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Determinants of SME's Social Media Marketing Adoption: Competitive Industry as a Moderator

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Abstract

In light of the growing role of social media marketing in the success of businesses and its low adoption rate among small and medium enterprises (SMEs), this study aims to identify determinants of SMEs' social media marketing adoption by considering the competitive industry as a moderator. Data were collected from 214 SMEs in Malaysia. Unlike extant literature, this study proposed a dual-stage analysis involving partial least squares (PLS) technique and artificial intelligence named deep artificial neural network (ANN). The application of deep ANN architecture is used to predict 91% of accuracy for the proposed model. The results showed that perceived relative advantage, perceived cost, top management support, perceived competitor pressure, and perceived vendor pressure have a significant impact on social media marketing adoption. Furthermore, the competitive industry moderates the effects of competitive pressure and customer pressure on social media marketing adoption. The results of the study extend the literature on social media marketing by illustrating the influence of technological, organizational, and environmental (TOE) factors on social media marketing adoption among SMEs concerning the extent of industry competition. The results of the study enable policymakers and managers of SMEs to understand the factors that influence social media marketing adoption in both competitive and non-competitive industries and invest effectively in digital marketing.

Keywords

social media marketing, digital marketing, mobile marketing, technology adoption, technology-organizational-environmental, TOE factors, determinants, SMEs

Highlights

- The application of deep learning provides higher predictive accuracy as compared to PLS results, that is, ANN R2 (91%), PLS R2 (50.2%) for intention to adopt social media among SMEs.
- Competitive Industry was proposed as a moderator that can enhance the process of social media marketing adoption by small and medium-sized enterprises in Malaysia.
- Perceived relative advantage, perceived cost, top management support, perceived competitor pressure and perceived vendor pressure have positive effects on intention to adopt social media marketing by SME's.
- Competitive industry positively moderates the impact of both perceived competitive pressure and perceived customer pressure on social media marketing adoption.

- Technical and Environmental drivers are not found to be moderated by the competitive industry.

Introduction

In the contemporary world, developments in information and communication technologies (ICTs), particularly social

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media, have revolutionized the way marketing activities take place (Eid et al., 2019; Khayer et al., 2020). Social media has surfaced itself as a cost-effective and efficient information exchange platform for all. Over the years, social media has diversified its role and has proven to be a distinct and pivotal marketing tool in shaping the success of any product/services/business (Eid et al., 2019; Wamba et al., 2019). In fact, it is visible that social media marketing serves as a great foundation in the pursuit of locating customers, creating an environment to engage them, and at the same time, producing promoters for various brands. Clearly, social media marketing is on the rise, and its importance is evident as the investment in social advertising across the globe is predicted to rise to US 153, 563 million by 2021 (Statista, 2021). Marketers in the U.S are applauding the move of integrating social media in their marketing activities because almost 90% of marketers state that the shift toward social media has increased their businesses' exposure and traffic (Skills Lab, 2019). In the United States alone, more than 14.8 billion U.S dollars was spent on social media marketing in 2016, thereby making the United States, beyond a doubt, the largest social media advertising market in the world (Statista, 2021).

By the dawn of the 21st century, the use of social media has become the most common business strategy, particularly in medium and small-sized enterprises (SMEs) (Chatterjee & Kar, 2020; Duff & Segijn, 2019; Eid et al., 2019). The function of SMEs in Malaysia is critical for the country's growth of the economy. Most importantly, these firms contribute significantly to economic development, job creation, and labor productivity (Siamagka et al., 2015). Indeed, it is undeniable that SMEs make a significant contribution to a country's economic health as they enhance both inventions and creativity (Stieglitz et al., 2018). Due to the abundance of employability available at SMEs at a low cost, it is fair to deem that SMEs in Malaysia have evolved as a vigorous and vibrant segment of economic activity (Ahmad et al., 2019; Ng et al., 2020). SME features are extremely diverse, with a large degree of adaptability and strong entrepreneurship. In Malaysia, SMEs are available in a multitude of capacities and technological capabilities, with a range of products, and service qualities. Consequently, it contributes to the rise of industry in underdeveloped and remote regions, thereby alleviating socioeconomic inequalities. This adds to a just and equal allocation of resources and government revenue. Thus, adopting new technologies and marketing practices, such as social media, can be very beneficial for SMEs, which habitually have a deficiency of resources for marketing purposes (Maduku et al., 2016). Consequently, enhancing the economic health of SMEs would result in the nation's economic development. Strangely, SMEs in Malaysia have a weak level of technological proficiency and minimal finances. Social media is seen as a critical component of ICTs that has a large effect on the market. In this light, it is crucial to research if the usage of social media may aid Malaysian SMEs in their annual expansion. Given the potential advantages and rising prominence, notably for marketing reasons, SME Corporation Malaysia (2018) observed poor adoption of social media by Malaysian SMEs at only 19.7%. Globally, social media adoption was reported by a tiny percentage (less than 30%) of SMEs at the start of this decade (Jussila et al., 2014). Additionally, studies on the factors impacting the adoption of social media among SMEs is still in the infancy phases (Ahmad et al., 2019; Ainin et al 2015a; Chatterjee & Kar, 2020; Qalati et al., 2021; Razak & Latip, 2016; Salo, 2017) particularly from the perspective of a developing country like Malaysia. This vacuum in the extant literature must be filled, as insights from Malaysia are equally applicable to those other related growing markets.

This research used the technological-organizational-environmental (TOE) paradigm to examine the factors that influence SMEs' adoption of social media marketing. The TOE model's merit is in its adaptability in predicting the extent of ICT adoption by businesses. The existing literature contains substantial studies on the successful effects of TOE factors on the implementation of advanced technologies (Abed, 2020; Maroufkhani et al., 2020; Qalati et al., 2021; Ullah et al., 2021). However, the insights, unfortunately, cannot be readily connected or extended to social media marketing adoption in SMEs because the impact of TOE elements varies by company structure, the geography of research, and technology type (Qalati et al., 2021; Wang, Jin et al., 2019). Each innovation is distinctive, and a multitude of elements contribute to its widespread delivery (Abed, 2020). TOE parameters vary according to the size of the firms, and outcomes from large-firm studies cannot be extended and generalized to SMEs (Ullah et al., 2021). The enormous disparity in availability of resources, organization culture, communications capabilities, and environmental factors among SMEs and large enterprises affects the relevance of TOE elements toward adopting a specific technology. Hence, to comprehend the determinants of social media marketing among SMEs, a unique approach is required. Moreover, the variety in environmental conditions and the country-related requirements dictate the magnitude to which TOE conditions influence a company's impact on innovation adoption. Undoubtedly, this particular setup sparks the need to consider specific circumstances. Furthermore, prior research has already established that firms tend to respond positively to situations where there is a fear of losing their competitive advantage (Zhu et al., 2003). Consequently, the competitive industry enables the firms to adapt to various technologies so that firms can maintain their competitive edge in the market. Thus, firms like SMEs in the competitive industry need to invest more on social media marketing to compete with competitors and gain a competitive advantage. Additionally, the availability of financial resources may trigger SMEs to adopt social media marketing primarily in the competitive industry. To compare, businesses and organizations in the non-competitive markets will not use such resources for social media

marketing purposes, even when the resources are abundantly available. Thus, by considering the extent of competition's role in the decision-making process of firms, this study aims to test the moderating effect of competitive pressure on the impacts of technological, environmental, and organizational factors on social media marketing adoption. The results of this study extend the literature by identifying the factors that motivate SMEs to adopt social media marketing according to the extent of competition in the firm's industry.

This research contributes in several ways. Firstly, this research investigates the multi-perspective framework by including several factors germane to SMEs' adoption of social media. Secondly, this study contributes to the existing body of knowledge as it investigates the moderating role of competitive industry to determine its effect on the adoption of social media in Malaysia. This was primarily done with an aim to bring a more holistic understanding of the determinants and drivers of social media adoption in Malaysia. Thirdly, some previous studies on social media adoption that applied structural equation modeling (SEM) (Ahmad et al., 2019; Ainin et al., 2015b; Chatterjee & Kar, 2020; He, Wang et al., 2017; Qalati et al., 2021; Siamagka et al., 2015) could only investigate the compensatory and the linear associations among the constructs, which is considered inadequate. It is lacking in terms of the ability to estimate the intricacies affecting multifaceted decision-making procedure of SMEs. Thus, to eradicate such limits, researchers have employed machine learning techniques such as artificial neural networks (ANN) as the second stage of investigation entailing a single hidden layer (Abbasi, Tiew et al., 2021; Al-Emran et al., 2021). Huang and Stokes (2016) posited that the second stage ANN analysis with a single hidden layer is a shallow type of ANN. Thereby, it was recommended to use deep ANN architecture with two hidden layers (Abbasi, Tiew et al., 2021; Weng et al., 2017). Because of its deep learning capabilities, the use of a deep ANN architecture with two or more hidden layers will increase the efficacy of non-linear connections in the proposed model (Ashaari et al., 2021). As a result, this paper advances a research gap by examining both non-linear and linear compensatory correlations using a deep learning dual-stage technique. Using a deep learning dual-stage technique to investigate the factors of social media adoption by Malaysian SMEs in order to improve performance is undeniably an advanced technique (Ashaari et al., 2021). It adds to the existing literature on social media adoption in a new way, particularly in terms of developing the country's perspective.

Literature Review

Social Media Marketing Adoption

Social media marketing has been defined as "a dialogue often triggered by customers/audiences, or a business/product/service that circulates amongst the stated parties to set in motion revealing communications on some promotional information, or that allows learning from one another's user experiences, eventually benefitting all of the involved parties" (Abed et al., 2015, p. 291). The Internet has facilitated organizations all around the globe, which has enabled communication media to conduct businesses anytime from anywhere (Abbasi et al., 2019). Conversely, in a worldwide setting, research has demonstrated the benefits of social media marketing in various domains such as advertising on social media (Abed et al., 2015), digital marketing (Taiminen & Karjaluoto, 2015), as well as supply chain management (Shareef et al., 2018). Besides, in different countries, it has been successfully proven that the adoption of social media has effectively generated sales and positively affected business performances, apart from increasing business exposure to customers; subsequently (Ahmad et al., 2018). Therefore, social media marketing through Facebook or Instagram is considered a game-changer for SMEs to connect with their customers. Small businesses might use social media marketing if they believed it would be less costly, easier to use, and compatible. On top of that, the extensive integration of social media into economic operations has resulted in the advent of innovative business models such as social commerce. As of today, out of the total population of Malaysia, that is, 32.86 million, 26.3 million people have access to the Internet (Statista, 2019a), where 78% of these users are active social media users (Statista, 2019b). As such, it is indisputable that social media marketing can contribute highly to the success of firms in Malaysia.

Technology-Organization-Environment (T-O-E) Framework

Due to the SMEs' varied nature and its amalgamation with active social media practices, it is strongly suggested that a solid theoretical foundation is needed in this research to reveal the effects of its social media activities in the purview of their marketing activities (Atanassova & Clark, 2015). Therefore, the Technology-Organization-Environment (T-O-E) framework is chosen as the theoretical basis for the development of the current research model (Figure 1).

Essentially, the T-O-E framework is proposed by Tornatzky et al. (1990). It is regarded as an organizational level theory. According to Baker (2012), this framework focuses chiefly on the adoption and implementation of numerous IT-linked products or services from the lens of multiple perspectives; technological, organizational, and environmental perspectives. T-O-E is used in this study considering that it encompasses a broad range of applications and elucidates the adoption process from various viewpoints, including technological, organizational, and environmental. As a result of the T-O-E framework's comprehensive
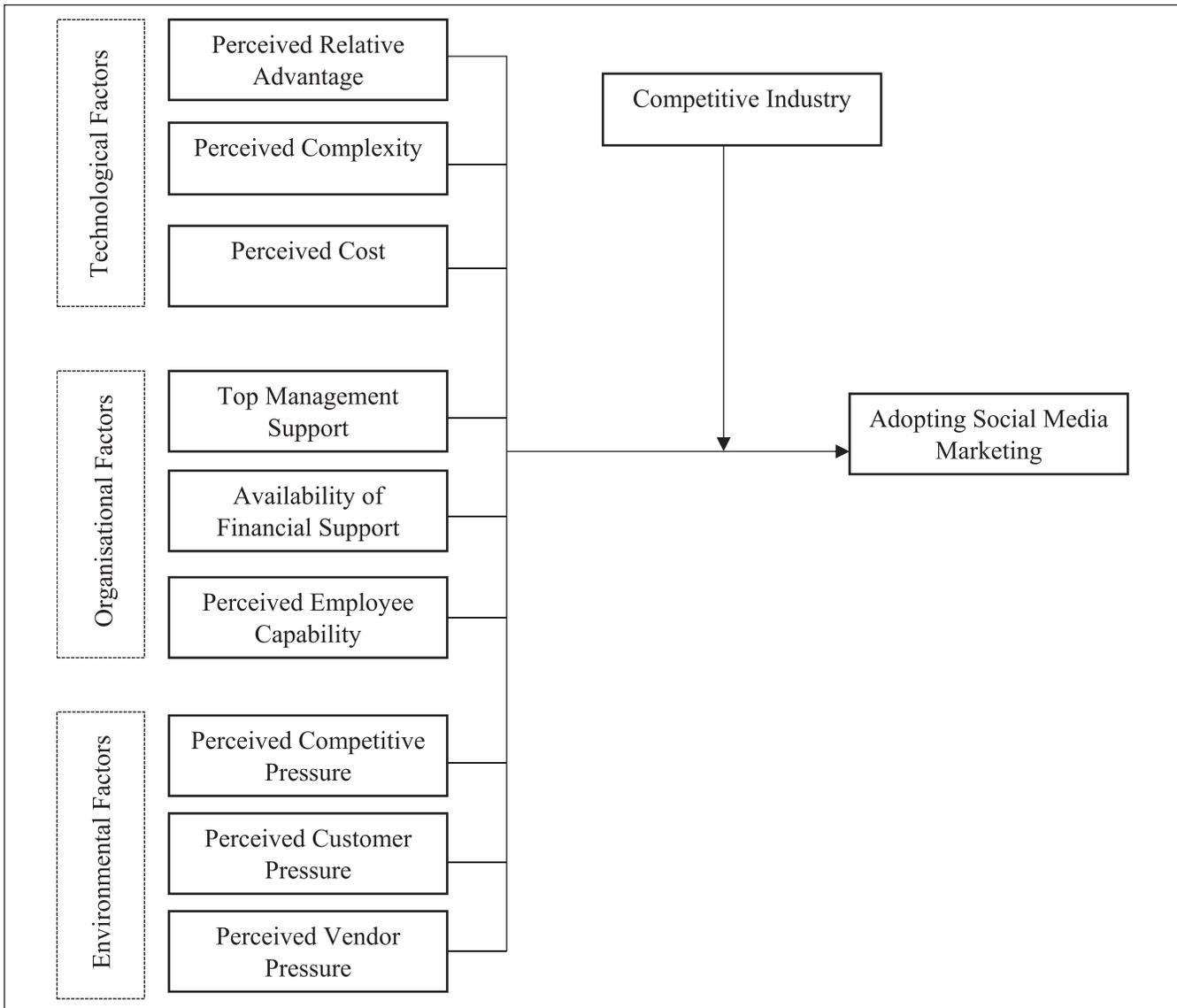
Figure 1. Conceptual framework.

approach, it is seen as an acceptable theory for SMEs to use social media marketing. Due to this diversity in the T-O-E framework, it has been regarded as the utmost prevalent academic framework on IT implementation (Ahmad et al., 2018; Chang et al., 2020; Hossain & Quaddus, 2011; Maroufkhani et al., 2020; Oliveira & Martins, 2010; Zhu et al., 2004). Previous studies have demonstrated that T-O-E has been successfully applied in IT adoption-based studies such as cloud computing (Chang et al., 2020; Gangwar et al., 2015; Gutierrez et al., 2015), e-tourism (Lama et al., 2019), social media marketing (Ahmad et al., 2018; Ainin et al., 2015a, b; Matikiti et al., 2018), e-commerce (Ghobakhloo et al., 2011; Rahayu & Day, 2015), green practices in logistics (Lin & Ho, 2011), big data adoption (Maroufkhani et al., 2020), and mobile marketing (Maduku et al., 2016).

Technological context mainly denotes both internal and external that are appropriate to the organizations. These technologies can either be in practice within the organization or obtainable in the marketplace (Chang et al., 2020; Oliveira et al., 2014). In this study, the technological context was described as the technical knowledge required to implement social media marketing. Secondly, the organizational context plays a significant role in creating an influence on adoption by SMEs. It specifically pertains to the existing resources which are required to aid the implementation procedure. According to Ramdani et al. (2009), organizational factors have remained successful in attracting the interest of most researchers globally. Organizational context has been bifurcated in two aspects: business characteristics (size of the business, managerial structure) and the existing resources

(employee capability, financial resources) (Maduku et al., 2016). Finally, environmental factors are the third and last factor relating to the T-O-E framework, which has also been recognized to significantly influence the adoption process, especially in SMEs (Abou-Shouk et al., 2016). Due to the thorough investigation and meta-analysis of extant literature, this study has adopted the following factors of each variable related to the T-O-E framework. This is due to the fact that these factors have been consistently proven to be more important in influencing technology adoption behavior, that is, technological (perceived relative advantage, perceived complexity, perceived cost), organizational (top management support, financial support, employee capability) and environmental (competitive pressure, customer pressure vendor support) (Ali et al., 2019; Iranmanesh et al., 2019; Maduku et al., 2016).

Hypotheses Development

Perceived Relative Advantage

According to Rogers (2003), relative advantage can be illustrated as a characteristic that enhances the value of a product or services from both customer and business point of view. The relative advantage of adopting social media marking in SMEs can be referred to as the perceived benefits of adoption. Research has shown that adoption-led decisions by the firms are primarily motivated by the perceived benefits that technology brings to the firms (Ahmad et al., 2019). Managers as decision-makers in SMEs will be more likely to advocate for such change if they perceive that adaptation will bring strategic and functioning gains within a business (Ramayah et al., 2016). At the same time, it is also narrated that the negative perception of specific innovation/technology will drastically reduce the adoption process (Li et al., 2008). Several studies have investigated the impact of relative advantage and have demonstrated the positive effects of it on adoption (Ramayah et al., 2016; Zailani et al., 2015a, 2019). Therefore, based on the following discussion, it is proposed that:

> **H1.** Perceived relative advantage has a positive influence on SMEs social media marketing adoption.

Perceived Complexity

The complexity of technology adoption is considered an important indicator in the process of technology adoption (Zailani et al., 2015b). Adopting any technology is hardly implemented if it is perceived as cumbersome to use (Alshamaila et al., 2013). Moreover, it is highlighted that these technologies must be straightforward and user-friendly to augment the process of adoption (Berman et al., 2012; Zailani et al., 2015a). Suffice to say that the easier technology to interpret, the more chances it contains to be adopted and

implemented (Oliveira et al., 2014). For example, if social media marketing use requires a considerable understanding and knowledge, it is highly unlikely that SMEs will implement social media marketing in their marketing activities. Therefore, perceived complexity can create many hindrances in the process of adopting new technologies (Alshamaila et al., 2013; Low et al., 2016; Maroufkhani et al., 2020). Several scholars have stated a significant relationship between perceived complexity and the intention to adopt an innovation (Gutierrez et al., 2015; Maduku et al., 2016; Oliveira et al., 2014; Ramdani et al., 2013). Unlike other factors, perceived complexity has demonstrated a negative relationship with the intention to adopt. Thus, the above discussion has led to the formulation of following hypothesis:

> **H2.** Perceived complexity has a negative influence on SMEs' social media marketing adoption.

Perceived Cost

Earlier research has established that the perception of cost displays an imperative role in accepting and utilizing technology (Alam & Noor, 2009). The element of cost is considered as a pivotal technological factor that can significantly influence SMEs' intention to adopt social media marketing practices (Chatterjee & Kar, 2020; Ramayah et al., 2016). However, there have been cases where cost did not significantly impact IT adoption, particularly in the case of Malaysia (Sin Tan et al., 2009). In general, the new technology adoption in any firm would draw a substantial start-up cost (Ghobakhloo et al., 2012). But unlike any IT-related adoption, several SMEs prefer social media adoption due to its cost usefulness, little or no barrier to involvement, and ease of use (Derham et al., 2011). In fact, many businesses will prefer using social media if the cost is low because it enables direct interaction between customers and businesses (Ainin et al., 2015a). By and large, social networking is a cost-effective innovation. It allows SMEs to engage with customers at a reasonable cost. Simply put, it is quite conceivable that SMEs will adopt social media marketing if the associated costs are fair. Thus, the preceding discussion led to the following hypothesis:

> **H3.** Perceived cost has a negative influence on SMEs' social media marketing adoption.

Top Management Support

Top management is looked upon as an essential organizational factor in any organization. Any help that is attained by the top-tier management in any organization is denoted as top management support. According to Gutierrez et al. (2015) and Zailani et al. (2014), the top management support aims to simultaneously establish a viable atmosphere and provide a variety of resources to encourage and facilitate the

process of adoption. Similarly, researchers have also proven that disseminating the overall aim of technology adoption within an organization is the sole responsibility of the top management (Maduku et al., 2016; Maroufkhani et al., 2020). Accordingly, if an SME wants to adopt social media marketing in their marketing strategy and create a constructive atmosphere, the top management, through their decision, can transfer the positivity about such adoption to its employee (Zailani et al., 2014). Several studies have researched and developed the positive role of top management support and regarded it as a pivotal pillar in establishing or implementing the new internet-related technologies (Alatawi et al., 2013; Maduku et al., 2016; Matikiti et al., 2018; Ramayah et al., 2016). Thus, the preceding discussion has proposed the following hypothesis:

H4. Top management support has a positive influence on SMEs' social media marketing adoption.

Availability of Financial Support

Availability of financial resources denotes the existence of monetary support, which can decide the fate of a specific technology an organization wishes to adopt (Kim & Garrison, 2010). Among all other various organizational factors in the adoption of innovation, the availability of financial resources is perceived as the backbone of the entire adoption process (Maduku et al., 2016; To & Ngai, 2006). It was also termed "organizational slack" which illustrates the readiness of various resources owned by the firm, that is, financial, technical, and human resources. Fundamentally, financial resources are accounted as a strong determinant of the adoption process (Karjaluoto & Huhtamäki, 2010). Similarly, a study by Ismail (2013) stated that the accumulation of sufficient capital is considered a thoughtful step as it diminishes any monetary hazard in the pursuit of implementing any technological adoption. Therefore, the above discussion led to the following hypothesis:

H5. The availability of financial resources has a positive influence on SMEs' social media marketing adoption.

Employee Capability

The presence of a specialized human resource to handle the intricacies of the technology-related adoption process is considered a fundamental step. Employees' learning skills and their competency enhance and aid the process of technology adoption in any firm. According to Maduku et al. (2016), it is observed that businesses driven by IT predominantly in the SME sector would face an additional cost of procuring an IT advisor at an exorbitant cost due to the dearth of employee's innovation and learning capabilities. Earlier research has highlighted that scarcity of an IT expert will seriously affect IT-associated complexities in firms (Ghobakhloo et al.,

2012). Therefore, the availability of employees who are receptive to technological adoption and increased learning capabilities will augment the adoption of social media marketing in SMEs. Thus, the discussion led to the making of the following hypothesis:

H6. Employee capability has a positive influence on SMEs' social media marketing adoption.

Perceived Competitive Pressure

Competitive pressure plays a significant role in the process of adopting the technology. It is defined as the pressure that is exerted by external competitors in the same industry (Oliveira et al., 2014). It has been stated that firms will adopt technological changes as a response if they perceive a surge in competition within the industry (El-Gohary, 2012; Haller & Siedschlag, 2011). The origins of such pressure are due to the threat of losing competitive gain in the industry (Maduku et al., 2016; Zainuddin et al., 2017). In the age of globalization, firms such as SMEs are susceptible to numerous competitors from all around the world. Thus, a firm can attain a strategic benefit by adopting technology and dominate the rule of the industry. So, the earlier a firm can embrace such change, the more competitive benefits it will gain (Gangwar et al., 2015). For example, if an SME competitor in Malaysia has adopted social media marketing in their marketing strategies, then it becomes imperative for a company to adopt such change too in order to survive and to sustain. Hence, it can be said that the competitive pressure in the industry determines the chances of technological adoption (Rahayu & Day, 2015). Several studies have established that competitive pressure has a significant impact on the intention to adopt a technology (Low et al., 2016; Maduku et al., 2016; Oliveira et al., 2014). Therefore, based on the above discussion, the following hypothesis is formulated:

H7. Competitive pressure has a positive influence on SMEs' social media marketing adoption.

Perceived Customer Pressure

In technological adoption studies, customer pressure is an important environmental element (Rahayu & Day, 2015). Earlier research on SMEs' technological adoption has proven a positive relationship between intention to adopt and the pressure from customers (Ghobakhloo & Tang, 2015; Maduku et al., 2016; Matikiti et al., 2018). In comparison to large enterprises, SMEs are more susceptible to the pressure created by their customers to meet the expectations formed by their customers (Maduku et al., 2016; Premkumar & Roberts, 1999). Wanyoike et al. (2012) examined the role of environmental factors on e-commerce adoption on Kenyan SMEs' and concluded that perceived pressure from customers determines the adoption of e-commerce. Similar results

were observed in a study by Maduku et al. (2016) concerning the adoption of mobile marketing in SMEs. Also, regarding the implementation of social media by SMEs, it has been successfully demonstrated that a firm will oblige to adopt to social media under the influence of pressure exerted by customers (El-Gohary, 2012). Therefore, based on the following discussions, the following hypothesis is formed:

H8. Perceived customer pressure has a positive influence on SMEs' social media marketing adoption.

Perceived Vendor Support

The decision to adopt the technology by SMEs has been highly predicted by the marketing policies of suppliers/vendors (Alshamaila et al., 2013). According to Maduku et al. (2016), training from suppliers can enhance the technology-related competencies of a client's firm. Subsequently, this training will play its role in mitigating the risk connected to technology, thus reinforcing the chances of technology adoption (Weigelt & Sarkar, 2009). However, the decision to adopt technology can also be hampered if the perception of vendor services or the vendor itself is perceived as unfavorable by the firms. Numerous researches have established the positive impact of perceived vendor support on technology adoption (Alshamaila et al., 2013; Maduku et al., 2016). Therefore, the following hypothesis is formulated:

H9. Perceived vendor support has a positive influence on SMEs' social media marketing adoption.

Competitive Industry

The competitive industry refers to the competition that is faced by the organization within the industry (Thong & Yap, 1995). An industry in which a firm functions has the power to leave a significant impact on technology adoption (Levenburg et al., 2006). Competitiveness forces enterprises to adapt to the new technology in order to maintain their competitive position. Furthermore, organizations such as SMEs' performance in a global industry must employ and participate more in social media marketing strategies to succeed and acquire a comparative benefit. Additionally, monetary support may motivate SMEs to implement social media marketing, particularly in competitive markets. Nevertheless, in non-competitive marketplaces, even if resources are available, SMEs may not employ them for social media marketing purposes. For example, if a firm operates in an industry where competition is non-existential, that is, monopoly, then the firm is unlikely to adapt to any changes, such as adopting social media marketing. Mostly it is the fear of losing a competitive advantage over its competitors that can stimulate a firm to implement such changes (Zhu et al., 2003). Moreover, it has also been stated that if a firm chose to adopt a change, it might gain a competitive edge among the competitors. And

this can subsequently change the competition in the industry (Porter & Millar, 1985). As stated in earlier research, it is reiterable that competition within the industry enables firms to adopt new technologies to sustain their competitive edge in the market. Therefore, the role of a competitive industry in SMEs is expected to positively moderate the relationship between technological, organizational, and environmental factors used in this study. Thus, the following hypothesis can be formed:

H10. Competitive industry positively moderates the impacts of (a) perceived relative advantage (b) perceived complexity (c) perceived cost (d) top management support (e) availability of financial resources (f) perceived employee capability (g) perceived competitive pressure (h) perceived customers pressure (i) perceived vendor support on social media marketing adoption.

Research Methodology

Measure of Constructs

This study is cross-sectional, and a survey questionnaire was used to collect data from respondents. To ensure content validity, the items of the study were adapted from the literature. The items of three technological factors, namely perceived relative advantage, perceived complexity, and perceived cost, were adapted from Lian et al. (2014) and Maduku et al. (2016). The scales of organizational factors, including top management support, perceived availability of financial resources, and perceived employee capability, were adapted from Maduku et al. (2016), Lai et al. (2014), and Lin and Ho (2011). In reference to environmental factors, including perceived competitive pressure, perceived pressure, and perceived vendor supports, the items were adapted from Oliveira et al. (2014), Wu and Lee (2005), and Ghobakhloo et al. (2011). Finally, the items of intention to adopt and competitive industry were adapted from Mishra et al. (2014) and Ahmad et al. (2019), respectively. The items were measured using a 5-point Likert scale anchored by "strongly disagree" and "strongly agree." Researchers also tackled the issue of common method bias by performing the Harman single factor test, which yields a single factor variance of less than 50%, as suggested by Podsakoff et al. (2003).

Data Collection and the Sample

The population of this study consists of SME firms in Malaysia. SMEs in Malaysia refer to the firms with less than 200 full-time employees in the manufacturing sector and less than 75 full-time employees in service and other sectors. The reason researchers have chosen SMEs as the population of this current study is because 98.5% of business establishments are SMEs contributing 37.5% of gross domestic purchase (SME CORP, 2018). According to the

Department of Statistics, Malaysia (2018), "Malaysia's SME GDP recovered a strong growth at 7.2% exceeded Malaysia's GDP, which registered at 5.9% in 2017." Thus, based on the statistics, the importance of SMEs in the sphere of the Malaysian economy cannot be ignored as it has demonstrated a significant contribution since the 1990s (Chin & Lim, 2018). In this regard, the role of competition in the industry where SMEs operate in Malaysia is undeniable. The list of SMEs was obtained from the Federation of Malaysian Manufacturers (FMM) directory, 2018. The data were collected from CEOs or owner-managers as they know the actual firm's environment and intention to adopt social media marketing. To reiterate, the main aim of the study is to figure out what factors influence SMEs to embrace social media adoption. As a start, the researchers had used an internet platform to gather information. An internet questionnaire has many advantages, including cost savings, time savings, and a broader reach. It is also considered a much more suitable approach. The data collection took place for 2 months, from January 2019 to March 2019. The invitation email was directed to the manager or owner of 1,000 firms with a detailed explanation of the aim of the study, along with the URL of an online survey. After two-times follow-up through email was done, 214 usable responses were received, with a response rate of 21.4%. Besides this, Kline (2013) speculated that an insufficient data set may have a negative impact on the generalizability of research results. As a practice, this research used G*Power to collect the minimum sample size. According to the G*Power, the minimum sample size was calculated to be 153. Thus, the sample used in this study is deemed appropriate. Furthermore, the descriptive analysis of the data shows that around 66.8% of the firms were less than 10 years in business. Regarding the type of industry, 62.1% of the firms are from the manufacturing industry, while 37.9% are from the service industry. The majority of the respondents were male (66.8%).

Analysis

Unlike previous research that has simply used Structural Equational Modeling (SEM) to analyze data (Abbasi et al., 2020; Abbasi, Kumaravelu et al., 2021; Moon et al., 2018; Singh et al., 2021; Tariq et al., 2021), researchers in this work have applied a deep learning-based dual-stage PLS-SEM and ANN technique (Ashaari et al., 2021; Lee et al., 2020). The anticipated associations between the constructs will be validated using a deep learning-based hybrid technique. This would also rank the most important factors based on the PLS findings. Researchers will analyze the proposed research model in the first phase of PLS-SEM analyses by evaluating hypotheses using Hair et al.'s (2019) two-step procedure (outer model and inner model). Researcher also used ANN to establish the ranking of variables using sensitivity analysis in the next phase.

Results

Measurement Model Evaluation

Initially, to test the validity and reliability of the measurement model, outer loadings, composite reliability (CR), average variance extracted (AVE), and heterotrait-monotrait (HTMT) criteria were evaluated. According to the results, the outer loadings of all items range from 0.579 to 0.953, as the CR and AVE of all constructs were above .7 and .5, respectively, thereby, this study qualifies and validates the measurement model (Hair et al., 2019; Iranmanesh et al., 2017). The loadings were also acceptable, with only one or two loadings less than 0.708 (Hair et al., 2019), see table 1 for details.

To establish the discriminant validity, heterotrait-monotrait (HTMT) criteria were used in this study (Henseler et al., 2015), updated by Franke and Sarstedt (2019). According to the results, all HTMT values were less than 0.85 (Kline, 2016), see table 2. As such, it can be concluded that the respondents understood that the 11 constructs are distinct and that the criterion for discriminant validity was fulfilled. Altogether, both of these validity tests have shown that the measurement items are both valid and reliable.

Structural Model Evaluation

The nine proposed technological, organizational, and environmental factors in this study can explain 50.2% per cent of SMEs' intention to adopt social media marketing variance (R^2 value = .502). The Stone-Geisser Q^2 (cross-validated redundancy) was measured ($Q^2 = 0.385$) to test the predictive relevance of the model, and it was more than zero (Chin, 2010), thus confirming the predictive relevance of intention to adopt social media marketing. To test the hypotheses, non-parametric bootstrapping with 5,000 replications was used (Wetzels et al., 2009). According to the results, out of nine factors, five factors including perceived relative advantage ($\beta = .146$; $p < .05$), perceived cost ($\beta = -.211$; $p < .001$), top management support ($\beta = .256$; $p < .001$), perceived competitor pressure ($\beta = .235$; $p < .01$), and perceived vendor pressure ($\beta = .151$; $p < .05$) have a significant impact on social media marketing adoption. As such, H1, H3, H4, H7, and H9 were supported, while H2, H5, H6, and H8 were not. Moreover, the moderating effect of the competitive industry was tested using the product indicator approach (Hair et al., 2017). The results indicate that the competitive industry moderates positively with the impacts of perceived competitive pressure ($\beta = .143$; $p < .05$) and perceived customer pressure ($\beta = .191$; $p < .01$) on SMEs' intention to adopt social media marketing. Thereby, H10g and H10h were supported, see table 3.

Figures 2 and 3 demonstrate that although competitive pressure and customer pressure positively affect SMEs' intention to adopt social media marketing among the firms in
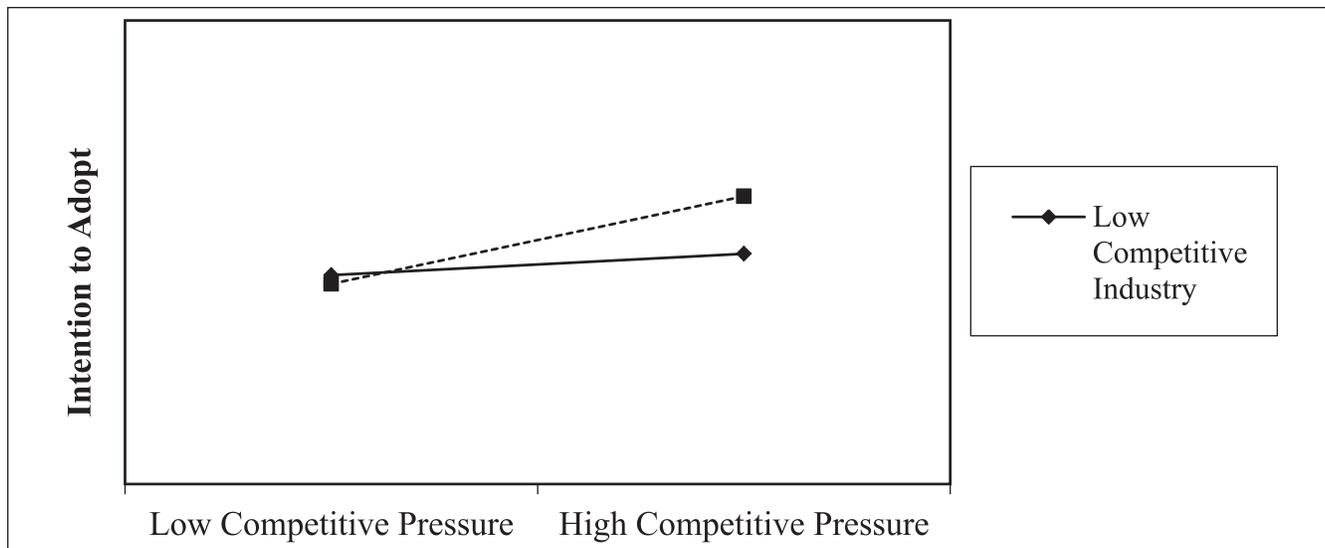
Figure 2. Interaction effect of competitive industry and competitive pressure on intention to adopt.
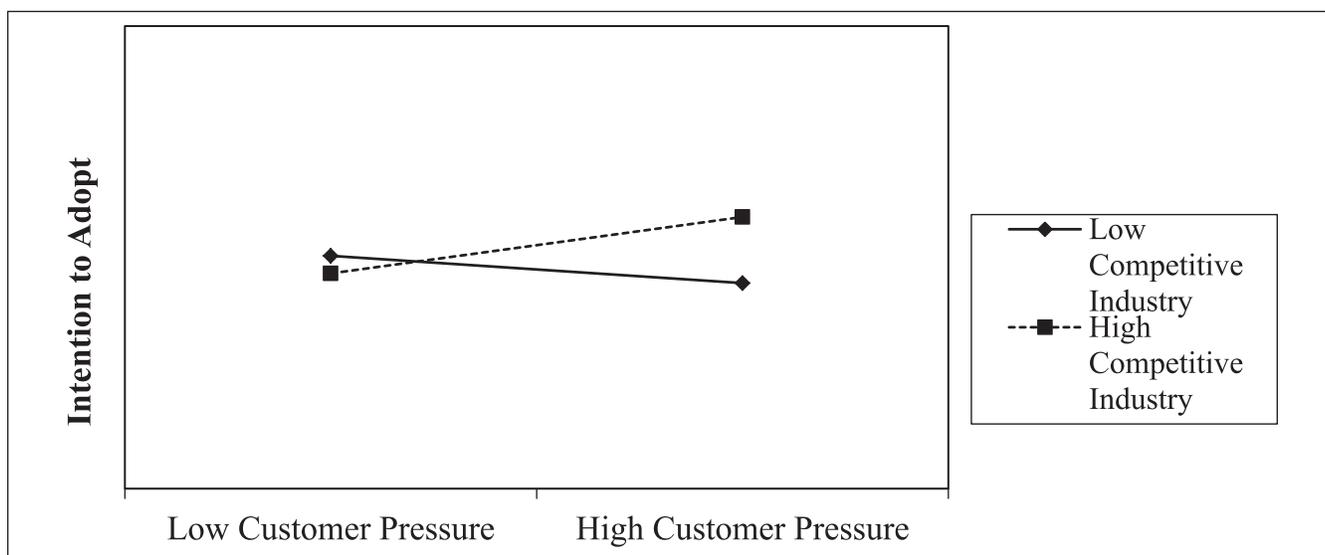

Figure 3. Interaction effect of competitive industry and customer pressure on intention to adopt.

a highly competitive industry, these factors have no effect among firms in a low competitive industry.

Artificial Neural Network (ANN)

ANN analysis reflects the way the human brain works, including axons, neurons, and synapse, and it improves knowledge through learning mechanisms (Abbasi, Tiew et al., 2021; Ashaari et al., 2021). It assists the researcher to forecast the antecedents' importance (Shahzad et al., 2020). The investigator can also use ANN to evaluate and counterbalance the PLS-SEM findings. At the same time, ANN

deals with the complex issue of non-linearity and linearity among the constructs and prioritizes them by using sensitivity analyses to provide a ranking (Abbasi, Tiew et al., 2021). Furthermore, authors have proved that the use of ANN yields strong results (Abbasi, Tiew et al., 2021; Ashaari et al., 2021). Furthermore, when contrasted to SEM or multiple regression approaches, it has been shown to yield better precision. As a result, it is acceptable to conclude that ANN and PLS-SEM are complementary (Shahzad et al., 2020). It is also recognized as a computer method capable of simulating the process of information transmission in the human brain. Learning rule, transfer functions, and network
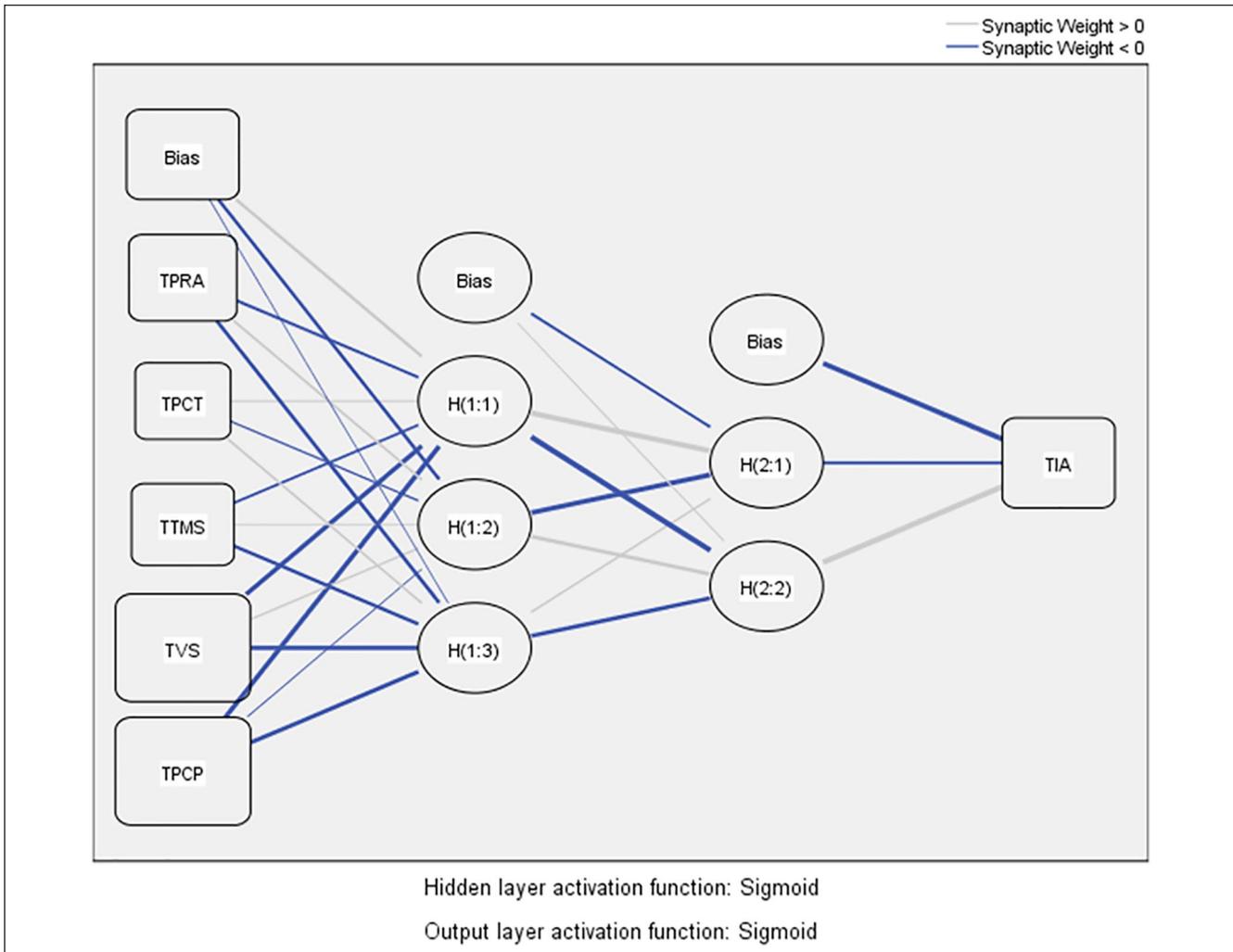
Figure 4. Figure 1: Deep ANN model.

architecture are the three functions that make up ANN (Simpson, 1990). Subcategories of these functions exist, such as radial basis, feed-forward multi-layer perceptron, and recurrent network (Sim et al., 2014). The most widely utilized function is feed-forward multi-layer perception (MLP), which consists of three layers: input, output, and hidden neurons (Abbasi, Tiew et al., 2021; Shahzad et al., 2020). The output neuron is primarily associated with the model's dependent variable, meanwhile the input layer is distinguished by independent variables that collect raw data and transfer it to hidden neurons in the form of synaptic weights. The sigmoid function, meanwhile, is the most widely utilized activation function (Abbasi, Tiew et al., 2021; Ashaari et al., 2021; Shahzad et al., 2020). Furthermore, because of their ability to address features in the proposed models, multilayer neural network models are regarded as particularly robust and strong. To evaluate and build the proposed research model, the research team uses multi-layer perceptron neural networks.

Validation of ANN

The SPSS 23 software package was used to conduct the ANN analysis in this study. In this work, a Multi-Layer Perceptron was employed to generate an ANN model with input (statistically relevant constructs to the study's exogenous variable), hidden, and output neurons (endogenous variables; Ashaari et al., 2021). This differs from previous research that used a single hidden layer (Abbasi, Tiew et al., 2021; Shahzad et al., 2020), a technique known as shallow ANN. As a result, to bridge that gap, this study used two hidden layers of deep ANN design, with the goal of allowing deeper learning for the output neuron node (Ashaari et al., 2021) (see Figure 4).

Table 1. Measurement Model Evaluation.

Constructs	Items	Factor Loadings	CR	AVE
Perceived Relative Advantage (PRA)	Social medial marketing would enable our enterprise to market our products/services in a better way.	0.579	0.849	0.591
	Social medial marketing would enable our enterprise to communicate with our customers effectively.	0.853		
	We would be able to reach our customers timeously with social medial marketing.	0.905		
	Social medial marketing would assist us to develop better relationships with our customers.	0.695		
Perceived Complexity (PCY)	The use of social medial marketing would require a lot of mental effort	0.716	0.883	0.654
	The use of social medial marketing would be frustrating.	0.848		
	Social medial marketing would be too complex for our marketing activities	0.835		
	The skills needed to use social medial marketing would be too complex for employees of our enterprise	0.828		
Perceived Cost (PCT)	The costs involved in the adoption of social medial marketing would be far greater than the expected benefits.	0.905	0.922	0.747
	The cost of maintaining social medial marketing would be very high for our enterprises	0.807		
	The cost involved in providing support systems for social medial marketing would be too high	0.911		
	The amount of money invested in training employees to use social medial marketing would be very high	0.831		
Top Management Support (TMS)	Top management would provide resources necessary for the adoption of social medial marketing.	0.841	0.909	0.714
	Top management would provide necessary support for the adoption of social medial marketing.	0.829		
	Top management would support the use of social medial marketing.	0.789		
	Top managers would be enthusiastic about adopting social medial marketing.	0.915		
Perceived Availability of Financial Resource (PFR)	Our enterprise would have the financial resources for adopting social medial marketing.	0.940	0.916	0.734
	Our marketing budgets would be significant enough to support the adoption of social medial marketing.	0.753		
	It would be easy to obtain financial support for social medial marketing adoption from local banks and/or other financial institutions.	0.822		
	Our enterprise would take social medial marketing more seriously because of the adequate financial support we receive from local banks.	0.900		
Perceived Employee Capability (PEC)	Our employees would be capable of learning new social medial marketing related technology easily.	0.740	0.899	0.693
	Our employees would be capable of using social medial marketing to solve our marketing problems easily.	0.953		
	Our employees would be capable of using social medial marketing to interact with our customers.	0.822		
	Our employees would be capable of providing new ideas on social medial marketing use for our enterprise.	0.800		
Perceived Competitor Pressure (PCP)	Our enterprise thinks that social media marketing has an influence on competition in their industry.	0.933	0.914	0.780
	Our enterprise is under pressure from competitors to use social media marketing.	0.833		
	Some of our competitors have already started using social media marketing.	0.880		
Perceived Customer Pressure (PCR)	Many of our customers would expect our enterprise to adopt social medial marketing.	0.917	0.915	0.731
	Our customers would demand that we establish relationships with them using social medial marketing.	0.830		
	Our relationship with our major customers would suffer if we did not adopt social medial marketing.	0.742		
	Our customers consider would consider us to be forward thinking by adopting marketing.	0.919		

(continued)

Table 1. (continued)

Constructs	Items	Factor Loadings	CR	AVE
Perceived Vendor Support (PVS)	Vendors actively market the use of social medial marketing.	0.778	0.937	0.790
	There would be adequate technical support for social medial marketing provided by vendors.	0.936		
	Training for social medial marketing is would be adequately provided by vendors and other training service providers.	0.944		
	Social medial marketing vendors are encouraging our enterprise to adopt social medial marketing by providing us with free training sessions.	0.886		
Intention to Adopt (IA)	Our enterprise intends to adopt social medial marketing.	0.885	0.913	0.777
	Our enterprise intends to start using social medial marketing regularly in the future.	0.857		
	Our enterprise would highly recommend social medial marketing for other enterprises to adopt.	0.902		
Competitive Industry (CI)	It is easy for our customers to switch to another company for similar services/products without much difficulty.	0.783	0.825	0.703
	Our customers are able to easily access to several existing products/services in the market which are different from ours but perform the same functions.	0.891		

Note. CR = composite reliability; AVE = average variance extracted.

Table 2. Hetrotrait-Monotrait Ratio (HTMT$_{.85}$).

	PCY	PRA	PCT	TMS	PFR	PEC	PCP	IA	PCR	PVS	CI
PCY											
PRA	0.520										
PCT	0.499	0.621									
TMS	0.614	0.504	0.433								
PFR	0.458	0.550	0.566	0.401							
PEC	0.470	0.465	0.570	0.559	0.475						
PCP	0.613	0.488	0.471	0.520	0.387	0.586					
IA	0.507	0.566	0.567	0.576	0.335	0.546	0.608				
PCR	0.328	0.430	0.388	0.285	0.510	0.425	0.319	0.345			
PVS	0.201	0.120	0.232	0.157	0.134	0.180	0.090	0.176	0.122		
CI	0.153	0.050	0.174	0.236	0.096	0.163	0.057	0.056	0.098	0.575	

Furthermore, both input and output neurons were normalized between [0, 1] to optimize the productivity of the study's developed framework. To prevent overfitting, a 10-fold cross-validation approach was used with a 70:30 ratio for both training and testing data (Abbasi, Tiew et al., 2021; Ashaari et al., 2021). The root mean square of errors (RMSE) numbers was recommended as a way to further assess the neural network model's accuracy. Table 4 shows the RMSE values of the ANN model used in this investigation for both training and training data, which vary from 0.153 to 0.177. It is determined that the suggested model obtains improvement in accuracy with the implementation of deep ANN architecture due to the lowest variations between the standard deviation and the RMSE values for both training and testing data.

Ranking of Predictors

Additionally, to calculate the relative normalized mean importance, the mean of each construct is used against the highest mean value, stated in percentage. Table 5 reveals the sensitivity analysis, which further displays that perceived vendor support has the highest effect, followed by perceived customer pressure. Findings also reveal that perceived cost has the least effect on the intention to adopt social media. In addition, Leong et al. (2019) suggested assessing goodness of fit, which can be compared to R^2 in PLS-SEM analysis, in order to validate the performance of the ANN model. Table 4 shows that the study's proposed research model has a substantially greater predictive accuracy (91%) than R^2 findings based on PLS-SEM, that is, 50.2%, thereby achieving one of the study's goals. The non-compensatory character of the deep learning dual-stage hybrid PLS-SEM & ANN technique, as well as the greater predictive accuracy outcome of this study, may be confirmed utilizing deep ANN architecture and the non-compensatory nature of the deep learning dual-stage hybrid PLS-SEM & ANN method (Ashaari et al., 2021). In comparison to SEM analysis, the results of this study show that the use of deep learning (ANN) evaluation

Table 3. Path Coefficient and Hypothesis Testing.

Hypotheses	Relationships	Path coefficients	Decision
Main Model			
H1	PRA -> IA	0.146*	Supported
H2	PCY -> IA	0.012	Not Supported
H3	PCT -> IA	−0.211***	Supported
H4	TMS -> IA	0.256***	Supported
H5	PFR -> IA	0.112	Not Supported
H6	PEC -> IA	0.103	Not Supported
H7	PCP -> IA	0.235**	Supported
H8	PCR -> IA	0.063	Not Supported
H9	PVS -> IA	0.151*	Supported
Moderating Effect of Competitive Industry			
-	CI -> IA	0.105	-
H10a	CI*PRA -> IA	0.023	Not Supported
H10b	CI*PCY -> IA	−0.011	Not Supported
H10c	CI*PCT -> IA	0.058	Not Supported
H10d	CI*TMS -> IA	0.017	Not Supported
H10e	CI*PFR -> IA	−0.021	Not Supported
H10f	CI*PEC -> IA	−0.009	Not Supported
H10g	CI*PCP -> IA	0.143*	Supported
H10h	CI*PCR -> IA	0.181**	Supported
H10i	CI*PVS -> IA	0.033	Not Supported

*$p < .05$. **$p < .01$. ***$p < .001$ (one-tail).

Table 4. RMSE Values.

	RMSE (Training)	RMSE (Testing)	R^2 PLS-SEM	R^2 ANN
	0.173	0.174	50.2%	91%
	0.175	0.177		
	0.168	0.171		
	0.170	0.169		
	0.168	0.176		
	0.177	0.166		
	0.152	0.198		
	0.153	0.197		
	0.176	0.169		
	0.167	0.175		
Mean	0.153	0.177		
SD	0.008	0.011		

Source. Self-created.

better explains the analyzed exogenous variables perceived relative advantage, perceived cost, perceived customer pressure, perceived vendor support, and top management support. The current research's success, according to the researchers, is attributable to the advantages of using deep ANN design and its capacity to identify non-linear linkages among the analyzed interactions.

Discussion

Fundamentally, this study aimed to investigate the determinants of social media marketing adoption intention among Malaysian SMEs by considering the moderating role of competitive pressure. Therefore, the influences of technological, organizational, and environmental factors on intention to adopt social media marketing were investigated. According to the results, perceived relative advantage, perceived cost, top management support, perceived competitor pressure, and perceived vendor pressure have a significant effect on social media marketing adoption. It is also discovered that competitive industry moderates positively the influences of competitive pressure and customer pressure.

Out of the three technological factors used as the drivers of social media marketing adoption intention, the results indicate that intention to adopt social media marketing is positively impacted by perceived relative advantage, while it is negatively affected by perceived cost. Surprisingly, the perceived complexity has demonstrated no significant relationship with the intention to adopt social media marketing on SMEs in Malaysia. The positive relationship between perceived relative advantage and intention to adopt social media marketing on firm-level innovation has been validated by several researchers (Hasani et al., 2017; Zailani et al., 2015a). However, its validation on SMEs social media marketing adoption in a developing country has additionally established the strength of this factor in intention to adopt (Ahmad et al., 2018; AlSharji et al., 2018). The results consequently recommend that perceived relative advantage is a pivotal predictor of intention to adopt social media marketing. Due to that, the local SMEs are willing to adopt social media marketing if they find it an effective tool to market their products/services, communicate with their customers, and develop a better relationship with them.

Table 5. Ranking of Predictors.

Sensitivity analysis (Importance)	PRA	PCT	TMS	PCP	PVS
ANN1	0.10	0.14	0.10	0.34	0.32
ANN2	0.12	0.01	0.25	0.24	0.38
ANN3	0.19	0.02	0.17	0.27	0.36
ANN4	0.14	0.11	0.13	0.26	0.37
ANN5	0.19	0.06	0.16	0.19	0.42
ANN6	0.12	0.03	0.10	0.33	0.42
ANN7	0.05	0.16	0.21	0.19	0.38
ANN8	0.08	0.10	0.16	0.33	0.34
ANN9	0.11	0.10	0.11	0.32	0.37
ANN10	0.14	0.04	0.10	0.36	0.36
Mean relative importance	0.12	0.08	0.15	0.28	0.37
Normalized relative importance (%)	33	21	40	76	100
Ranking	4	5	3	2	1

Source. Self-created.

The findings also reveal that perceived complexity has shown no effect on the intention to adopt social media marketing by SMEs. This discovery demonstrates that SMEs in Malaysia are not predisposed to the complexity of social media marketing in their adoption intention. The results of the findings are consistent with Maduku et al. (2016) study, which found no significant relationship between perceived complexity and mobile marketing adoption. One of the potential reasons behind the insignificant relationship can be ascribed to the familiarity of social media usage. This familiarity enhances the effectiveness of its use, for by doing so, it eradicates the level of complexity involved. In fact, increased familiarity with the new technology will reduce the level of complexity involved when using or adapting it (Vasseur & Kemp, 2015).

Results also indicate a significant negative relationship between perceived cost and intention to adopt social media marketing. This correlation illustrates that if the element of cost is perceived as high, it is more likely for businesses not to adopt it. Significantly, this result is in line with earlier research (Maduku et al., 2016; Ramayah et al., 2016). In the previous study, it was robustly recognized that there is a negative affiliation between perceived cost and technology adoption. Therefore, to prevent cost as a potential barrier to its adoption, marketers need to create strategies that can comprehend the gains of using social media marketing from the respondents' view.

Consistent with earlier literature, top management support has been a key predictor in relation to technology adoption (Ahmad et al., 2018; Alshamaila et al., 2013; AlSharji et al., 2018; Oliveira et al., 2014). Similarly, in the context of this study, a significant positive relationship has been discerned. This particular finding signifies that SMEs will have a positive intention to use social media marketing when the support from the top management is substantial. As the day-to-day affairs and any futuristic decisions are driven from the top management, it would be excellent if the top management is more akin and aware of social media usage and its benefits.

This is because such realization and awareness will naturally spread to their employees, creating a positive intention to adopt social media marketing as a business strategy.

The findings also reveal that there is no significant relationship between perceived availability of financial resources and intention to adopt social media marketing intention. These findings are not consistent with the findings of Maduku et al. (2016) and To and Ngai (2006), who found that financial resources play an important role in the entire technology adoption process. The potential reason for the insignificant effect of financial resource in the context of social media marketing is the fact that the cost of marketing through social media is less than another traditional method such as print advertisement. This indicates that managers believe that social media marketing is cost-effective and has less cost in comparison to other marketing tools.

Perceived employee capability has shown no relationship with intention to adopt social media marketing on SMEs. This result is not in line with the findings of Ghobakhloo et al. (2012), who found that the lower level of employee capability will prove to be an obstacle during the process of technological adoption in most organizations. This result can also be further explained by the popularity of social media in Malaysia. As such, they are familiar with different social media functions, and using them for marketing purposes is not a challenging task for these individuals. This entails the fact that using social media for marketing purposes is not complex for individuals who have used it for many years. As such, employee compatibility plays an insignificant role in shaping SMEs' intention to adopt social media marketing.

In this study, the effect of perceived competitive pressure on SMEs' social media marketing adoption is positively significant. This illustrates that SMEs are driven by pressure from competitors to adopt social media marketing. The findings of this study are consistent with the findings of Lin (2014) and Wang and Cheung (2004) studies which also empirically posited that competitive pressure plays a

significant role in creating an intention to adopt the technology within firms. The reason behind this result can be attributed to the competition within the industry, which could have compelled the SMEs to adapt to medial social marketing.

Perceived customer pressure has shown no significance toward the intention to adopt social media marketing in Malaysian SMEs. This finding is not parallel to the results of several studies which have indicated that SMEs are more likely to implement technology within an organization if their users are using that technology or if it could meet the difficulties of their customers through its usage (Ghobakhloo & Tang, 2015; Maduku et al., 2016; Matikiti et al., 2018). The results also show that customer pressure plays a more critical role in perusing firms in highly competitive industries to adopt social media marketing than low, competitive industries. As such, the insignificant effect of customer pressure can be related to the competition in the market. When the industry is not competitive, the firms face fewer challenges in attracting and keeping customers. Due to that, they do not need to use social media as an effective tool to attract and communicate with customers.

Finally, the perceived vendor support is found to have a significant positive effect on the intention to adopt social media marketing in Malaysian SMEs. This result is consistent with the finding of Ghobakhloo et al. (2011). In the current context, SMEs in Malaysia are more likely to receive support from the vendor. Furthermore, if their officials believe that their vendor has the potential capabilities to fulfill their technical, operational, and financial requirements, SMEs are more likely to develop positive intention to adopt social media marketing.

The results in this study showed that competitive industry moderates the relationship between the environmental factors that is, perceived competitive pressure and perceived customer pressure only. However, the impact on technological, organizational factors, and perceived vendor support has remained insignificant. It is understandable that if a firm operates in a highly competitive industry, it tends to respect and listen to the demands originating from customers and try to fulfill them. By doing so, firms will be able to maintain their competitive advantage in the market. Both competitors and customers play a significant role in shaping the patterns of SMEs (Odlin, 2019). Therefore, the competitive industry moderates the relationship between the perceived customer and perceived competitive pressure, respectively. Concerning other factors such as top management support, regardless of the nature of the industry, top management support always plays an essential role in shaping firms' decision to adopt a technology, which is why it remained significant during this study.

Implication

From a theoretical perspective, this study extends the literature on social media marketing by illustrating the technological, organizational, and social factors that affect SMSs social media marketing adoption. The results showed that among technological factors, perceived relative advantage and perceived cost play a significant role. However, top management support is the only organizational factor that affects social media marketing adoption, while perceived availability of financial resources and perceived employee capability are not significant. The low cost and low complexity nature of social media can explain these results. Regarding the environmental factor, competitive pressure and vendor support are two factors that motivate SMEs to adopt social media marketing. This study also extends the literature by testing the moderating effect of the competitive industry. The findings show that both competitive pressure and customer pressure play a more important role in pursuing SMEs to adopt social marketing in highly competitive industries. From a practical perspective, the findings of the study will be useful for policymakers. By using the findings and factors that motivate SMEs to adopt social media marketing, policymakers can develop policies that will effectively promote social media marketing among SMEs. In return, this approach can influence SMEs' success, which will later reflect in the growth of the country's economy. Also, the results will help SME managers to understand the factors that need to consider adopting social media marketing successfully.

Lastly, this study also contributes methodologically, unlike previous studies which have applied SEM (Albashrawi & Motiwalla, 2020; Chang et al., 2020; Dey et al., 2020), which could only detect linear associations among the constructs. This study has gone a step ahead by applying the Artificial Intelligence tool ANN with deep architecture to cover the existing lacunas, that is, detecting both linear and non-linear associations among the studied variables. The application of ANN along with PLS-SEM brings more robust results, and it clearly displays that the application of ANN is highly accurate.

Limitations and Future Studies

This study has some limitations that can be considered in future studies. Firstly, the study is cross-sectional, limiting the ability to observe the dynamic changes of adopting social media marketing adoption in the process of changing the extent of technological, organizational, and environmental factors. As such, the proposed relationships should be examined for an extended period of time to provide more accurate results. Secondly, the data were collected from a small number of SMEs in Malaysia. Future researchers may need to increase the sample to be generalized. However, the determinants of social media marketing adoption may be different between countries. Moreover, in addition to the nine criteria examined in this study, there may be additional precursors such as the bandwagon effect, political ties, social ties, various learning, and customer trust. As a result, the usage of a restricted number of factors may be regarded as a constraint. Future studies can incorporate different factors to test and validate the same theory in other countries.

Furthermore, future study is needed to test the impacts of technological, organizational, and environmental factors on social media marketing among large firms. Also, this study only investigated the determinants of social media marketing but did not assess the adoption of social media marketing and its impact on SMEs' performance. Thus, future researchers can investigate the influence of social media marketing on SMEs' performance. Those findings may reveal some new insights. Lastly, the discrepancies between theory and empirical findings may be due to the sample's uniqueness, which is not confined to the Malaysian setting. The majority of SMEs in the study sample (67.0%) have been operating for less than 10 years. Apart from that, only 37.9% of the sample of this study represent the services industry SMEs. Future, researchers should have a balanced respondent to have a better perspective for both theory and meaningful interpretations of their findings. This will also help future researchers to generalize the findings.

Declaration of Conflicting Interests

Funding

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