, the roles of absorptive capacity are argued to vary in different roles. The roles include that of a moderator (Ibarra-Cisneros et al., 2021; Cisneros & Hernández-Perlines, 2019; Herath, 2020), a mediator (Ma et al., 2021; Cuevas-Vargas et al., 2022; Nabeel-Rehman & Nazri, 2019; SALISU & Mohammed, 2019; Nazeer et al.,2021; Tzokas et al., 2015), and an independent variable (Chaudhary & Batra, 2018; Neumann et al., 2021; Sancho-Zamora et al., 2021; Bolívar-Ramos et al., 2013; Kale et al., 2017). Thus, there are inconsistencies and mixed findings in terms of the role of absorptive capacity in mediating the relationship between technology adoption and SME performance. According to Indarti et al (2019), most studies on absorptive capacity were conducted in the context of large companies instead of SMEs, and concentrating on a moderating variable, independent variable, and dependent variables. The authors recommended that future directions for absorptive capacity investigations include delving deeper into organizational size, combining multiple theories (internal and external), and looking at mediating factors. According to Zamani (2022), TOE framework is the most popular theory in literature, which categorized factors influencing technology adoption into three categories: technological, organizational, and environmental. Within the organizational context, the influential factors of absorptive capacity on technology adoption and firm performance are yet to be fully explored. Durani (2021), Chiu (2017), and Lin (2014) have undertaken studies focusing on the adoption and implementation of technology rather than on firm performance. Any organization that operates in a business environment will somehow be affected by environmental factors. Most of the studies show that competitive environment does affect technology adoption (Abbasi et al., 2022; Matikiti et al., 2018; Sin et al., 2016) and firm performance (Yasa et al., 2020; Hussain et al., 2020). Limited studies emphasize competitive environment as an external trigger (moderator) that

influences absorptive capacity (Zahra & George, 2002), which in turn leads to competitive advantage.

The business environment that influences the firm's performance consists of environmental dynamism, environmental competitiveness, environmental complexity and environmental munificence (Mintzberg, 1979; Dess & Beard, 1984). From the environmental competitiveness perspective, Dess and Beard (1984) said environmental competitiveness means that there exists a high intensity of competition, a small number of market opportunities that can take advantage of and uncertainty of market and product, companies are affected direct by the forces and factors in the external environment, therefore survival is the primary objective of the enterprise. Dess and Beard (1984) and Jansen et al (2006) suggest that the external environment moderates the relationship between firms' resources and performance. These arguments supported by Prajogo (2016) who reveals that environmental competitiveness positively moderates the link between process innovation and business performance, but negatively moderates the link between product innovation and business performance. The findings from Jabeen et al. (2022) indicated that external environment in terms of market turbulence and competitive intensity moderates the relationship between market orientation and business performance of SMEs. In addition, Fu et al. (2021) concluded the external environment has a moderating impact on innovation and performance of Pakistani SMEs. In a competitive environment, a firm's ability to constantly stay ahead of competition is crucial. This encourages firms to adopt new technologies and make them more competent by fostering their internal capabilities. For instance, Hong et al. (2023) found that firms operating in highly competitive industries have a higher intention to adopt FinTech technology to gain competitive advantages. Thus, a highly competitive environment can lead to a higher intention to adopt technology and potentially improve a firm's performance. The actual outcome also depends on the firm's ability to adopt technological changes. Jansen et al. (2006) stated that companies competing in a highly dynamic environment should develop their potential absorptive capacity to reduce the risk of extinction, and that the competitive environment should encourage the development of realized absorptive knowledge. Thus, somehow, the external environment does influence absorptive capacity.

According to Daghfous (2004), firm size is one of the factors that influences a company's absorptive capacity. The size of the organization can compromise the effectiveness of the company's absorptive capacity. Firm size is measured by the number of employees in the entire organization. Firm size is an important source of absorptive capacity heterogeneity (Volberda et al., 2010). There are mixed findings in terms of the effect of firm size on technology adoption, firm performance, and absorptive capacity. Some studies show positive relationships (Isma'ili et al., 2016) or negative relationships (Alhammadi et al., 2015), while others show no relationship (Durani, 2021). Besides, in organizational studies, the varied roles of firm size have raised arguments. Some researchers used firm size as one of the determinants that influence technology adoption as part of the TOE framework, whereas others used it as a moderating variable (Lee et al., 2017; Salah et al., 2021) or a control variables (Ma et al., 2021) in relation to technology adoption, absorptive capacity, and firm performance.

From the preceding discussion, the direct relationship between technology adoption and firm performance has been well established. Previous research has been focusing on factors influencing technology adoption and its impact on firm performance based on the TOE framework (Tornatzky & Fleischer, 1990). However, there is a lack of extensive research and a shortage of studies that includes mediating effect of organizational factors (such as absorptive capacity) and moderating effect of environmental factors (such as competitive environment), as well as firm size, indicating a research gap that worth to be further explored. This study seeks to examine the role of absorptive capacity in mediating the relationship between marketing technology adoption and SME performance. Furthermore, competitive environment and firm size could have a moderating effect on the direct and indirect relationship between marketing technology adoption and SME performance. This study contributes to the literature by demonstrating the importance of absorptive capacity in the relationship between marketing technology adoption and SME performance, as well as moderating effect of competitive environment and firm size. This research helps practitioners recognize the importance of acquisition, assimilation, transformation and the exploitation of marketing technology knowledge for business performance.

Literature Review and Hypotheses Development

The relationship between Marketing Technology Adoption and SME Performance

The impact of technology adoption on firm performance has been widely studied. It has been proven that technology adoption has a positive direct relationship with firm performance (Ma et al., 2021; Abdullahi et al., 2022; Faisol, 2022; Hanafiah et al., 2021; Asih et al., 2017). Although the scope of technologies is different, commonly used technologies include Facebook, e-commerce, social media technology, cloud computing, ERP system, CRM system, information technology and digital marketing technologies. By adopting new technology in marketing, productivity and efficiency of businesses are increased. This is done through automating marketing operations, streamlining marketing workflows, and customer management. The use of information technology in marketing, sometimes known as marketing information technology does affect firm performance (Figueroa, 2020). Both Khairuddin (2020) and Qalati et al. (2021) confirmed that digital adoption and social media adoption respectively have a positive and direct effect on business performance. Some studies have shown a positive direct effect of technology adoption on the financial aspect of firm performance (Ma et al., 2021; Abdullahi et al., 2022; Gwadabe, 2017) while some authors argued that the impact of non-financial performance is more significant (Giantari et al., 2022; Redjeki & Affandi, 2021; Singh et al., 2021). Besides digital marketing and social media technology, the adoption of the e-SCM also has a positive impact on the performance of the firms (Dinesh Kumar Pandey, 2021). However, in studies on social media adoption, Ahmad et al. (2019) and Foltean et al. (2019) argued that there are no direct or indirect effects of social media adoption on firm performance in terms of sales revenue, but instead impact on non-financial performance in term of market share, customer loyalty and brand reputation (Qalati et al., 2021). Various research concluded the direct effect of technology adoption on firm performance and the indirect effect of technology adoption on firm performance does exist (Jalil et al., 2021; Lee et al., 2017 and Foltean et al., 2019). According to the finding from Ma et al. (2021), information technology has both a direct and indirect impact on firm performance in terms of sales and market share.

The Relationship between Marketing Technology Adoption and Absorptive Capacity

Marketing technology adoption plays a crucial role in enhancing a firm's absorptive capacity by providing the tools and capabilities to acquire and leverage external knowledge effectively. When organizations adopt marketing technologies, it allows them to access huge amounts of data, analytics, and insights for better marketing decision-making. This influx of information and knowledge enables firms to better understand customer behaviors, market trends, and competitive landscapes, enhancing their ability to absorb and apply external knowledge based on absorptive capacity theory. Several studies have shown that information technology adoption positively affects the absorptive capacity, which in turn improves firm performance (Ma et al., 2021; Bolívar-Ramos et al., 2013). The information technology adoption itself does not equivalent to absorptive capacity, rather it depends on a firm's ability to acquire the information technology knowledge, integrating external knowledge, build the competency and capabilities, and utilized to enhance business performance (Bi et al., 2009; Dong-ling Ning., 2011). The same argument was supported by Tzokas et al. (2015) who also concluded that technological capability of a firm does increase its absorptive capacity. However, Arifin and Frmanzah (2015) argued that the absorptive capability positively affects the adoption of technology, instead of vice versa. Absorptive capability has a close relationship with technology adoption and firm performance. Technology adoption and implementation foster the knowledge within the organization and increase firm ability to gain competitive advantage. Thus, it is concluded that technology adoption does influence a firm's absorptive capacity.

The Relationship between Absorptive Capacity and SME Performance

The relationship between absorptive capacity and firm performance is strong and mutually influential (Cuevas-Vargas et al., 2022; Rehman et al., 2020; Nazeer et al., 2021). The relationship between absorptive capacity and firm performance has been studied in different domains such as small family business (Chaudhary & Batra, 2018), SMEs (SALISU & Mohammed, 2019; Raisal et al., 2021), medium and large-sized manufacturing firms (Ibarra-Cisneros et al., 2021), small and medium manufacturing firms (Nabeel-Rehman & Nazri., 2019), textile and clothing firms (Nazeer et al., 2021), small and medium sized hotels and restaurants (Herath, 2020), marketing service companies (Figueroa et al., 2020) and generalised firms (Ma et al., 2021; Arifin & Frmanzah, 2015; Song et al., 2018; Kale et al., 2019; Pu & Liu, 2023). The importance of absorptive capacity in an organization has been known and established across multiple fields of studies such as innovation performance (Kostopoulos et al., 2011; Liu et al., 2018; da Costa et al., 2018; Medase & Barasa, 2019; Munawar et al., 2021; Cuevas-Vargas et al., 2022; Nabeel-Rehman & Nazri, 2019), organizational performance (Bolívar-Ramos et al., 2013; da Costa et al., 2018), business performance (Liu et al., 2018; Ahmed et al., 2019; Cisneros & Hernández-Perlines, 2019; Sancho-Zamora et al., 2021) and financial performance (Lichtenthaler, 2016; Neumann et al., 2021). Empirical studies from Pu and Liu (2023), Sancho-Zamora et al. (2021), and Neumann et al. (2021) show the direct relationship of absorptive capacity on firm performance. Furthermore, Liu et al. (2018) show that absorptive capacity can directly and indirectly enhance business performance. Riding on the argument from Zahra and George (2002) that the impact of absorptive capacity on firm performance can be further explored from a "potential" and "realized" angle, Sancho-Zamora et al. (2021) and Neumann et al. (2021) confirmed that both potential absorptive capacity (PACAP) and realized absorptive capacity (RACAP) has a positive impact on firm performance. Organization that develops their abilities to acquire information from external environments

and managed to integrate their effort to engage with external knowledge with a proactive attitude should anticipate a better performance. The realisation of the potential benefits from the ERP adoption come after ERP assimilation and implementation (Deelert, 2020). Effective use of the technology helps in improving the efficiency of the company, thus leading to improved firm performance. Similarly, the assimilation, transformation, and exploitation of information impact directly on firm performance (Kale et al., 2019). Further evidence shows that absorptive capacity positively influences firm performance (Raisal et al., 2021; Ibarra-Cisneros et al., 2021; Kale et al., 2017; Tzokas et al., 2015). Both information acquisition and information utilization are consistent with the absorptive capacity of acquiring external knowledge and utilize it to improve firm performance (Kale et al., 2019)

Absorptive Capacity as a Mediator

The mediating effect of absorptive capacity between technology and firm performance has been investigated by Nazeer et al. (2021), Ma et al. (2021), Cuevas-Vargas et al. (2022) and Nabeel-Rehman and Nazri (2019). The study offers empirical and theoretical support for the hypothesis that the firm's performance is correlated with its absorptive capacity. Firm with greater degree of absorptive capacity usually better in acquiring external knowledge, better understand and exploit knowledge more effectively to improve firm performance. According to Nazeer et al. (2021), absorptive capacity significantly mediates the relationship between technological capabilities, technology transfer, and firm performance. The absorptive capacity act as a partial mediator between information technology and firm performance, as well as a direct impact on firm performance (Ma et al., 2021). Furthermore, it has been shown that absorptive capacity significantly partially mediates the relationship between ICT adoption and open innovation, as well as the indirect effects of this relationship on firm performance (Cuevas-Vargas et al., 2022). Absorptive capacity can bring improvement to business performance through IT capabilities (in term of integration and alignment), and helps businesses establish and maintain a competitive edge (Nabeel-Rehman & Nazri., 2019). Similarly, Rehman et al. (2020) emphasized that IT capabilities (in term infrastructure flexibility and technical skills) have a significant direct impact on absorptive capacity as well as both direct and indirect impact on firm performance. Likewise, Liu et al. (2013) indicated that absorptive capacity positively mediates the relationship between IT capabilities (in term of infrastructure and assimilation) and firm performance. The combination of "hardware" and the "soft skills" enables firms to effectively acquire external knowledge and exploit it to enhance firm performance. The literature has shown that IT have greater impact on firm's performance through the indirect path than the direct path, as it enables firms to identify and leverage on other capabilities such as absorptive capacity that further contribute to high performance of the firm (Liu et al., 2013).

Competitive Environment as a Moderator

There was significant evidence that environmental factors moderate the relationship between IT adoption and competitive advantage (Chiu & Yang, 2019). Besides that, Marín-Idárraga and Cuartas-Marín (2019) argued that when SMEs operates in a highly competitive environment, the impact of technology on firm performance is high. This means that under intense competition, companies capitalize existing resources to take advantage of the gained knowledge especially technological knowledge and resort to innovate rather than technologically outdated. This is considered and as a proactive measure to predict shifts in the market. Johnny (2006) discovered that the relationship between innovative efforts and

performance is moderated by competitive intensity. Specifically, a high level of competitive intensity is associated with a positive relationship between innovative efforts and performance. However, competitive intensity does not necessarily moderate firm's innovativeness and business performance independently, which may subject to the nature of competition (Tsai & Yang, 2013). According to Hussain et al. (2020), the usage of e-commerce as a mediator on business performance is significantly impacted by direct and indirect relationships with competitive pressure. The adoption of technology is influenced by competitive pressure such that when a firm recognises it can lead to a competitive advantage and ultimately improve firm performance (Soto-Acosta et al., 2015).

The nature of environmental changes acts as external activation triggers (Zahra & George, 2002) that influence the absorptive capacity of an organization. As intensity increases, firms are more likely to invest in additional resources to build capabilities to acquire and assimilate external knowledge. Deelert et al. (2020) found that the environmental in term of competitive pressure had a positive direct effect on ERP adoption, implementation, and assimilation in which affect firm performance indirectly. This is in line with the study by Xu et al. (2015), confirming that competitiveness of the environment has a direct impact on the ERP assimilation and eventually improving firm performance. According to Shoham et al. (2017), environmental uncertainty prompted firms to acquire, assimilate, and exploit new external. The uncertainty of the market environment encourages firms to absorb new external knowledge for marketing and technology, assimilating the knowledge and commercialize this knowledge (Cohen & Levinthal, 1990).

Firm Size as a Moderator

Numerous studies have already examined the relationship between the size of firm in relation to technology adoption. However, mixed findings exist where some has reported a positive correlation between firm size and technology adoption, but other studies have discovered a negative correlation, and still other researchers have not identified any meaningful relationships at all. Even though some researchers have found a negative relationship between firm size and technology adoption such as in the studies of cloud computing (Alhammadi et al., 2015), majority of studies conclude a positive relationship in different contexts, such as cloud computing (Isma'ili et al., 2016), e-commerce (Ghobakhloo et al., 2011), CRM adoption (Chavoshi et al., 2012) and Big Data technology (Nguyen & Petersen, 2017). According to Martini et al. (2023), the number of employees has a direct and positive moderating effect on the financial performance of the company. This suggests that SMEs have a greater potential for e-commerce to boost financial performance than do large corporations with a larger workforce. Compared to small and medium-sized businesses, large corporations already enjoy a sufficiently wide market reach, thus the adoption of e-commerce does not significantly enhance customer acquisition. Similarly, the impact of e-commerce's marketing effect on firm performance is more prominent in SMEs with a small number of employees than in SMEs with a large number of employees (Ramanathan et al., 2012). As a result, the relationship between e-commerce and performance is strongly moderated by firm size, but with different moderation directions for marketing and operations effects. Larger businesses can use e-commerce to improve their operations more successfully than smaller businesses. However, smaller businesses can use e-commerce to improve their marketing to a larger extent than larger businesses. It is also discovered that firm size positively moderates the relationship between technical diversification and firm performance according to Lee et al.

(2017). This indicates that the benefits of technological for performance are greater for larger firms. Numerous organizational studies have indicated that a firm's performance is significantly influenced by its size. Business with different sizes could have varying capacities and resources to handle technology adoption initiatives. Huynh (2021) revealed that the size of the firm has a positive effect on the performance of Vietnamese SMEs. Firm size is one of the factors initiated by Daghfous (2004) where the size of the firms can bring different outcomes to the effectiveness of the company's absorptive capacity. Gray (2006) concluded that firm size significantly influences the acquisition and assimilation of knowledge among SMEs. Firm size is an important source of absorptive capacity heterogeneity (Volberda et al., 2010). However, the findings of Zou et al. (2018) indicate that a firm's absorptive capacity does not increase in line with firm size. The relationship between firm size and absorptive capacity is found to be positive and significant for small firms and negative and significant for larger firms. Firm size is commonly used as a control variable in absorptive capacity, innovation, and technology studies. This is because by having more resources than small firms, large firms are in a better position to build their absorptive capacities. Indarti et al. (2019) argued that large companies are more focused on the "realized absorptive capacity", which include transformation and exploitation whereas small and medium companies emphasize more on the "potential absorptive capacity", which include the acquisition and assimilation. However, no solid conclusion has been made on whether the size of a company (SMEs versus large companies) matter in the absorptive capacity process. In a few studies on absorptive capacity and firm performance, firm size is used as a control variable. Several findings show that firm size does not affect the firm performance (Ma et al., 2021; Sancho-Zamora et al., 2021; Nguyen et al., 2022). Furthermore, there was argument that firm size has a negative moderating effect on absorptive capacity and firm performance (Pu & Liu, 2023). In contrast, Durani (2021) found that the "Acquisition" absorptive capacity and the "Exploitation" absorptive capacity have no relationship with firm size.

Conceptual Framework

This study is based on the underpinning theory of TOE framework (Tornatzky & Fleischer, 1990) which has been widely used in the studies of factors influencing technology adoption and its impact on firm performance (Abdullahi et al., 2022; Ahmad et al., 2019; Asih et al., 2017; Deelert et al., 2022; Dinesh Kumar Pandey., 2021; Nguyen et al., 2022; Qalati et al., 2021; Ullah et al., 2023). TOE framework (Tornatzky & Fleischer, 1990) addresses technology adoption in an organization that is affected by three dimensions: technology, organization, and environment. However, most studies focus on these three dimensions as independent variables and their direct relationship with technology adoption. Some studies have used absorptive capacity as determinant as part of organizational factors (Durani, 2021; Chiu, 2017; Lin, 2014; Zamani, 2022) but ignored the theory of absorptive capacity. Absorptive capacity theory (Cohen & Levinthal, 1990; Zahra & George, 2002) is an organizational capability that widely adopted in IS research (Goa et al., 2017; Roberts et al., 2012) and its influence on firm performance is well established (Senivongse et al., 2019; Song et al., 2018; Ma et al., 2021; Neumann et al., 2021; Cuevas-Vargas et al., 2022). Zahra and George (2002) defined absorptive capacity as "a set of organizational routines and processes by which firms acquire, assimilate, transform and exploit knowledge to generate a dynamic organizational capability". The absorptive capacity's dimension consists of potential absorptive capacity (acquisition and assimilation) and realized absorptive capacity (transformation and exploitation) as proposed by Zahra and George (2002). Instead of focusing on the technological, organizational and

environmental factors that influence on marketing technology adoption, this study reinvents the framework by examine the impact of marketing technology adoption on firm performance with the existence of absorptive capacity and firm size (as organizational factors) and competitive environment (as environmental factors). It is argued that the absorptive capacity could play a role of mediating the relationship between marketing technology adoption and SME performance (Nazeer et al., 2021; Ma et al., 2021; Cuevas-Vargas et al., 2022; Nabeel-Rehman and Nazri, 2019). Furthermore, competitive environment and firm size could have a moderating effect (Vij & Farooq, 2017) on the direct and indirect relationship between marketing technology adoption and SME performance.

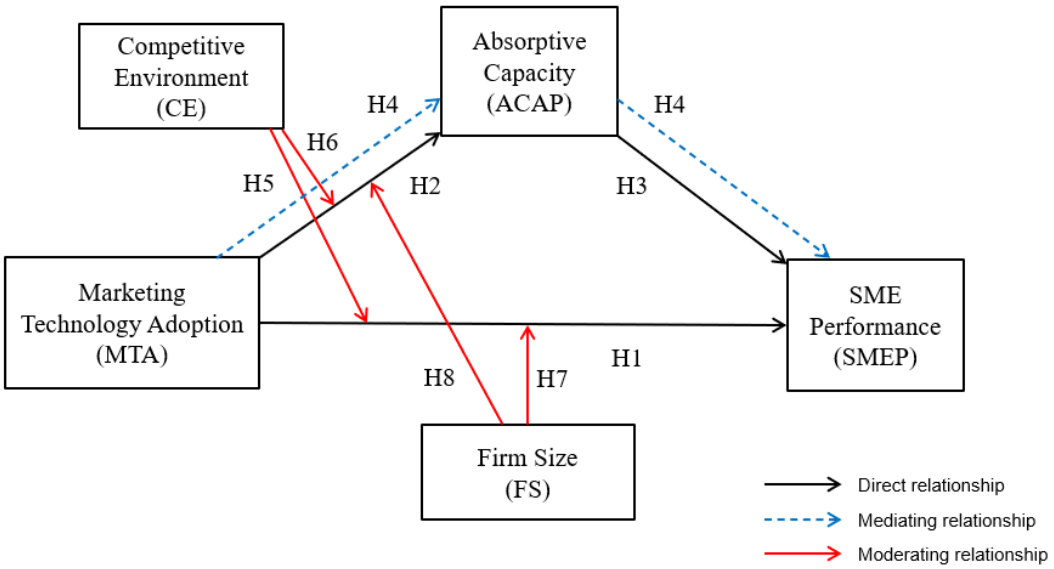

Figure 1: Conceptual framework

Hypothesis Development

Based on an earlier literature review, the study proposes the following hypothesis:

H1: There is a significant direct relationship between marketing technology adoption and SME performance.

H2: There is a significant direct relationship between marketing technology adoption and absorptive capacity.

H3: There is a significant direct relationship between absorptive capacity and SME performance.

H4: Absorptive capacity has a mediating role between marketing technology adoption and SME performance.

H5: Competitive environment has a moderating role on the direct relationship between marketing technology adoption and SME performance

H6: Competitive environment has a moderating role on the indirect relationship between marketing technology adoption and SME performance through absorptive capacity.

H7: Firm size has a moderating role on the direct relationship between marketing technology adoption and SME performance.

H8: Firm size has a moderating role on the indirect relationship between marketing technology adoption and SME performance through absorptive capacity.

Research Design and Methodology

This study is using a deductive approach where hypotheses were developed upon pre-existing theory of absorptive capacity and TOE framework to test the causal relationship of marketing technology adoption and performance of SMEs, as well as the mediating effect of absorptive capacity, and moderating effect of competitive environment and firm size (Figure 1: Conceptual framework). A quantitative survey would be used to enable data collection from targeted respondents in relation to the variables of study for statistical analysis (Saunders & Lewis, 2019).

Based on the Malaysia Statistical Business Register (MSBR) published by the Department of Statistics, Malaysia (DOSM), the target population to be examined in this study will be SMEs in service, wholesales & retail and manufacturing industry which consists of a total 214,134 firms, excluding construction, agriculture, and mining & quarrying. For this study, the unit of analysis will be organization, which are the SMEs in Malaysia, in line with the argument that most studies investigate absorptive capacity at the organizational level (Roberts et al., 2012; Gao et al., 2017). Besides that, it is essential to determine the respondents representing the unit of analysis (Hair, 2006). Therefore, the target group includes top management (Business owner, C-suites, director, or head of department) or manager/ executive (marketing, digital or technology). These groups of respondents are among the decision makers or key users who are involved in adoption, implementation and use of marketing technology within a firm. The primary source of sampling frame is the list of small-medium sized firms registered under SME Corporation Malaysia. The proportionate stratified sampling was the method of choice for this study to ensure that the sample surveyed was representative of the target population (Sekaran & Bougie, 2016; Rahman et al., 2022). Based on the G*Power (Faul et al., 2009) software calculation, the minimum sample size required for this study is 129. Considering the minimum respondent of 30 for each subgroup as suggested by Roscoe (1975), a total sample size of 250 is proposed for this study.

There are five main variables based on the conceptual framework: marketing technology adoption (MTA), absorptive capacity (ACAP), competitive environment (CE), firm size (FS) and SME performance (SMEP). Each variable is operationalized with appropriate measurement items (Pelz, 2021; Van Thiel, 2014). A total of 24 measurement items (indicators) were developed for this study based on prior knowledge, as substantiated by a thorough literature review (El-Den et al., 2020) and general rules of thumb that at least two items are required to compute Cronbach's alpha, which is the measure of reliability. This study uses the Five-Point Likert Scale (Likert, 1932), each of the measurement items (indicators) associated with five attributes ranging from "Strongly Disagree", "Disagree", "Neutral", "Agree" and "Strongly Agree". The attributes are assigned with numbers 1 ("Strongly Disagree"), through 5 ("Strongly Agree") respectively.

The pilot test will be conducted with 30 target respondents according to the survey criteria set. This is done to evaluate the validity of the survey in terms of its length, content validity, and scale relevance. The responses received from this pilot group will be used to make improvement for the final survey. This study employed a self-administered online questionnaire. The online questionnaire will be distributed via email to the target respondents. To achieve sample size of 250, the estimated total number of questionnaires to be distributed will be 1,250 based on average of 20% response rate (Abbasi et al., 2022). A

completed questionnaire will be input into the SPSS software for data cleaning and analysis. The structural model assessment in PLS-SEM is used to test the proposed causal relationships between the variables in the conceptual framework. Apart from this, it is also to examine the mediating effect (partial mediation or full mediation) of absorptive capacity on the relationship between marketing technology adoption and SME performance (Zhao et al., 2010; Preacher & Hayes, 2008). The moderation effect of competitive environment and firm size on the relationship between the marketing technology adoption and SME performance will be tested (Hair et al., 2022).

Discussion and Conclusion

Based on the preceding research and literature review, it is predicted that the indirect effect of marketing technology adoption (MTA) and absorptive capacity (ACAP) is positive and significant. The indirect effect of absorptive capacity (ACAP) and SME performance (SMEP) shall be positive and significant. Thus, a mediation model of shall exist. From this study, it is predicted that partial mediation shall exist, meaning that the absorptive capacity (ACAP), as a mediator partially mediates the relationship between marketing technology adoption (MTA) and SME performance (SMEP). Hence, the hypothesis H1, H2, H3, and H4 shall be supported. The result is consistent and supported by Ma et al. (2021), Nazeer et al. (2021), and Cuevas-Vargas et al. (2022). This implies that fostering absorptive capacity in an organization is an important factor that influences the impact of marketing technology adoption to improve the performance of SMEs in Malaysia. Technology adoption alone is insufficient to improve business performance significantly without assimilation and implementation of technology (Deelert et al., 2020). In terms of the moderating effect, it is expected that the interaction term's effect is significant, and the path coefficient is positive, which means that an increasing competitive environment or firm size will strengthen the relationship between marketing technology adoption and SME performance, and vice versa. This translates to the fact that the impact of marketing technology on SME performance is significantly increased in a highly competitive environment, and when there is a larger number of employees. Thus, hypotheses H5 and H7 shall be supported. However, hypothesis H5 is in contrasts with the study by Chiu and Yang (2019) according to which the environmental factors have a significant negative moderating effect on the relationship between IT adoption and competitive advantage. In terms of firm size (hypothesis H7), in contradiction with the view of Martini et al. (2023), it is indicated that e-commerce performs better in improving the financial performance of micro and small industries in which firm size (number of workers) is smaller. On the other hand, it is predicted that the index value of competitive environment (CE) and firm size (FS) for moderated mediation effect is significant and positive. This means that the indirect effects are moderated by the competitive environment (CE) and firm size (FS). Therefore, the hypotheses H6 and H8 are supported. With the changes of competitive environment, the indirect effects of marketing technology adoption on SME performance through absorptive capacity are changed. This implies that external competitive environment may influence the absorptive capacity of marketing technology among the SMEs in Malaysia. Perhaps companies that operate in highly competitive markets will see the important role of acquiring, assimilating, transforming, and exploiting the marketing technology to improve business performance compared to companies that operate in less competitive markets. The result is consistent with the study by Shoham et al. (2017).

In conclusion, this study shall contribute to the SME business owners or practitioners by concluding that the ability of firm to acquire external knowledge, assimilate it, transform it, and exploit it for financial or non-financial performance of firm is essential, especially with the adoption of marketing technology. Companies that operate in highly competitive markets are likely to adopt and take advantage of marketing technology to improve their business performance. The outcome could be different depending on the size of the company.

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