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Article

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Investigating the factors of SMEs' business resilience in the post-pandemic crisis of COVID-19 with technology adoption as a quasi-moderator: a multigroup analysis of Indonesian and Malaysian SMEs

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ABSTRACT

In spite of the devastating effects of COVID-19 on businesses, many SMEs have demonstrated resilience and continued on with their operations. This study investigates the determinants of SMEs' business resilience in Malaysia and Indonesia, with a focus on the moderating factor of technology adoption. The Resource-Based View (RBV) Theory, the Dynamic Capability View Theory (DCV), and the Technology-Organization-Environment (TOE) Framework were combined to analyze a set of business resilience-impacting factors in each country. Online surveys with respondents were used to gather data. Partial least squares-based structural equation modeling was used to examine a total of 539 respondents, of whom 335 were from Indonesia and 204 were from Malaysia. The results showed that government support, technological use, and compliance costs have a significant direct impact on the business resilience of SMEs in both countries. Notably, it was discovered that there were insignificant effects from financial resources and financial literacy. The association between financial resources and business resilience in Indonesia and the relationship between government support and business resilience in Malaysia are both negatively moderated by technology adoption. The findings of this study contributed to a multigroup analysis between neighboring countries, offering valuable insights on the factors influencing SMEs' business resilience to withstand the COVID-19 crisis and their subsequent recovery. It helps explain how SMEs cope with the epidemic, use government support, and use technology to adapt to the changing business climate. These findings enabled SMEs and governments to use preparation and resilience methods to anticipate future difficulties.

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1. Introduction

In the wake of the unprecedented global disruptions wrought by COVID-19, small and medium-sized enterprises (SMEs) find themselves navigating a complex and challenging landscape (Sneader & Singhal, 2020). This global landscape of business underwent a seismic shift in the wake of the pandemic, presenting an unparalleled challenge to the resilience of SMEs. Compared to the economic crisis in 1998, where SMEs were more adaptable than large companies (Juergensen et al., 2020), the COVID-19 pandemic caused severe external shock and adversely affected supply and demand, primarily during the implementation of health distancing policies (Hidayat et al., 2020; Juergensen et al., 2020; Mishrif & Khan, 2023).

As a result, SMEs have been forced to not only weather immediate shocks but also fortify themselves against future uncertainties (Albulescu, 2021; OECD, 2020; Segal & Gerstel, 2020). This makes SMEs in Malaysia and Indonesia no exception to this threat, as they may have little to no resources to survive

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the crisis (Hidayat et al., 2020). In the unique contexts of Indonesia and Malaysia, where SMEs play a vital role in the economies of both countries, investigating the determinants of business resilience becomes imperative. As the backbone of economic vitality, SMEs have faced multifaceted adversities challenging their resilience and adaptive capacities (Martinez et al., 2020). Similar to Malaysian SMEs, the pandemic has also hampered the performance of Indonesian SMEs in terms of production, market, and revenue (Srikalimah et al., 2020). In fact, since the COVID-19 outbreak, many businesses in Indonesia and Malaysia, particularly SMEs, have been on the ropes (Sinar Harian, 2021; Varma & Dutta, 2023).

Despite the unprecedented, continuous impact of the COVID-19 pandemic on the profitability and sustainability of SMEs, some SMEs still managed to survive the post-pandemic crisis, and their resilience has attracted the attention of academic researchers to explore the factors influencing their survivability. Studies on business resilience, particularly among SMEs, are highly desirable and crucial due to the lack of research on the strategies to respond and adapt to such a situation, especially in developing countries (Hidayat et al., 2020; Saad et al., 2021; Sanusi et al., 2023). Saad et al. (2021), for example, conducted a systematic literature review on SMEs' business resilience in highly vulnerable settings like developing countries. Although their findings revealed that the factors influencing business resilience are inconclusive and have varying definitions and measurements, research on SMEs' business resilience in developing countries is still rather scarce, despite the contributions of SMEs to the economies of these countries. Meanwhile, Martinez et al. (2020) identified the key characteristics that enable firms to face market changes and overcome the effects of the global COVID-19 crisis. Interestingly, they found that internal factors and resilience are crucial for attaining success or avoiding failure. Sanusi et al. (2023) also revealed three important determinants of small businesses' resilient framework, namely technology acceptance, government support, and financial literacy. Finally, Kantis and Angelelli (2020) explored the pandemic's impact on the entrepreneurial ecosystem in Latin America and the Caribbean. Their survey-based study suggests that technology sector firms and dynamic start-ups exhibit a strong capacity to withstand and overcome challenges. Hence, business resilience could be attributed to factors such as innovative practices, adaptability to change, robust business models, or other characteristics inherent in these organizations.

Notably, existing literature has provided insights into the challenges faced by SMEs during crises; however, there is a dearth of research exploring the factors contributing to SMEs' resilience in the aftermath of COVID-19. Therefore, the primary objective of this study is to comprehensively investigate the determinants of SMEs' business resilience after the COVID-19 pandemic, with a focus on the moderating effect of technology adoption on the relationships between these determinants. Accordingly, the following question is addressed: 'What are the factors influencing SMEs' business resilience in the post-pandemic crisis of COVID-19?' In this study, business resilience based on a multigroup analysis of Indonesian and Malaysian SMEs in response to the COVID-19 crisis is explored, using technology adoption as a moderator. These distinctive contexts involving the neighboring countries hold paramount importance for both Indonesia and Malaysia as rapidly growing economies in Southeast Asia (Jomo & Chowdhury, 2020), especially in view of insufficient research on SMEs' business resilience in developing countries (Saad et al., 2021), such as Indonesia and Malaysia.

Although the two nations share geographical proximity, their entrepreneurial ecosystems, regulatory environments, and cultural landscapes differ significantly (Hamid, 2020; Nadiyah et al., 2019; Ratten, 2020). In this vein, through a multigroup analysis, this study aims to unravel the contextual intricacies that mold the resilience strategies of Indonesian and Malaysian SMEs. Due to the countries' unique economic landscapes, investigating SMEs' business resilience in the post-pandemic scenario also takes into account the specific challenges and opportunities that characterize each country, providing tailored insights for policymakers and businesses. Since SMEs in Indonesia and Malaysia vary in terms of size, sector, and market orientation, understanding the factors that contribute to resilience in different SME segments is, therefore, crucial for developing targeted support mechanisms (Chin & Lim, 2018; Purnomo et al., 2021).

In recent years, the concepts of resilience and innovation have been investigated as crucial factors of business continuity in response to the COVID-19 crisis. For example, Aifuwa et al. (2020) identified how technology can promote products or businesses while maintaining business cash flow and resilience. According to the authors, SMEs should use technological advancements to carry out various transactions, such as web portals and mobile transfer platforms for payments. In another study, Zutshi et al. (2021)

conducted a systematic literature review to examine how COVID-19 challenges turn into opportunities for SMEs to survive the post-pandemic. As highlighted by Islam et al. (2021), technology adoption is one of the initiatives utilized by Malaysian SMEs to endure the crisis. The adoption of digital technologies will support the survivability of SMEs and their value-adding potential when facing uncertain situations in the future. Furthermore, technology adoption has allowed businesses to tap into the growing digital consumer market, thereby ensuring continuity of sales even during the crisis (Islam et al., 2021). As a matter of fact, technology adoption has emerged as a significant factor influencing organizational resilience (Ratten, 2020). Digital technologies, such as e-commerce platforms and digital communication tools, enable SMEs to adapt to changing market conditions and enhance their operational flexibility (Costa & Castro, 2021; North et al., 2018).

SMEs in developing countries have increasingly embraced digital tools for their remote work and virtual operations (Ngo et al., 2023). For instance, due to the adoption of digital technology and other factors like globalization, rising internet usage, and government initiatives to promote digitalization, Indonesian and Malaysian SMEs have experienced significant growth in recent years. In Indonesia, SMEs are recognizing the transformative potential of digital technologies in enhancing operational efficiency and expanding market reach. As such, the Indonesian government's commitment to the 'Making Indonesia 4.0' initiative has provided a conducive environment for SMEs to embrace digital innovations (Ministry of Industry of Republic of Indonesia, 2019). Similarly, in Malaysia, the government's Digital Economy Blueprint has also played a pivotal role in encouraging SMEs to adopt digital technologies by focusing on e-commerce, digital marketing, and Industry 4.0 practices (National Council of Digital Economy and Fourth Industrial Revolution, 2021). However, both countries share common challenges, such as limited digital literacy and financial constraints, thus highlighting the need for targeted support and capacity-building programs to further accelerate SMEs' digital transformation journeys (Ngo et al., 2023). Based on a qualitative study by Fitriasaki (2020), in which data were analyzed using a content meta-analysis, business resilience is supported by digital transformation. Digital transformation exists when new digital skills emerge and digital tools are adopted. In this regard, the right digitalization strategy is needed in order to successfully achieve business goals and develop more competitive SME products or services.

Several theories have been used to examine technology adoption in SMEs, such as the Technology Acceptance Model (TAM) (e.g. Grandon & Pearson, 2004), Theory of Planned Behavior (TPB) (e.g. Harrison et al., 1997), combined TAM and TPB (e.g. Riemenschneider et al., 2003), TAM2 (e.g. Venkatesh, 2000), Diffusion of Innovations (DOI) (e.g. Premkumar, 2003), Resource-Based View (e.g. Mehrrens et al., 2001), stage theory (e.g. Poon & Swatman, 1999), ICT and relationship transformation model (Ritchie & Brindley, 2005), and Unified Theory of Acceptance and Use of Technology (UTAUT) (e.g. Anderson & Schwager, 2004). However, the present study integrates three theories, Resource-Based View Theory (RBV), Technology-Organization-Environment (TOE) Framework, and Dynamic Capability View (DCV), to provide a comprehensive theoretical foundation for a nuanced examination of the factors influencing SMEs' business resilience in the post-pandemic context involving Indonesia and Malaysia. The integration of these theories offers a well-rounded perspective that considers internal capabilities, dynamic adaptations, as well as the technological, organizational, and environmental factors shaping the business resilience of SMEs (Barney, 1991; Helfat & Peteraf, 2009; Peteraf, 1993; Teece, 2007) in both nations.

To the researchers' best knowledge, no research has integrated three theories to support the factors affecting SMEs' business resilience with technology adoption as a moderating variable in the context of two neighboring countries, Indonesia and Malaysia. Besides, the literature has provided insufficient attention to cross-country comparisons, and many existing studies tend to overlook cross-country variations. (Saad et al., 2021) also highlighted the scarcity of studies examining SMEs' business resilience in developing countries. For example, Fitriasaki (2020) conducted a qualitative study with literature studies from several sources, including both printed and electronic media, books, and research results from various electronic journals, to describe the Business Model Canvas of SMEs during the pandemic. However, only general findings were reported, and no specific focus on Indonesian SMEs or cross-country variations were highlighted. This literature gap calls for research that recognizes the diverse economic contexts of different countries, such as Indonesia and Malaysia.

The current study seeks to make several contributions to the existing literature in order to bridge the literature gap. First, by conducting a multigroup analysis of Indonesian and Malaysian SMEs, this study

acknowledges and explores the distinct factors influencing SMEs' business resilience in the two neighboring countries—Indonesia and Malaysia—thereby providing a more nuanced understanding of cross-cultural variations in the post-pandemic scenario.

The second contribution of this study involves exploring the moderating role of technology adoption, as the literature on SME business resilience lacks a comprehensive examination of technology adoption as a moderator in the post-pandemic context. Moreover, according to Premkumar (2003), very few studies have examined the impact of technological characteristics on SMEs' technology adoption. Therefore, the current study addresses this gap by incorporating technology adoption as a moderating variable in the relationships between various determinants of SMEs' business resilience. The extent to which technology is embraced within business operations not only adds a layer of sophistication to the analysis but also reflects the increasing importance of technology in the modern business environment.

Finally, the current study expects to translate its findings into practical implications that may be beneficial for policymakers and SMEs. In essence, the findings can inform policy decisions and guide SMEs in developing strategies that enhance resilience in the post-pandemic era. Hence, the existing research gap motivates the current study to explore the key factors of Indonesian and Malaysian SMEs' business resilience in response to the COVID-19 crisis.

This research paper is organized into seven sections. After the key introduction in [Section 1](#), [Section 2](#) presents the research background, while [Sections 3](#) and [4](#) present the theoretical literature review and empirical literature and hypotheses development, and [Section 5](#) describes the research design used in this study, respectively. [Section 6](#) elaborates on the empirical findings and discussion, and, finally, [Section 7](#) provides the summary findings of the study and conclusion.

2. Background

The COVID-19 pandemic has brought unprecedented challenges to economies worldwide, disrupting various sectors such as trade, tourism, transportation, education, and health (Hanushek & Woessmann, 2020; Segal & Gerstel, 2020; Sneider & Singhal, 2020). Small and medium enterprises (SMEs) were no exception, as they are the most threatened entity due to having little to no resources to survive the crisis (Fitriasari, 2020; Lestari et al., 2022). Many businesses in Malaysia, particularly SMEs, have been on the ropes since the COVID-19 outbreak (Noor Azmi et al., 2023). Former Minister of Entrepreneurship Development and Cooperatives, Wan Junaidi Tuanku Jaafar (2020), mentioned that over 30,000 SMEs have ceased operations subsequent to the implementation of the Movement Control Order (MCO) on March 18, 2020. In conjunction, the COVID-19 pandemic has also hampered Indonesian SMEs' performance in terms of production, market, and revenue (Lestari et al., 2022; Srikalimah et al., 2020). As compared to the economic crisis in 1998, where SMEs were more adaptable than large companies (Juergensen et al., 2020), the COVID-19 pandemic caused severe external shock and adversely affected supply and demand, primarily during the implementation of health distancing policy (Fitriasari, 2020). Corresponding to Malaysia's scenario, the sustainability of Indonesian SMEs was likewise affected by the pandemic (Juergensen et al., 2020).

Past studies acknowledged the vital role of SMEs (Gherghina et al., 2020; Karadag, 2015; Tambunan, 2008), as these enterprises, being the backbone of many economies, have faced immense pressure to adapt and survive in the post-pandemic landscape. Zafar and Mustafa (2017) revealed the importance of SMEs to Pakistan's economies, such as the Gross Domestic Product (GDP), enhance the livelihood of people in the country by creating more economic opportunities, and contribute towards work era and fare improvement. Similarly, a study by Yoshino and Hesary (2018) highlighted the importance of SMEs in the Asian region. They pointed out that the majority of business establishments in Asian countries are comprised of SMEs (which make up more than 96%) and provide two out of three private-sector jobs on the continent. SMEs in Indonesia and Malaysia also contribute significantly to GDP and job opportunities (Ali et al., 2017; Tambunan, 2008). SMEs in Indonesia account for more than 90% of all companies, hence becoming the biggest source of employment (Laila et al., 2023; Tambunan, 2008, 2022). In addition, SMEs play an essential role in Malaysia's economic growth and building social welfare. In Malaysia, 662,939 SMEs operate their businesses, representing more than 97% of the total

business establishments and contributing more than one-third of the total Malaysian GDP (Ali et al., 2017; Chin & Lim, 2018).

The focus of this study is the Indonesian and Malaysian SMEs sectors, as both countries have experienced unique challenges and opportunities related to distinctive regulatory, reform, and policy environments. The challenges faced by these two nations' SMEs are significantly shaped by the dynamic interaction of changing policy frameworks and regulatory standards. Therefore, it is important to examine the frameworks, facilitating an insight into how the landscape is created. The Indonesian SME sector has faced hurdles due to the country's diverse regulatory landscape. For example, the decentralization of regulatory powers to regional governments has led to varying approaches to managing the pandemic's economic fallout (Fitriasari, 2020). Lee et al. (2023) emphasized the significance of regulatory consistency and coordination in enhancing SME resilience during times of crisis. In addition, ongoing reforms aimed at fostering a favorable business environment have had an impact on Indonesia's regulatory response. A World Bank Group (2020) report acknowledged Indonesia's efforts to simplify business procedures, but challenges persist, impacting the agility of SMEs to adapt to the post-pandemic era.

Malaysia's SME landscape, on the other hand, operates within a framework that is formed by comprehensive policies and strategic initiatives. The Malaysian government's swift response to the economic challenges posed by the pandemic, as seen in the Prihatin Rakyat Economic Stimulus Package, has provided crucial support for SMEs (Aji et al., 2020; Laila et al., 2023; Shah et al., 2020). Past research by Mohd-Rashid et al. (2019) emphasizes the importance of policy alignment and integration in bolstering SMEs resilience. The Malaysian government's emphasis on digitalization and technology adoption, as outlined in the National Policy on Industry 4.0, is seen as a transformative opportunity for SMEs to enhance their competitiveness in the post-COVID-19 era.

The initiatives taken by both nations' governments have shown that policymakers have recognized the need for structural reforms to address long-standing challenges and capitalize on emerging opportunities. The ASEAN Economic Community's (AEC) initiatives and regional collaborations are avenues through which SMEs can expand their market reach, as discussed in studies by Robiyanto et al. (2023). Additionally, as studies like Klein and Todesco (2021) highlight, embracing digitalization and e-commerce gives SMEs opportunities to adapt to shifting consumer behaviors and global market trends.

SMEs in Indonesia and Malaysia have encountered distinctive challenges and opportunities in the wake of the COVID-19 pandemic, formed by their regulatory, reform, and policy environments. Indonesia's decentralized regulatory structure and ongoing reforms underscore the importance of achieving coordination for effective crisis management, while Malaysia's comprehensive policy frameworks demonstrate a proactive approach to supporting SMEs during challenging times. As both countries strive for post-pandemic recovery, the alignment of policies, regulatory consistency, and integration of reforms will play a crucial role in enhancing the resilience of SMEs. The emphasis on digitalization, regional collaborations, and the transformative potential of Industry 4.0 presents a pathway for SMEs to not only recover but thrive in the evolving economic landscape. Hence, it is worth and appropriate to explore the issue of SMEs business resilience incorporating technology adoption as a moderating effect in two contexts, Indonesia and Malaysia.

3. Theoretical literature review

This study employed the Resource Based View (RBV), Dynamic Capability View (DCV), and Technological, Organizational, and Environmental (TOE) Framework to examine the factors that contribute to the business resilience of small and medium-sized enterprises (SMEs) in the aftermath of the COVID-19 pandemic crisis.

3.1. Resource Based View (RBV) and Dynamic Capability View (DCV)

Business owners encountered various resource constraints to be resilient in the financial domain throughout the entire period of the COVID-19 pandemic. Hence, in order to investigate the utilization of resources during and after the COVID-19 pandemic in the financial domain, we employ Resource Based View (RBV) and Dynamic Capability View (DCV).

The adoption of the Resource-Based View (RBV) has become increasingly prevalent in both academic and industry. Its primary objective is to cultivate and sustain a competitive advantage by effectively utilizing an organization's resources and capabilities. According to Resource Based View (RBV), a company is equivalent to a diverse set of resources (Benner, 2018). The Resource-Based View (RBV) theory argues that a company competitive advantage and success stem from its distinctive internal resources and capabilities. Apart from traditional industrial organization economics, which largely relies on competitive business environment analysis, the resource-based perspective focuses on the firm's various resources (Das & Teng, 2000).

The Resource-Based View (RBV) theory argues that a the company competitive advantage and success stem from its distinctive internal resources and capabilities (Mubeen et al., 2023). Wenerfelt (1984) states that resources are both tangible and intangible assets (like SMEs financial literacy level) that are semi-permanently linked to the firm. To maintain their competitive advantage, businesses must have a wide and varied set of resources and a diverse knowledge base (Conner & Prahalad, 1996). According to Resource Based View (RBV), a firm is considered to possess a sustained competitive advantage if it employs a value – creating strategy that no present or potential competing companies are utilizing at the same time, and when these other firms cannot recreate the advantages of this strategy (Barney, 1991).

According to RBV perspective, start-up SMEs might use resources to improve their performance and gain a competitive advantage (Barney, 1991; Conner & Prahalad, 1996; Wernerfelt, 1984). Moreover, small and medium-sized enterprises (SMEs) exhibit varying performance due to their unique characteristics and resources that are VRIN or valuable, rare, inimitable, as well as non-substitutable (Barney, 1991).

Richtnér and Löfsten (2014) argue that corporate resilience is established through the utilization of various resources inside a company. Organizational resources assist organizations in achieving competitive advantage over the long term (Barney, 1991). As a result, during unpredictable disruptions, organizations could use their precious resources, information, and knowledge to respond quickly and hasten the recovery process (You et al., 2023).

While the Resource-Based View (RBV) theory has been applied to clarify how an organization might attain a competitive advantage, it falls short in explaining how and why certain enterprises possess a competitive advantage in circumstances characterized by rapid and unpredictable change. Amidst a period of uncertainty and upheaval, (Teece et al., 1997) suggests that organizations should establish dynamic capabilities in order to ensure their survival. Dynamic capabilities refer to the organizational process of integration, reconfiguration, creation, and delivery of their resources to align with and perhaps instigate market disruption (Eisenhardt & Martin, 2000). Dynamic capabilities include the ability to recognize and configure threats and opportunities, grasp opportunities, and sustain a competitive edge by strengthening, integrating, preserving, and restructuring the organization's intangible and tangible resources (Teece, 2007).

The COVID-19 pandemic has hit SMEs hard since they lack the necessary resources to cope. Companies must adapt to external changes via resilience and innovation to survive amid adversity. Thus, from a resource-based perspective, resilient companies should adopt and implement innovation-based strategies to face challenges holistically, where the effectiveness of the strategy depends on managerial capacities and the level of adaptation to constant market changes with internal assets and capacities needed to survive (Valdez-Juárez et al., 2022). In contrast to major organizations, small and medium-sized enterprises (SMEs) must immediately and effectively devise recovery strategies following the Covid-19 pandemic by thinking innovatively and reinventing themselves in novel ways (Zutshi et al., 2021). According to the Dynamic Capability View Theory, it is believed that small and medium-sized enterprises (SMEs) can enhance their skills in effectively utilizing digital technologies to identify and take advantage of opportunities, and then adapt their resources to successfully navigate unpredictable and fast-paced business environments (Vrontis et al., 2022).

3.2. Technological, organizational, and environmental (TOE) framework

Various theories like Technology Acceptance Model (TAM) by Davis (1989), Theory of Planned behaviour (TPB) by Ajzen (1991), Unified Theory of acceptance and Use of Technology 2 (UTAUT 2) by Venkatesh

et al. (2012), and Theory of Diffusion of Innovation (DOI) by Rogers (1962) have been employed to analyze the adoption and dissemination of Information and Communication Technology (ICT) in Small and Medium Enterprises (SMEs) in many literatures. Although contributions to this field of study have been recognized, it has been acknowledged that a significant amount of the literature has produced fragmented results. Nevertheless, adoption frameworks such as Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Theory of Reasoned Action (TRA) are frequently criticized for their excessive emphasis on related to technology rigidity (Ngo et al., 2023). The TOE framework offers a comprehensive theoretical framework for ICT adoption and diffusion research, examining technological, organizational, and environmental aspects that influence acceptance (Ramdani et al., 2013). Also, according to Baker (2012), the TOE framework evaluates innovation uptake and adaptation in many contexts effectively, providing interesting pathways for future study.

Tornatzky and Fleischer (1990) created the TOE framework. It outlines three characteristics of an enterprise's context that influence the process by which technological innovations become adopted and applied: environmental context, technical context, and organizational context. The technological aspect encompasses internal as well as external technology that has the potential to increase productivity within a company. It is described through the lenses of business scope and size, the structure of management complexity, the level of quality, attributes, and the extent of organizational technological as well as financial resources (Hoti, 2015). The second aspect of the TOE model is organization. Organization pertains to the attributes and assets of a company when incorporating technology for business purposes (Religia et al., 2023). The last aspect is environment or institutional. The environment aspect on the TOE framework pertains to the aspects that either support or hinder a company's decision to adopt innovation and new technologies, taking into account its existing operational characteristics and technology capabilities (Tornatzky & Fleischer, 1990).

The pandemic has changed the corporate macro-environment, prompting enterprises to use digital technologies faster and more widely (Ragazou et al., 2022). The epidemic has presented SMEs with the chance to transform themselves by embracing contemporary technology. Furthermore, the implementation of lockdown measures has compelled several retail establishments throughout the globe to offer online buying services, and this pattern is anticipated to persist after the pandemic (Mishrif & Khan, 2023). Amidst the COVID-19 epidemic, the TOE framework offers a complete viewpoint on the interplay between technology and societal factors, and their impact on significant shifts in technology adoption by organizations (Ngo et al., 2023).

3.3. Business resilience

In turbulent times, revolution, renewal, and resilience all seem to be three important states, and resilience is widely considered a desirable organizational characteristic to overcome different types of adversity (Hamel & Välikangas, 2003). The notion of resilience itself is closely linked to an element's abilities and capacity to recover to a perfect equilibrium after a disturbances (Bhamra et al., 2011). In the face of adversity (exogenous shocks and continuing pressure) that an organization faces on an ongoing basis, Vogus and Sutcliffe (2007) define resilience as the ability to maintain a positive alteration so as to arise stronger and more resourceful. Since the type of crisis that actually happens is unlikely to be the one that was expected, organizations need to build in as many ways as possible to respond to and recover from any crisis that may happen. As a result, resources devoted to resilience-building increase an organization's chances of surviving a crisis (Seville, 2008). Annarelli and Nonino (2016) define organizational resilience as the ability to anticipate and manage internal and external shocks through strategic awareness and integrated operational management. Resilience is static when it is based on preparedness and preventive measures to minimize threat probability and impact, and dynamic when it is based on managing disruptions and unexpected events to shorten unfavorable repercussions and boost the organization's speed of recovery to the original or a better state. Gianiodis et al. (2022) define entrepreneurial resilience as the capacity to recover from or adapt to adversity while planning, launching, growing, and managing a business. Moreover, Saad et al. (2021) defines SME resilience is the capacity to adjust to disturbances, expand (a positive performance), and

grab commercial opportunities in a difficult environment. According to the dynamic capability perspective, SMEs must build these competencies to a greater level to be resilient in complicated business contexts.

Small and medium-sized enterprises (SMEs) are the pillar of many economies, accounting for more than 90% of all businesses or companies in some countries (Gunasekaran et al., 2011). Therefore, amidst the extreme uncertainties that surround SME on an ongoing basis, it is more important to study how SMEs as an organization could survive and be resilient (Bhamra et al., 2011; Lestari et al., 2022). Ates and Bititci (2011) study reveals that most SMEs focus on operational, hard, and internal change management with a short-term, reactive approach, overlooking strategic, long-term, and soft requirements of organizational change. Clearly, the lack of coherence between the hard and soft aspects of change severely restricts SMEs' resilience and capacity to adapt efficiently and effectively. According to Bhamra et al. (2011), in varying degrees, SMEs can be resilient by adjusting to the threat through their own business operations to avoid the disastrous effects of external disturbance. The extent of their resilience, however, will be determined by their capability and resource availability.

4. Empirical literature review and hypotheses development

4.1. Compliance cost and business resilience

Compliance costs include all costs associated with following and adhering to rules. Compliance costs include compliance staff salary, reporting time and money, new retention methods, and so on. OECD guidelines classify compliance costs as administrative burdens, administration and enforcement expenses, and substantive compliance costs. Substantial expenditures include implementation, direct labor (wages), supplies, components, and external services. Compliance costs can affect the long-term viability and survival of firms, especially SMEs (Sanusi et al., 2023). In association with government policy, regularly paying taxes opens up new market opportunities and encourages process and product innovation, which in turn contribute to improved SME performance in the long run (Kitching et al., 2015). According to Mukhlis et al. (2015) research on the SME handicraft sector in Indonesia, the existence of a tax on business activities in the SME sector should be viewed as an opportunity for the SME sector to become more competitive. Because the owners of SMEs meet their tax obligations in accordance with applicable regulations, the tax paid by SMEs should be restored in the form of physical infrastructure that can help businesses and reduce economic costs. As a result, tax compliance businesses in the SME sector of handicrafts are essentially an important factor that can boost SME's performance in the long run. Moreover, according to Matarirano et al. (2019), tax compliance costs may indicate that the company is doing well and expanding in size. SME expansion results in more skilled employees as well as managerial benefits such as improved decision-making and financial information management. Therefore, the hypothesis in this study is:

H1: Compliance cost is positively affect SME's business resilience.

4.2. Financial literacy and business resilience

RBV states that a firm's resources drive its growth and success (Barney, 1991). The RBV lists physical resources like assets, capital, finance, human resources, and intangible ones like skills, knowledge, strategy, information, business process, reputation, patent, and others. as list of company valuable resource (Runyan et al., 2006). Several studies have considered SMEs owner or business manager knowledge of financial information as a valuable intangible resource (Adomako & Danso, 2014; Hossain et al., 2020; Owusu et al., 2019). Financial literacy refers to a person's ability to comprehend and apply financial concepts and information (Huston, 2010; Servon & Kaestner, 2008). According to Remund (2010), financial literacy is defined in five ways: understanding of financial concepts, capacity to convey about financial concepts, proficiency in handling one's own finances, ability to make acceptable financial decisions, and self-belief in effectively planning for future financial needs. In the case of small and medium-sized enterprises (SMEs), definitions of financial literacy are made for managers and business owners (Fatoki, 2014;

Mutamimah et al., 2021; Okello et al., 2016). According to Eniola and Entebang (2015), SME financial literacy is the conception of how organizations manage and make strategic decisions using their financial knowledge, which has a significant impact on decision makers' behaviors, awareness, and attitudes regarding making sound decisions and, ultimately, attaining organizational performance. Study by Ye and Kulathunga (2019) finds that financial literacy improves SMEs' sustainability by ensuring they can cope with unexpected economic uncertainty and quickly shifting financial and credit markets, allowing them to improve their performance over time. According to study conducted by Seraj et al. (2022), financial literacy has a significant positive effect on entrepreneurial resilience in the Saudi Arabia context. Similar finding also found on Lestari et al. (2022) that shows Small and medium-sized enterprise (SME) owners that possess strong financial literacy are able to make more informed financial decisions, which in turn enhances the survival prospects of their firms under difficult economic circumstances. Financial knowledge and competence aid entrepreneurs to cultivate the capacity to bounce back from entrepreneurial hardships and detriments, allowing companies to survive through a crisis. Therefore, the hypothesis in this study is:

H2: Financial literacy is positively affect SME's business resilience.

4.3. Financial resource and business resilience

According to Penrose (1959), the RBV notion states that corporations may achieve a competitive edge over their competitors by structuring their resources, making it harder for competitors to copy their strategy (Barney, 1991; Kor & Mahoney, 2004). According to Wernerfelt (1984), the success of an organization is influenced by its resources, like finance, assets, and capabilities. The availability of financial resources as an intangible asset becomes more value when it is appropriately managed to achieve positive results like as performance and growth (Owusu et al., 2019). The availability of financial resources is a critical enabler of growth for small enterprises (Cowling et al., 2018). Financial resource are an important component of company start-up, development, and growth because SMEs have very different financing needs and face different challenges than large businesses (Rupeika-Apoga & Danovi, 2015). According to Songling et al. (2018), access to the organization's financial resources can help the organization gain a competitive edge. Moreover, company with greater access to financial resources may utilize its internal resources more seamlessly and cogently, leading to greater competitiveness and monetary gain (Buckley et al., 2016; Li et al., 2020). Several study have discovered that the availability of financial resources has a significant impact on the growth of SMEs in developing countries, like Ghana (Owusu et al., 2019), Pakistan (Abbass et al., 2019; Khan et al., 2021), Tanzania (Ismail, 2022), and UEA (Zarrouk et al., 2020). Therefore, the hypothesis in this study is:

H3: Financial resource is positively affect SME's business resilience.

4.4. Government support and business resilience

The impact of crises on the long-term sustainability of small and medium-sized enterprises (SMEs) has caught the attention of academics and governments due to the importance of such businesses in economic development, innovation, and work opportunities (Manzaneque-Lizano et al., 2019). Government support programs help small and medium-sized businesses (SMEs) overcome both financial and non-financial barriers that make it hard to run a business while also encouraging more entrepreneurial behavior (Nakku et al., 2020). During crisis, External credit availability, stable market interest rates, affordable tax rates, and reduced transaction costs are examples of government macroenvironmental activities that may create a favorable environment for nurturing SMEs performance (Ganlin et al., 2021). Beside government financial assistance during the COVID-19 pandemic, government technical assistance is crucial for small and medium restaurants' marketing and process innovation. SMEs benefit more from government innovation support. Especially when marketing and process innovation are essential to business survival during the pandemic (Najib et al., 2021). Previous studies show that during the COV-19 pandemic found that environmental factors in the form of government support positively impacted the

business resilience of MSMEs for developing countries context (Hidayat et al., 2020; Lestari et al., 2022; Najib et al., 2021; Nurunnabi, 2020). Therefore, the hypothesis in this study is:

H4: Government support is positively affect SME's business resilience.

4.5. Technology adoption and business resilience

Small and medium-sized enterprise (SME) involvement in technology implementation is becoming increasingly important in both developed and developing countries (Ganlin et al., 2021). A study by Arifin et al. (2023) shows a positive effect on the extent of digital adoption among entrepreneurs and the likelihood of their firm achieving success. Consequently, those who decline to embrace digital technology will be left at a disadvantage and face difficulties in achieving success and survival. The accelerated growth of e-commerce brings value to companies in terms of reduced expenses and increased profit because customers can be approached all over the world without needing a physical presence in the customer's location (Ganlin et al., 2021; Zainal & Mat Udin, 2015). Technology adoption boosts company performance and lowers expenses. Innovative financial practices also allow MSMEs to access crowd-sourcing, peer-to-peer lending, and internet based loans. These benefits will retain profitability and boost MSME activity ratios, sustaining financial success (Kurniawan et al., 2023). From financial side, In Indonesia, to help business, the government enacted regulations encouraging SMEs to obtain business loans from financial technology companies, particularly from Peer-to-Peer (P2P) lending in Indonesia. This new platform was expected to promote the growth of the digital economy while also exposing the general public to financial services (financial inclusion) (Kurniasari et al., 2021). Therefore, the hypothesis in this study is:

H5: Technology adoption is positively affect SME's business resilience.

Although previous research has shown many positive effects of technology adoption on the sustainability of SME in the face of crisis (Hidayat et al., 2020; Lestari et al., 2022), In fact, in terms of tax compliance, the adoption of technology by SME even results in losses on the payment side because of the many digital business operators who do not register and pay their taxes. These findings were found in e-commerce sellers both in Malaysia (Hamid et al., 2019; Zainal & Mat Udin, 2015) and Indonesia (Ridho, 2021; Sitorus & Kopong, 2017). Cross-border shopping and mail order catalogs have long posed difficulties in the administration of indirect taxes based on destination (Agrawal & Fox, 2016). Therefore, the hypothesis in this study is:

H6: Technology adoption negatively moderates the relationship between compliance cost and SME's business resilience.

According to micro-entrepreneurs frequently suffer from intricate financial decisions because of their lack of financial literacy (Drexler et al., 2014). Indonesian SMEs have been designated as targets of the Financial Literacy and Inclusion Improvement Program because their level of financial literacy remains low (Yuneline & Suryana, 2020). According to Basar et al. (2022), Malaysia's government implemented the National Strategy for Financial Literacy 2019–2023 to improve financial literacy, nurture sound financial behavior, and promote healthier attitudes toward financial management among Malaysians of all ages and stages of life. It does not, however, specifically address digital financial literacy. As a result of low financial literacy, consumers with limited experience with (intricate) financial products must deal with new forms of access to finance via fintech (Elsinger et al., 2018). Moreover, according to Setyorini et al. (2021), financial technology does not always result in financial literacy. Also, a study by Nugraha et al. (2022) shows that the use of Fintech by SMEs in Indonesia is not directly linked to financial literacy. Lastly, Panos and Karkkainen (2019) discover that financial literacy is negatively related to cryptocurrency ownership in a recent cross-country study. This suggests that less financially literate consumers have a limited understanding of cryptocurrencies' higher risk and reward trade-offs that have been offered by fintech.

Moreover, technology adoption disrupts SMEs access to get financial resource. Technology propel the rise of Peer to peer lending with technology based application (Setyorini et al., 2021). According to Nugraha

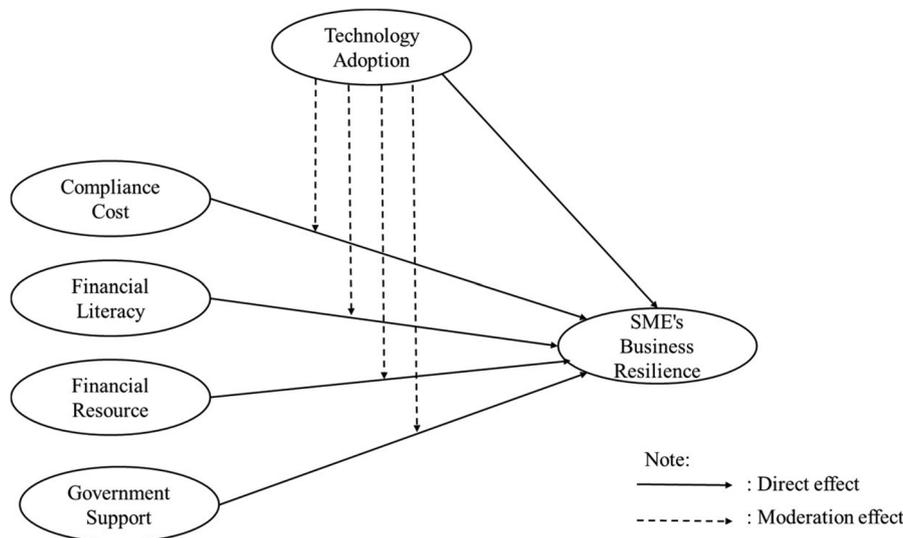


Figure 1. Research framework.

et al. (2022), Fintech plays an important role in facilitating financial access and benefiting SMEs. Although it offers easy access to funding for SMEs, in developing countries such as Indonesia, technology based peer-to-peer lending is much worrisome for the public, where the billing system and interest rates imposed on customers who wait for payment bills are very high (Situmorang et al., 2020). Potential misuse and fraud in digital services, as well as issues of data confidentiality and digital profiling, are the most significant market-driven risks when customers adopt fintech. If more people have access to credit and investment products, marketing practices that reinforce behavioral biases (like a lack of self-control or a focus on the short term) could be a problem (Elsinger et al., 2018). Therefore, the hypothesis in this study is:

H7: Technology adoption negatively moderates the relationship between financial literacy and SME's business resilience.

H8: Technology adoption negatively moderates the relationship between financial resource and SME's business resilience.

Study reveals that SMEs were urged to recover from the pandemic after seeing the government's involvement in the process of recovery through policy and financial assistance (Razumovskaia et al., 2020). According to Ganlin et al. (2021), government support is critical for small companies to remain viable, particularly in a pandemic situation. During the COVID-19 crisis, government assistance in the form of financial and technical assistance is most important in facilitating marketing and process innovation on SMEs (Najib et al., 2021). However, SMEs were typically unable to obtain government financial support for the obtaining of IT technology for improving their business (Vu & Nguyen, 2022) due to low rate of digital literacy. Moreover, in developing countries, a lack of government interest in and support for developing the infrastructure required to expand internet access may occur as a result of a lack of funding or a failure to effectively prioritize technological innovation (Khalil et al., 2022). Therefore, the hypothesis in this study is:

H9: Technology adoption negatively moderates the relationship between government support and SME's business resilience.

Based on previous literature studies, the following are the research model in this study (see Figure 1):

5. Research design

5.1. SME's contexts in Indonesia and Malaysia

According to Indonesian Law No. 11 of 2020, SME are defined based on their amount of working capital. Whereas a micro-enterprise is a business that has business capital up to the maximum of Rp 1,000,000,00

(one billion rupiah), not including land and buildings, A small enterprise is a business that has an enterprise capital of more than Rp1,000,000,000 (one billion rupiah) up to a maximum of Rp5,000,000,000 (five billion rupiah), not including land and buildings. Meanwhile, a medium-sized enterprise is a business that has an enterprise capital of more than Rp5,000,000,000 (five billion rupiah) to a maximum of Rp10,000,000,000 (ten trillion rupiah), not including land and buildings (Windusancono, 2021). Data from the Ministry of Cooperation and Small and Medium Enterprises (KemenkopUKM) show that Indonesia has 64,194,057 UMKMs (or about 99% of the total enterprise units) and employs 116,978,631 workers (or roughly 97% of total employment in the economic sector). During the COVID-19 pandemic outbreak, the Ministry of Cooperation and Small and Medium Enterprises (KemenkopUKM) reported that there are about 37,000 UMKM who report that they are very seriously affected by the presence of this pandemic. Whereas 56% of SMEs report experiencing declines in sales, 22% have problems with financing, 15% have problems with the distribution of goods, and 4% have difficulties obtaining raw materials (Pakpahan, 2020). The Indonesian government has allocated RP 96.21 trillion in incentives to support MSMEs. These incentives include capital assistance (BLT UMKM), low borrowing interest rates, and relaxed terms for credit and tax payments. These measures aim to help MSMEs survive throughout the uncertain period of the epidemic (Lestari et al., 2022). SMEs in Indonesia have the following characteristics: they are family businesses with one person in charge of management, they do not go public on the stock exchange, they have limited financial access, and their credit risk is higher than that of non-SMEs. This demonstrates that SMEs have a significant opportunity to be studied in order to contribute to economic empowerment and poverty reduction (Mutamimah et al., 2021).

The definition of SMEs in Malaysia is based on two criteria: the number of full-time employees and annual sales turnover. In the manufacturing sector, SMEs are defined as businesses with a sales turnover of less than RM50 million or fewer than 200 full-time employees. In the services and other sectors, SMEs are defined as businesses with a sales turnover of less than RM20 million and fewer than 75 full-time employees. Micro enterprises have fewer than five employees or a sales turnover of less than RM 300,000 in the manufacturing sector and less than RM 300,000 in the other sectors, which include agriculture, mining, quarrying, construction, and services (Basar et al., 2022). In 2021, Small and Medium Enterprises (SMEs) in Malaysia made up 38.2% of the Gross Domestic Product (GDP). Additionally, regardless of industry or size, SMEs contributed to 97.2% of the overall business growth in 2020. In 2020, SMEs accounted for almost 48.0% of Malaysia's entire workforce, offering job possibilities (Ramdan et al., 2022). Keshavarzi et al. (2021) study state that 33% of Malaysian enterprises were affected by COVID-19. In terms of severity, 42% of organizations had some operational issues but remained stable. However, 32% were severely impacted and struggled to operate. Interestingly, 6% of respondents indicated no major obstacles, while 5.3% said the outbreak had given businesses new development opportunities. According to DOSM (Department of Statistics Malaysia), 83.1% of companies relied on financial aid or subsidies from the government. Additional assistance was provided through the implementation of corporate tax cuts or any other associated tax reductions, amounting to a maximum of 67%. Approximately 39.1% of enterprises further sought postponement of loan repayments, while 30.6% asked governmental revision of policies and associated regulations. Regarding execution, the main objectives were to accelerate the process of approving and distributing PRIHATIN/PENJANA loans or grants. In response to the dire circumstances, particularly affecting small and medium-sized organizations (SMEs), the government has declared the implementation of the RM 250 billion PRIHATIN Package aid to provide help to these businesses in their efforts to maintain their workforce (Rahim et al., 2022).

5.2. Data collection, sampling and data analysis technique

Data collection in this study was carried out using digital questionnaires distributed through social messaging platforms such as WhatsApp and LINE and social media platforms like Instagram and SME groups on Facebook. When delivering a digital questionnaire, the researcher first conveys consent to conduct research, makes introductions, and conveys the research's purpose and procedure for filling out the questionnaire. In Indonesia, digital questionnaires were distributed to 500 people, but only 335 of their responses could be further processed in the study. As for Malaysia, out of the 640 digital questionnaires distributed, 204 data can be further processed in the study. Thus, the total number of respondents in

Table 1. Data collection process.

	Indonesia	Malaysia
Total incoming responses	500 (100%)	640 (100%)
Total sample that meets sampling criteria (<i>SME's owner that still running the business during covid-19, and already adopt technology to support their business</i>)	339 (67.8%)	215 (33.60%)
Total final data after bad data reduction	335 (67.0%)	204 (31.88%)

this study was 539 (For a detailed explanation, please see [Table 1](#)). A pilot survey was conducted prior to the survey to make sure respondents fully grasped the survey questions.

This study's objective is to investigate factors that affect SMEs' business resilience. In this study's framework, the researchers examine the effect of several independent variables, like compliance cost, financial literacy, financial resources, and government, on the dependent variable of SMEs' business resilience. This study also adds the technology adoption factor as a quasi-moderator variable (Durmusoglu et al., 2014) to gain a deeper understanding of how technology adoption helps the survival of SMEs during the pandemic (For a detailed explanation, please see [Table 2](#)). Each construct was assessed on a seven-point Likert scale, with items ranging from (1) or 'strongly disagree' to (7) or 'strongly agree'. Previous research constructs and measurements were adapted to evaluate SME business resilience for the context of Indonesia and Malaysia. This study using research measurement that previously use in Hidayat et al. (2020) and Winarsih et al. (2020).

This study used quantitative descriptive research approach. This study used non-probability sampling with judgmental technique to SME's owner that still running the business during covid-19, and already adopt technology to support their business. In this study, the researchers did not input the unsurvived SMEs as sampling due to the absence and difficulty of accessing data for SMEs whose businesses did not survive during the pandemic. A power analysis using the software G*Power 3.1 (Hair et al., 2017) suggested a sample size of 111 if the effect size, significance level, and statistical power were all set to the default values of 0.39, 0.05, and 0.95, respectively.

PLS-SEM was chosen because it can perform multi-group analysis (MGA) of data subgroups using the MICOM (Measurement Invariance of Composite Models) procedure (Hair et al., 2017). This was an important consideration in the selection process. SEMs have this ability in addition to PLS, which allows them to evaluate a large number of constructs and their interrelationships at the same time. An analysis of the PLS SEM invariance can be performed with the help of this procedure. The more traditional moderation method, which evaluates structural relationships one at a time, has been replaced by the more modern moderation method, known as MGA using PLS-SEM. This allowed researchers to investigate the effects of moderation in multiple relationships at the same time. The standard approach would not have allowed us to achieve this goal. MGA can be used by researchers to compare two different research models for different pre-specified groups in order to identify differences in the structural paths taken by each model. MGA can also be used to compare and contrast several models at the same time (Ghazali et al., 2020).

6. Empirical result and discussion

6.1. Empirical result

[Table 1](#) shows an overview of the profile of respondents in this study, which is divided based on two groups of respondents, namely MSME respondents from Indonesia and Malaysia. Regarding gender, most of the MSME respondents in this study were women (68.96% for the Indonesian MSME group and 52.94% for the Malaysian MSME group). Regarding the age of MSME owners, the majority, or as many as 88.36% of respondents who are MSME owners in Indonesia, are aged 18–29 years. Meanwhile, most respondents who own MSMEs in Malaysia are aged 18–29 years (49.02%), followed by the age group of respondents 30–39 years (26.47%) and the age group of 40–49 years (15.20%). Regarding marital status, most respondents who own MSMEs in Indonesia are still single (88.36%), while in Malaysia, most SME owner respondents are married (52.4%). In terms of the number of dependents, the majority of respondents who own MSMEs in Indonesia and Malaysia do not have dependents. Regarding education level, the majority of respondents who own MSMEs in Indonesia, or 61.49%, are high school graduates (61.49%) and have a

Table 2. Research variables and measures.

Variable	Label	Measurement items	
Dependent Variable Business Resilience	BUS_RES_1	We still run our business as usual during the Covid-19 pandemic.	
	BUS_RES_3	Our business remains resilient because we think that the Covid-19 pandemic is a challenge that must be faced positively rather than feared	
	BUS_RES_8	We believe that building networks is important for business resilience.	
	BUS_RES_9	The provision of complete business accounting records also contributes to business resilience.	
Independent Variables Financial Literacy	FIN_LIT_1	I have the ability and finance knowledge to manage the business income.	
	FIN_LIT_2	I can make a right financial decision.	
	FIN_LIT_3	I can use financial knowledge to survive in difficult economic conditions.	
	FIN_LIT_4	I can use financial knowledge to increase business growth.	
	FIN_LIT_5	I join the financial program organized by the government	
	FIN_LIT_6	I am willing to spend money to learn financial management and accounting.	
Independent Variables Compliance Cost	COMP_COST_3	I am willing to invest in new technology to ensure business sustainability.	
	COMP_COST_4	I need to invest in risk management to decrease the risk of threat.	
	COMP_COST_5	I need to look for opportunities and quickly adapt to keep running the business and survive through the crisis phase.	
	COMP_COST_6	Online selling requires employee training.	
	COMP_COST_7	The business needs to bear training costs since starting the online business	
	Independent Variables Financial Resource	FIN_RES_1	It is easy for entrepreneurs to obtain financial assistance.
		FIN_RES_2	It is easy for entrepreneurs to obtain bank loans.
FIN_RES_3		It is easy for entrepreneurs to obtain loans from Amanah Ikhtiar/government	
FIN_RES_4		The tax incentives provided by the government helped ease the financial burden of my business.	
FIN_RES_5		Interest subsidy for micro-enterprise loans helped ease the financial burden of my business.	
FIN_RES_6		Delayed payment of the principal for micro-enterprise loans helped ease the financial burden of my business.	
Independent Variables Government Support	GOV_SUPT1	During the Covid-19 crisis period, the government always ensures that micro-businesses and Small and Medium Enterprises (SMEs) can run well.	
	GOV_SUPT2	Government assistance during the pandemic has greatly helped cash flow management during the Covid-19 crisis.	
	GOV_SUPT3	The government's regulation and policies in handling the Covid-19 pandemic are still within reasonable limits and acceptable to the business world.	
	GOV_SUPT4	The government always introduces new incentives to help the business during the Covid-19 crisis.	
	GOV_SUPT5	The government always provides skills education such as courses, seminars, and entrepreneurial motivation in enhancing the competitiveness of micro-businesses and SMEs.	
	GOV_SUPT6	The government always provides business exposure such as information, activities, and entrepreneurial opportunities.	
	GOV_SUPT7	The government always provides business support such as networking access, mentor services, and business consultant services.	
Quasi Moderator Variable Technology Adoption	PEOU_2	Promotion is conducted easily through digital platforms	
	PEOU_3	My interaction with the customers in promoting the products or services would be clear and understandable if using digital platforms.	
	PU_1	Using the digital platforms to promote products or services would enable the business to accomplish growth more quickly.	
	PU_2	The use of digital platforms in my business helps day -to -day affairs become more effective	
	PU_3	The use of digital platforms in my business helps to accomplish tasks more quickly	
	PU_4	The use of digital platforms in my business gives me more opportunities to take control of my daily activities	
	PU_5	Using digital platforms is much easier for the business to gain access to the potential customers	
	PU_6	Using digital platforms is much easier to make or receive payments.	
PU_7	Using the digital platforms would increase the number of sales		

bachelor's degree (34.33%). Meanwhile, the respondents who own MSMEs in Malaysia are mostly diplomas (40.20%) and bachelor degrees (30.39%).

Table 3 shows that most of the respondents who own MSMEs in Indonesia are in the food and beverage business (48.96%), the service industry (17.61%), or the fashion industry (13.73%). Meanwhile, the majority of respondents who own MSMEs in Malaysia mostly have food businesses (43.63%), services (24.98%), and retail businesses (7.84%). In terms of the number of employees owned by the majority of respondents who own MSMEs in Indonesia, they are sole proprietors (55.52%) and only have one to two

Table 3. Descriptive statistics.

Demography	Indonesia		Malaysia	
	Qty	%	Qty	%
Gender				
Male	104	31.04%	96	47.06%
Female	231	68.96%	108	52.94%
Age				
18–29 years old	296	88.36%	100	49.02%
30–39 years old	20	5.97%	54	26.47%
40–49 years old	12	3.58%	31	15.20%
50–59 years old	7	2.09%	18	8.82%
>59 years old	0	0%	1	0.49%
Marital Status				
Married	37	11.04%	107	52.45%
Single	296	88.36%	91	44.61%
Widow/Widower	2	0.60%	6	2.94%
The number of dependents				
1–2 Persons	47	14.03%	61	29.90%
3–4 Persons	34	10.15%	34	16.67%
5–6 Persons	5	1.49%	23	11.27%
7–8 Persons			3	1.47%
9 persons and more			1	0.49%
None	249	74.33%	82	40.20%
Education Level				
Elementary School	0	0%	4	1.96%
Secondary School	3	0.90%	31	15.20%
High School	206	61.49%	7	3.43%
Diploma	10	2.99%	82	40.20%
Bachelor	115	34.33%	62	30.39%
Master/Doctoral	1	0.30%	11	5.39%
Professional	0	0%	7	3.43%
Business Sector				
Food and Beverage	164	48.96%	89	43.63%
Service	59	17.61%	53	25.98%
Fashion	46	13.73%	8	3.92%
Retail Sector	24	7.16%	16	7.84%
Engineering	4	1.19%	10	4.90%
Others	38	11.35%	28	13.73%
Number of Employee				
Sole proprietor	186	55.52%	45	22.06%
1–2 Persons	84	25.07%	51	25.00%
3–4 Persons	34	10.15%	23	11.27%
5–6 Persons	14	4.18%	22	10.78%
7–8 Persons	5	1.49%	8	3.92%
9 persons and more	12	3.58%	55	26.96%
Primary Source of Capital				
Own savings	298	88.96%	144	70.59%
Borrowing from family	23	6.87%	13	6.37%
Loan institution	4	1.19%	32	15.69%
Borrowing from friends	2	0.60%	3	1.47%
Inheritance property	1	0.30%	6	2.94%
Others	7	2.09%	6	2.94%
Annual revenue				
<300 million IDR	299	89.25%		
300 million to 2.5 billion IDR	33	9.85%		
>2.5–50 billion IDR	3	0.90%		
RM10,000 and below			57	27.94%
RM10,001–RM20,000			25	12.25%
RM20,001–RM50,000			25	12.25%
RM50,001–RM70,000			17	8.33%
RM70,001–RM100,000			22	10.78%
RM100,001 and above			58	28.43%

employees (25.07%). The respondents who own MSMEs in Malaysia have nine or more employees (26.96%), one to two employees (25.00%), and sole proprietors (22.06%), in that order. Regarding the primary source of capital for businesses, most of the main sources for businesses, both for the respondent group of MSME owners in Indonesia and Malaysia, come from personal savings. In terms of total annual income, the majority, or as many as 89.25% of respondents who own MSMEs in Indonesia, have an annual income of under 300 million rupiahs. Most respondents who own MSMEs in Malaysia have total yearly revenues above 100,001 RM (28.43%) and below 10,001 RM (27.94%).

6.1.1. Analysis of measurement model

The first step in performing PLS-SEM is to conduct measurement model analysis before being able to hypothesize test the research model for the context of Indonesia and Malaysia SME's sample with multi-group analysis. The measurement analysis must be evaluated to ensure that the measurement items are capable of measuring their latent constructs reliably (Hair et al., 2017). This entailed assessing the consistency between observed indicators and their unobserved latent variables. Internal consistency reliability and convergent validity were investigated using four parameters: outer loadings value, Cronbach alpha value, composite reliability (CR) and extracted average variance (AVE). For a study to be considered to have a high level of internal consistency, the Cronbach's alpha and composite reliability (CR) values for all latent variables must be greater than 0.7. (Hair et al., 2011; Hair et al., 2017). Based on Table 4, all latent variables in both groups of countries (Indonesia and Malaysia) have Cronbach alpha and CR values between 0.706 and 0.963. The Cronbach alpha and CR values of all latent variables in this study were greater than 0.7, so it can be said that the internal consistency in each group of state samples in this study was good. Furthermore, the evaluation of the level of convergent validity in the study was carried out by looking at the outer loading value and the Average Variance Extracted (AVE) value. A latent variable is said to have a good convergent validity value if it has an outer loading value greater than 0.7 for confirmatory research, and a value greater than 0.6 for exploratory research (Fornell & Larcker, 1981; Hair et al., 2011; Hair et al., 2017). According to Saad et al. (2021) and Lestari et al. (2022), research related to

Table 4. Reliability and convergent validity.

Construct/Item	Indonesia				Malaysia			
	Loadings	Cronbach Alpha	CR	AVE	Loadings	Cronbach Alpha	CR	AVE
Business Resilience		0.706	0.725	0.527		0.735	0.754	0.555
BUS_RES_1	0.650				0.658			
BUS_RES_3	0.669				0.707			
BUS_RES_8	0.783				0.806			
BUS_RES_9	0.790				0.797			
Compliance Cost		0.823	0.832	0.583		0.823	0.850	0.584
COMP_COST_3	0.781				0.762			
COMP_COST_4	0.797				0.846			
COMP_COST_5	0.753				0.835			
COMP_COST_6	0.728				0.730			
COMP_COST_7	0.757				0.627			
Financial Literacy		0.903	0.904	0.674		0.823	0.837	0.530
FIN_LIT_1	0.826				0.619			
FIN_LIT_2	0.834				0.631			
FIN_LIT_3	0.851				0.703			
FIN_LIT_4	0.866				0.779			
FIN_LIT_5	0.795				0.802			
FIN_LIT_6	0.750				0.808			
Financial Resource		0.882	0.897	0.626		0.920	0.923	0.715
FIN_RES_1	0.734				0.762			
FIN_RES_2	0.762				0.860			
FIN_RES_3	0.754				0.831			
FIN_RES_4	0.859				0.874			
FIN_RES_5	0.851				0.865			
FIN_RES_6	0.776				0.876			
Government Support		0.908	0.919	0.644		0.930	0.931	0.707
GOV_SUPT1	0.827				0.770			
GOV_SUPT2	0.799				0.852			
GOV_SUPT3	0.758				0.806			
GOV_SUPT4	0.789				0.902			
GOV_SUPT5	0.807				0.790			
GOV_SUPT6	0.807				0.877			
GOV_SUPT7	0.827				0.880			
Technology Acceptance		0.921	0.928	0.617		0.959	0.963	0.757
PEOU_2	0.688				0.793			
PEOU_3	0.614				0.746			
PU_1	0.832				0.898			
PU_2	0.838				0.927			
PU_3	0.796				0.924			
PU_4	0.842				0.868			
PU_5	0.798				0.896			
PU_6	0.785				0.866			
PU_7	0.842				0.897			

business resilience is a relatively new research domain, so this study uses a threshold value of 0.6 to evaluate the outer loadings value of latent variable indicators. Based on Table 4, it can be seen that the value of the outer loading value of the research indicator in each of the latent variables in the two sample country groups is greater than 0.6. Referring to Hair et al. (2009) in order to keep the measurement model's clonogenicity within the theoretical framework. Items with factor loadings less than 0.5 were considered for deletion. Therefore, research items Bus_Res_2, Bus_Res_4, Bus_Res_5, Bus_Res_6, Bus_Res_7, Bus_Res_10, COMP_COST_1, COMP_COST_2, PEOU_1, PEOU_4, PEOU_5 not used in research analysis. Furthermore, the level of convergent validity of the latent variables of the study is also seen from the value of the Average Variance Extracted or AVE. A model has a good convergent validity value when all its latent variables have an AVE value greater than 0.5 (Hair et al., 2011; Hair et al., 2017). Based on Table 4, the AVE values of the latent variables in both sample group states are greater than the threshold of 0.5. Thus, it can be said that the research model has good convergent validity.

Evaluation of the validity of discriminants in the study was carried out by looking at the value of the Fornell Larcker Criterion matrix and the value of heterotrait-monotrait (HTMT) (Hair et al., 2017). The discriminant validity is established through contrasting the AVE square-root values of each composite with the correlations between the model's composites (Fornell & Larcker, 1981). Based on Fornell-Lacker criterion on Table 5, Both of countries sample have a good level of discriminant validity because each indicator's AVE value is higher than the correlation between latent variables (Hair et al., 2014, 2017). Moreover, Hair et al. (2017) also suggest HTMT as more reliable criterion of discriminant validity. This study examined discriminant validity utilizing the heterotrait-monotrait (HTMT) ratio (Henseler et al., 2015). Table 6 shows that the HTMT value for every construct in both countries samples was below the 0.9 cut-off (Gold et al., 2001; Shahzad et al., 2020). Based on the evaluation of Fornell Larcker Criterion and HTMT in Tables 5 and 6 it can be said that all constructs in both countries (Indonesia and Malaysia) samples have acceptable discriminant validity.

Table 5. Discriminant validity-fornell larcker criterion.

Country	1. Compliance Cost	2. Financial Literacy	3. Financial Resource	4. Government Support	5. SME's Business Resilience	6. Technology Acceptance
Indonesia						
1. Compliance Cost	0.764					
2. Financial Literacy	0.615	0.821				
3. Financial Resource	0.297	0.350	0.791			
4. Government Support	0.310	0.329	0.556	0.802		
5. SME's Business Resilience	0.494	0.490	0.211	0.356	0.726	
6. Technology Acceptance	0.512	0.569	0.102	0.329	0.554	0.785
Malaysia						
1. Compliance Cost	0.764					
2. Financial Literacy	0.548	0.728				
3. Financial Resource	0.336	0.608	0.846			
4. Government Support	0.272	0.486	0.519	0.841		
5. SME's Business Resilience	0.490	0.458	0.367	0.490	0.745	
6. Technology Acceptance	0.549	0.533	0.317	0.520	0.654	0.870

Table 6. Discriminant validity-HTMT.

Country	1. Compliance Cost	2. Financial Literacy	3. Financial Resource	4. Government Support	5. SME's Business Resilience	6. Technology Acceptance
Indonesia						
1. Compliance Cost						
2. Financial Literacy	0.706					
3. Financial Resource	0.340	0.374				
4. Government Support	0.361	0.361	0.611			
5. SME's Business Resilience	0.608	0.594	0.277	0.456		
6. Technology Acceptance	0.568	0.623	0.134	0.357	0.655	
Malaysia						
1. Compliance Cost						
2. Financial Literacy	0.650					
3. Financial Resource	0.382	0.753				
4. Government Support	0.305	0.578	0.563			
5. SME's Business Resilience	0.588	0.576	0.465	0.593		
6. Technology Acceptance	0.614	0.581	0.341	0.549	0.754	

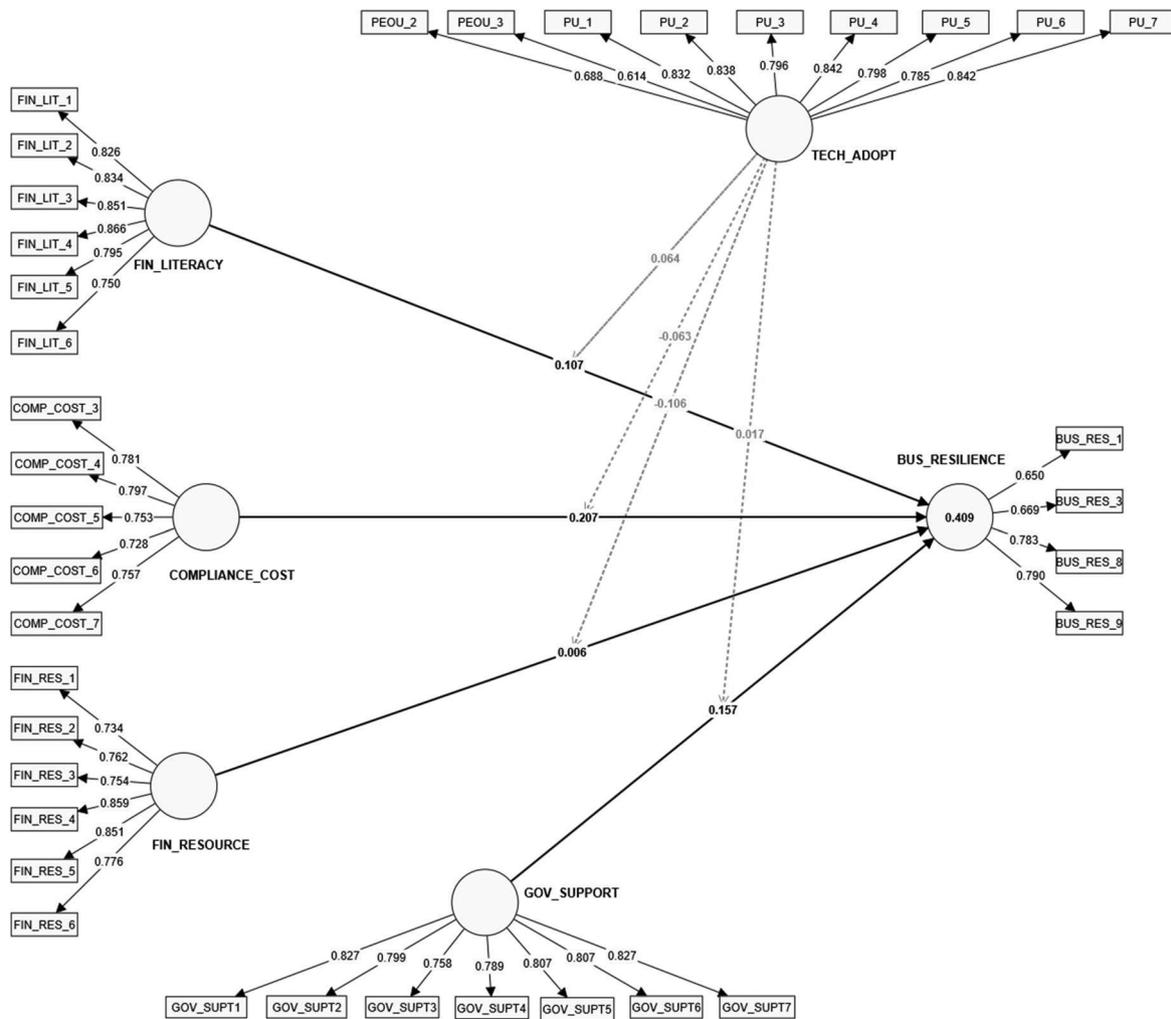


Figure 2. PLS algorithm Indonesia model.

The results of the analysis of the path algorithm of structural model testing for samples from Indonesia and Malaysia in this study can be seen in Figures 1 and 2.

Henseler et al. (2012) state that the coefficient determinant R^2 is the most important requirement in assessing a structural model. Based on Figure 2, it can be seen that the R^2 for the Indonesian model is 0.409. Meanwhile, according to Figure 3, the R^2 for the Malaysian model is 0.528. In other words, for the Indonesian model, the 40.9% variance of SME's business resilience can be explained by the latent variables of financial literacy, compliance cost, financial resources, government support and technology adoption. While for model Malaysia, the 52.8% variance of SME's business resilience can be explained by the latent variables of financial literacy, compliance cost, financial resource, government support and technology adoption. The value of R^2 for the Indonesian model is moderate, while the R^2 for the Malaysian model is substantial (Hair et al., 2014, 2017; Henseler et al., 2009)

6.1.2. Structural model and multigroup analysis (MGA)

Hair et al. (2017) state that measurement invariance, also known as measurement equivalence, is the primary goal of multigroup analyses. By establishing measurement invariance, researchers can be confident that group differences in model estimates are not due to differences in the content and/or meanings of the latent variables across groups (Sarstedt et al., 2011). To evaluate the model's measurement invariance, we used a three-step MICOM (measurement invariance of composite models) procedure (Henseler et al., 2016).

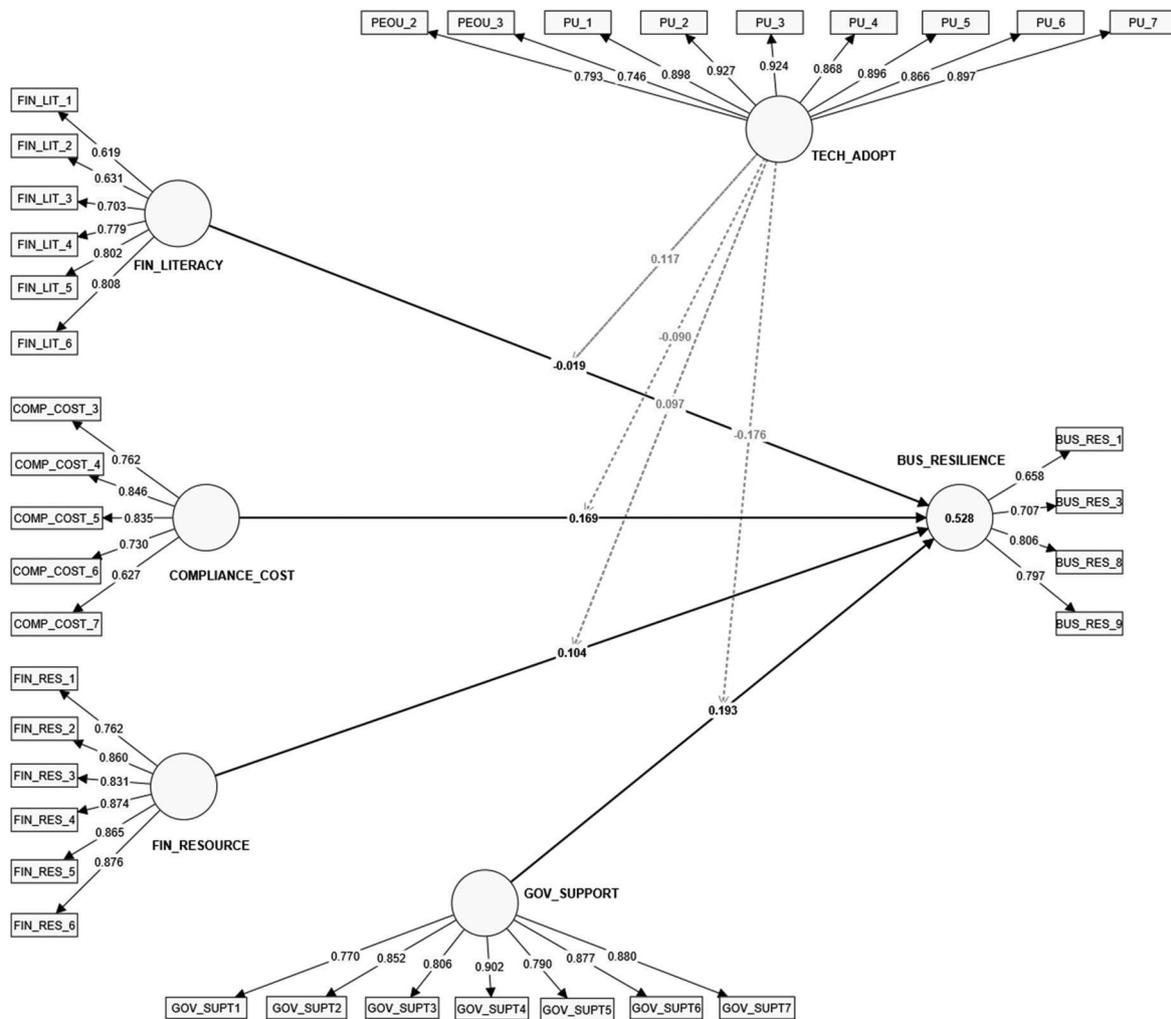


Figure 3. PLS algorithm Malaysia model.

The first step is to attain the model's configural invariance. A preliminary qualitative evaluation of the specification of the composites across all groups must guarantee the use of identical measures, similar data treatment, and identical algorithm configurations. This study uses the same research framework and uses identical latent variables and measurements. Therefore, the first MICOM step is attained. According to Hair et al. (2017), configural invariance is required for compositional invariance (c) or step two. Compositional invariance investigates whether a composite is formed in the same way across groups. The MICOM procedure employs a statistical test to ensure that the composite scores do not differ significantly across groups. A MICOM procedure with 5000 permutations has been implemented using SmartPLS software 4.0. According to Cheah et al. (2020), in order to determine configuration invariance, we must examine the outcomes of the c correlation between the first and second groups' composite scores (column original correlations) with the 5% quantile. Table 7 shows that for each construct, the quantile result was less than (or equal to) correlation c. The p-values were greater than 0.05 for each permutation, indicating that the correlation was not significantly less than one. Compositional invariance was proven, according to the findings. The next step after achieving compositional invariance is to conduct step 3, or the equality assessment of the composites' mean values and variances. Step 3a will assess whether the value of each construct was within the 95% confidence interval. If the mean original difference falls between the lower (5%) and upper (95%) confidence intervals, the first part of Step 3 is met, indicating preliminary evidence of invariance. Table 8 shows that the mean differences in compliance cost and SME business resilience fell within the 95% confidence interval of 95% confidence level boundaries, whereas financial literacy, financial resources, government support, and technology adoption did

Table 7. The measurement of invariance assessment (Step1 and 2).

Construct	Step 1		Step 2		
	Configural Invariance		Compositional Invariance		
	Result	C = 1	Cls	P Value	Result
Compliance Cost	Yes	0.997	(0.992, 0.997)	0.344	Yes
Financial Literacy	Yes	0.999	(0.994, 0.998)	0.502	Yes
Financial Resource	Yes	0.997	(0.987, 0.996)	0.500	Yes
Government Support	Yes	0.999	(0.997, 0.999)	0.512	Yes
SME's Business Resilience	Yes	0.999	(0.985, 0.996)	0.812	Yes
Technology Acceptance	Yes	1.000	(0.999, 1.000)	0.395	Yes

Table 8. The measurement of invariance assessment (Step 3a and 3b).

Construct	Step 3a. Equal Mean Invariance				Step 3b. Equal Variance Invariance			
	Different	Cls	p value	Result	Different	Cls	p value	Result
Compliance Cost	0.057	(-0.146, 0.140)	.239	Yes	0.073	(-0.226, 0.241)	.330	Yes
Financial Literacy	0.833	(-0.158, 0.150)	.000	No	0.143	(-0.213, 0.219)	.148	Yes
Financial Resource	0.171	(-0.147, 0.141)	.020	No	-0.084	(-0.214, 0.230)	.251	Yes
Government Support	-0.147	(-0.138, 0.139)	.042	No	0.070	(-0.198, 0.212)	.314	Yes
SME's Business Resilience	0.024	(-0.145, 0.142)	.383	Yes	-0.063	(-0.204, 0.207)	.290	Yes
Technology Acceptance	0.256	(-0.144, 0.147)	.002	No	-0.353	(-0.217, 0.219)	.005	No

not, indicating that there were no significant differences in the mean values of the two groups (Indonesia and Malaysia). Step 3b is to evaluate the results of composite variances. Table 8 shows that, with the exception of technology adoption, all of the original differences in latent variables are within the 95% confidence interval and have p-values greater than 0.05. The model can be concluded to have partial measurement invariance. As a result, the standardized coefficients of the structural model can be evaluated by comparing across groups (Hair et al., 2017). Following the establishment of partial invariance, MGA was used to evaluate the path coefficients of the two country groups (Indonesia and Malaysia)

Table 7 displays the MGA's results using MGA bootstrapping (Henseler et al., 2009) and Chin's permutation test (Chin et al., 2016). Henseler's MGA method entails p-value differences between path coefficients that are less than 0.05 or greater than 0.95, indicating that the two groups are statistically different in terms of path coefficients at the 5% confidence level.

Table 9 shows the study hypotheses tested with 5000 bootstrap re-samples and 5000 permutations. The testing of the hypotheses revealed that the direct effects of compliance cost, financial literacy, financial resources, government support, and technology adoption on a SME's business resilience have no differences (H1, H2, H3, H4, and H5). Also, with the moderation effect of technology adoption on the relationship between compliance cost and financial literacy to a SME's business resilience (H6 and H7), there were no statistical differences in the findings. Meanwhile, the moderation effect of technology adoption on the relationship between financial resource and government support for SMEs business resilience has shown different statistical findings for both countries (H8 and H9).

6.1.3. Direct effects

Table 9 shows that three out of five hypotheses were accepted, while the other two were rejected. First, compliance costs positively affected SMEs' business resilience in both Indonesia ($\beta=0.207$, T value = 3.462, p -value=.000) and Malaysia ($\beta=0.169$, T value = 2.232, p -value=.013); therefore, Hypothesis 1 was accepted. On the contrary, Hypothesis 2 was rejected because financial literacy had no effect on SMEs' business resilience in both Indonesia ($\beta=0.107$, T value = 1.402, p -value=.080) and Malaysia ($\beta = -0.019$, T value = 0.235, p -value=.407), and this finding does not coincide with Erdem and Rojahn (2022) who found that financial literacy positively influenced the financial resilience of business. Similarly, Hypothesis 3 was also not accepted because financial resources had an insignificant effect on SMEs' business resilience in Indonesia ($\beta=0.006$, T value = 0.086, p -value=.466) and Malaysia ($\beta=0.104$, T value = 1.212, p -value=.113), a finding that is likewise in contrast with a study by Nugraha et al. (2022). Nevertheless, government support was found to have a positive effect on SMEs' business resilience in Indonesia ($\beta=0.157$, T value = 2.288, p -value=.011) and Malaysia ($\beta=0.193$, T value = 2.865, p -value=.000), thus

Table 9. Analysis of structural model and MGA.

Hypotheses	Path coefficients			T-values			p-values			Confidence intervals Bias Corrected (95%)			Differences of Path Coefficient			p-values (1 tailed)			MGA Result
	INA		MAL	INA		MAL	INA		MAL	INA		MAL	Path Coefficient		Henseler MGA		permutation		
H1	0.207	0.169	3.462	2.232	0.000	0.013	(0.110, 0.309)	(0.027, 0.279)	0.038	0.347	0.346	No different							
H2	0.107	-0.019	1.402	0.235	0.080	0.407	(-0.016, 0.236)	(-0.154, 0.107)	0.126	0.127	0.120	No different							
H3	0.006	0.104	0.086	1.212	0.466	0.113	(-0.107, 0.114)	(-0.031, 0.255)	-0.098	0.816	0.161	No different							
H4	0.157	0.193	2.288	2.865	0.011	0.002	(0.046, 0.272)	(0.085, 0.302)	-0.035	0.644	0.347	No different							
H5	0.340	0.397	4.809	5.458	0.000	0.000	(0.216, 0.449)	(0.286, 0.526)	-0.057	0.712	0.296	No different							
H6	-0.063	-0.090	1.134	1.296	0.128	0.097	(-0.159, 0.024)	(-0.209, 0.015)	0.027	0.387	0.396	No different							
H7	0.064	0.117	0.979	1.442	0.164	0.075	(-0.047, 0.168)	(-0.003, 0.266)	-0.054	0.701	0.020	No Difference							
H8	-0.106	0.097	1.683	1.154	0.046	0.124	(-0.204, 0.006)	(-0.038, 0.239)	-0.204	0.973	0.303	Different							
H9	0.017	-0.176	0.301	2.948	0.382	0.002	(-0.071, 0.106)	(-0.258, -0.071)	0.194	0.018	0.024	Different							

accepting Hypothesis 4. Finally, Hypothesis 5 was also accepted because technology adoption positively affected SMEs' business resilience in Indonesia ($\beta=0.304$, T value = 4.809, p -value=.000) and Malaysia ($\beta=0.397$, T value = 5.458, p -value=.000), similar to compliance costs and government support. These results are consistent with several past studies such as those by Razumovskaia et al. (2020) and Rahim et al. (2022) on technology adoption, Nakku et al. (2020) on government support, and Mukhlis et al. (2015) on compliance costs.

6.1.4. Moderation effects

In this study, the moderation effects of technology adoption on the relationships between compliance costs, financial literacy, financial resources, government support, and SMEs' business resilience were tested (Hypotheses 6, 7, 8, and 9). Based on the MGA bootstrapping results for both countries (see Table 9), technology adoption had no moderation effect on the relationships between compliance costs and business resilience (Hypothesis 6), as well as between financial literacy and business resilience (Hypothesis 7). However, the results showed that technology adoption negatively moderated the relationship between financial resources and business resilience in Indonesia but not Malaysia. On the contrary, technology adoption was found to have a negative moderation effect on the relationship between government support and business resilience in Malaysia but not Indonesia. Therefore, both Hypotheses 8 and 9 were accepted.

6.1.5. Robustness checks

The latest study suggests alternate methodologies for measuring PLS-SEM robustness (Hair et al., 2017). According to Hair et al. (2019) and (Sarstedt et al., 2020), researchers need to investigate nonlinear effects, endogeneity, and unobserved heterogeneity in the structural model.

First, this study tests structural model non-linearity using PLS-SEM quadratic effect. Researchers must use a polynomial model with a quadratic term. This quadratic term approximates the exogenous construct's interaction with itself (Rigdon et al., 2010). If the interaction term's influence is substantial and positive (negative), the exogenous construct's effect strengthens (weakens) at increasing levels. Conversely, a nonsignificant interaction term shows linear effect robustness (Sarstedt et al., 2020). The results of the bootstrapping test with 5000 samples that can be seen in Table 10 show that the interaction results of this research variable have a p value greater than .05. Thus, it can be concluded that this study has a robust linear effect.

Second, when use PLS-SEM for explanatory research, it is crucial to examine the presence of endogeneity. Path models may exhibit endogeneity if researchers exclude a construct that is correlated with one or more determiner constructs and the dependent construct (Hair et al., 2019). In order to evaluate and address endogeneity, researchers should adhere to Hult et al. (2018) systematic methodology, commencing with the implementation of Park and Gupta (2012) Gaussian copula technique on financial literacy, compliance cost, financial resource, and government support that serve as independent variables on this study. The findings shown in Table 11 indicate that both the individual variable Gaussian copulas and all the different combinations of latent variable Gaussian copulas included in the model do not exhibit any statistical significance (p value > .05) (Sarstedt et al., 2020). As a result, we conclude that endogeneity does not exist in our study, supporting the robustness of the structural model's results with regard to this respect.

Third, Hair et al. (2019) also suggest to check unobserved heterogeneity of the structural model. Unobserved heterogeneity refers to the presence of distinct subgroups within the data that result in significantly varied model estimates. Given this scenario, it is quite probable that estimating the model

Table 10. Robustness Test-Nonlinearity Test.

Nonlinearity test	Coefficient	p value
QE (FIN_LITERACY) -> BUS_RESILIENCE	-0.007	0.835
QE (COMPLIANCE_COST) -> BUS_RESILIENCE	0.031	0.383
QE (FIN_RESOURCE) -> BUS_RESILIENCE	-0.024	0.464
QE (GOV_SUPPORT) -> BUS_RESILIENCE	-0.004	0.908

Table 11. Evaluation of endogeneity test with the Gaussian copula procedure.

	Latent Variable	Coefficient	p value
Model 1 Gaussian copula in endogenous variables (FIN_LITERACY).	GC (FIN_LITERACY) -> BUS_RESILIENCE	0.101	0.531
Model 2 Gaussian copula in endogenous variables (COMPLIANCE_COST).	GC (COMPLIANCE_COST) -> BUS_RESILIENCE	-0.049	0.730
Model 3 Gaussian copula in endogenous variables (FIN_RESOURCE).	GC (FIN_RESOURCE) -> BUS_RESILIENCE	-0.111	0.745
Model 4 Gaussian copula in endogenous variables (GOV_SUPPORT).	GC (GOV_SUPPORT) -> BUS_RESILIENCE	0.159	0.475
Model 5 Gaussian copula in endogenous variables (FIN_LITERACY, COMPLIANCE_COST).	GC (FIN_LITERACY) -> BUS_RESILIENCE	0.133	0.428
	GC (COMPLIANCE_COST) -> BUS_RESILIENCE	-0.079	0.596
Model 6 Gaussian copula in endogenous variables (FIN_LITERACY, FIN_RESOURCE).	GC (FIN_LITERACY) -> BUS_RESILIENCE	0.123	0.478
	GC (FIN_RESOURCE) -> BUS_RESILIENCE	-0.176	0.626
Model 7 Gaussian copula in endogenous variables (FIN_LITERACY, GOV_SUPPORT).	GC (FIN_LITERACY) -> BUS_RESILIENCE	0.082	0.621
	GC (GOV_SUPPORT) -> BUS_RESILIENCE	0.142	0.533
Model 8 Gaussian copula in endogenous variables (COMPLIANCE_COST, BUS_RESILIENCE).	GC (COMPLIANCE_COST) -> BUS_RESILIENCE	-0.040	0.791
	GC (FIN_RESOURCE) -> BUS_RESILIENCE	-0.081	0.828
Model 8 Gaussian copula in endogenous variables (COMPLIANCE_COST, GOV_SUPPORT).	GC (COMPLIANCE_COST) -> BUS_RESILIENCE	-0.080	0.566
	GC (GOV_SUPPORT) -> BUS_RESILIENCE	0.196	0.388
Model 9 Gaussian copula in endogenous variables (GOV_SUPPORT, FIN_RESOURCE).	GC (GOV_SUPPORT) -> BUS_RESILIENCE	0.184	0.427
	GC (FIN_RESOURCE) -> BUS_RESILIENCE	-0.178	0.616
Model 10 Gaussian copula in endogenous variables (FIN_LITERACY, COMPLIANCE_COST, FIN_RESOURCE).	GC (FIN_LITERACY) -> BUS_RESILIENCE	0.146	0.404
	GC (COMPLIANCE_COST) -> BUS_RESILIENCE	-0.068	0.664
	GC (FIN_RESOURCE) -> BUS_RESILIENCE	-0.137	0.719
Model 11 Gaussian copula in endogenous variables (FIN_LITERACY, FIN_RESOURCE, GOV_SUPPORT).	GC (FIN_LITERACY) -> BUS_RESILIENCE	0.108	0.541
	GC (FIN_RESOURCE) -> BUS_RESILIENCE	-0.230	0.536
	GC (GOV_SUPPORT) -> BUS_RESILIENCE	0.169	0.471
Model 12 Gaussian copula in endogenous variables (GOV_SUPPORT, FIN_RESOURCE, COMPLIANCE_COST).	GC (GOV_SUPPORT) -> BUS_RESILIENCE	0.209	0.366
	GC (FIN_RESOURCE) -> BUS_RESILIENCE	-0.136	0.721
	GC (COMPLIANCE_COST) -> BUS_RESILIENCE	-0.069	0.645
Model 13 Gaussian copula in endogenous variables (GOV_SUPPORT, COMPLIANCE_COST, FIN_RESOURCE, FIN_LITERACY).	GC (GOV_SUPPORT) -> BUS_RESILIENCE	0.199	0.396
	GC (COMPLIANCE_COST) -> BUS_RESILIENCE	-0.093	0.541
	GC (FIN_RESOURCE) -> BUS_RESILIENCE	-0.186	0.632
	GC (FIN_LITERACY) -> BUS_RESILIENCE	0.137	0.440

Table 12. Unobserved heterogeneity assessment.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
AIC	1.248.711	1.191.824	1.136.843	1.091.360	1.072.826	1.061.604
AIC3	1.258.711	1.212.824	1.168.843	1.134.360	1.126.826	1.126.604
AIC4	1.268.711	1.233.824	1.200.843	1.177.360	1.180.826	1.191.604
BIC	1.291.608	1.281.908	1.274.114	1.275.818	1.304.471	1.340.435
CAIC	1.301.608	1.302.908	1.306.114	1.318.818	1.358.471	1.405.435
HQ	1.265.490	1.227.058	1.190.534	1.163.507	1.163.429	1.170.663
MDL5	1.543.197	1.810.244	2.079.198	2.357.649	2.663.049	2.975.761
LnL	-614.356	-574.912	-536.422	-502.680	-482.413	-465.802
EN	0.000	0.341	0.726	0.600	0.731	0.846
NFI	0.000	0.374	0.701	0.517	0.648	0.788
NEC	0.000	355.210	147.596	215.344	145.013	82.814

using the complete data set will yield deceptive outcomes. Therefore, it is essential to incorporate a systematic examination for unobserved heterogeneity in any PLS-SEM study to determine the validity of analyzing the complete dataset (Hair et al., 2019). Applying Sarstedt et al. (2017) systematic approach to detect and potentially address unobserved differences in PLS path models, we initially executed the FIMIX-PLS technique on the dataset. As per Sarstedt et al. (2020), to determine the maximum number of segments to extract, we calculated the minimum sample size needed to estimate each segment (Sarstedt et al., 2017). According to a post hoc power analysis assuming an effect size of 0.15 and a power level of 80%, the minimal sample size is 85 to extract six segments from the 359 sample size. Rerunning FIMIX-PLS for one to six segments with the same parameters as before. Based on Table 12, the studies do not clearly indicate a particular segmentation solution because: (1) AIC3 and CAIC point to distinct segment numbers; and (2) MDL5, AIC4 and BIC points to different segments. Thus, we may infer that the presence of unobserved differences among individuals is not significant, thereby confirming the findings of the overall data analysis.

6.2. Discussion

This study investigates the factors contributing to the business resilience of SMEs in the post-pandemic era of COVID-19, with technology adoption serving as a moderator. Employing a multigroup analysis of Indonesian and Malaysian SMEs, the research aims to provide a nuanced understanding of the distinctions and similarities between these two groups. Drawing from past evidence, certain SMEs have successfully maintained and sustained their business operations in the aftermath of the COVID-19 pandemic. Therefore, this study is motivated to uncover the determinants that underpin the business resilience of SMEs during this post-pandemic period. The summarized results of the direct effect reveal a noteworthy observation: compliance costs exhibit a positive impact on SMEs' business resilience in both Indonesia and Malaysia. Moreover, government support was also found to have a positive impact on SMEs' business resilience in both Indonesia and Malaysia. Additionally, the results indicate that technology adoption plays a positive role in enhancing SMEs' business resilience in both Indonesia and Malaysia. Conversely, financial literacy and financial resources show no significant effect on SMEs' business resilience in either country.

The direct effect result for both countries in this study strengthens the results of previous studies on SMEs business resilience. The results show that SMEs business resilience is positively affected by compliance costs (Kitching et al., 2015; Matarirano et al., 2019; Mukhlis et al., 2015), government support (Ganlin et al., 2021; Hidayat et al., 2020; Manzanque-Lizano et al., 2019; Nakku et al., 2020) and technology adoption (Arifin et al., 2023; Ganlin et al., 2021; Zainal & Mat Udin, 2015).

In term of government support, both countries result shows that stimulus packages for economic that the government launched and implemented help the SMEs to survive during the pandemic. The 'National Economic Regeneration Plan' (PENJANA) by the Malaysian government, which involves 24 initiatives and RM14.5 billion, directly affects SMEs through financial support and deferment on financing payments to ease cash flow pressure in 2021 (Rahim et al., 2022; Sari & Achmad Hizazi, 2021). Indonesian government BLT (Bantuan langsung tunai) helps small company owners get finance during COVID-19 (Hidayat et al., 2020; Lestari et al., 2022). Furthermore, SMEs in both countries have increased adoption of technology as a coping mechanism for social mobility restriction policies (Mishrif & Khan, 2023; Wicaksono & Simangunsong, 2021). To survive, SMEs in both countries reconfigure and allocate their internal resources to adopt technology for business and market enhancement.

For the moderation effect, we found that, technology adoption is negatively moderate the relationship between financial resources and SMEs resilience in Indonesia but not in Malaysia. Similarly, technology adoption is negatively moderate the relationship between government support and SMEs resilience in Malaysia but not in Indonesia. These moderation effect findings have important implications in understanding the different effect of technology adoption and policy implementation in these two neighbouring countries.

The scenario in Indonesia showed that businesses might allocate a significant portion of their financial resources toward technology adoption due to huge technology costs such as software, hardware and information technology personnel, leaving fewer resources for other aspects of business resilience such as diversification, risk management, or employee training (Warnecke, 2016). In addition, rapid technology adoption can lead to disruptive changes in business operations. Despite having financial resources, businesses may face challenges in managing and adapting to such disruptions, which could negatively impact their resilience. Therefore, businesses in Indonesia may struggle to find and retain talent with the necessary technology-related skills even with financial resources. This could hinder the effective utilization of financial resources for technology adoption, leading to negative moderation of the relationship (Irma et al., 2016).

Meanwhile, for SMEs in Malaysia, despite being the backbone of the country's business environment, digital adoption among Malaysian SMEs lags behind that of larger enterprises (Wong & Kee, 2022). The negative moderation effect of technology adoption on the relationship between government support and business resilience suggests that Malaysian SMEs might have inadequate resources or expertise to effectively adopt and integrate technology into their operations. Despite the financial assistance offered by government support programs, these funds may not be sufficient to cover the costs associated with technology adoption and may strain the SMEs' resources. In addition, the rapid pace of technological

changes can create a skill gap among SMEs such that even with government support, they may struggle to find and retain employees with the necessary technological expertise. As a result, this can hinder the successful implementation of technology and, in turn, affect SMEs' business resilience. Moreover, the technology adoption can be a complex process, thus, government support programs might not provide sufficient guidance or resources to address these challenges, and SMEs may not develop the ability to adapt and innovate independently if they heavily rely on government support for technology initiatives. Overreliance on external support can make SMEs vulnerable to changes in government policies or funding availability, which negatively impacts their long-term resilience. Besides, as more SMEs adopt technology, competition in the market may intensify and this can erode profit margins and put pressure on SMEs, thus offsetting the benefits of government support. Other challenges might also include the introduction of new technologies, which can disrupt traditional business models. Therefore, even with government support, SMEs that fail to adapt to these disruptions may experience negative effects on their resilience.

We support the findings with the theories employed for this study. For example, from an RBV perspective, the positive relationship between compliance cost and business resilience suggests that investments in compliance mechanisms can be viewed as valuable resources that contribute to the competitive advantage of SMEs. By effectively managing and leveraging these resources, SMEs can enhance their adaptive capacity and overall resilience in the face of regulatory changes and uncertainties. In the context of the moderation effect found in Indonesia, where technology adoption negatively moderates the relationship between financial resources and SME resilience, RBV theory suggests that the strategic utilization of financial resources alone may not be sufficient. The negative moderation implies that, in the Indonesian SME landscape, the effectiveness of financial resources in enhancing resilience is contingent upon concurrent investments in technology. This aligns with RBV principles, emphasizing the need for dynamic and interconnected resource configurations for sustainable competitive advantage. In Malaysia, where no negative moderation effect is observed between financial resources and SME resilience, RBV theory might suggest that financial resources alone are more self-sufficient in contributing to resilience. This could imply a stronger standalone role for financial resources in the Malaysian SME context (Zutshi et al., 2021).

From the perspective of the TOE framework, the theory posits that successful integration of technology depends on a firm's technological capabilities, organizational structure, and the external environment. However, SMEs in Indonesia and Malaysia may encounter barriers related to the adoption of advanced technologies due to factors such as limited financial resources, lack of digital infrastructure, and a shortage of skilled personnel (Fitriasari, 2020). Thus, SMEs that can overcome these challenges and strategically adopt relevant technologies stand to enhance their operational efficiency, adaptability, and overall resilience.

Moreover, the study reveals the catalyzing role of government support in bolstering SMEs' resilience. In the context of the DCV, government support can be seen as an external factor that stimulates the development of dynamic capabilities within SMEs. This support, whether in the form of financial incentives, regulatory guidance, or capacity-building programs, empowers SMEs to build the adaptive capacity necessary for resilience.

In light of these findings, policymakers, business leaders, and other stakeholders should recognize the multifaceted nature of SME resilience. Crafting policies that mitigate compliance burdens, fostering a conducive technological ecosystem, and providing targeted support can collectively contribute to the holistic resilience of SMEs. By embracing and integrating these elements, SMEs can position themselves not only to weather uncertainties but also to thrive in an ever-changing business landscape.

7. Summary and conclusion

The COVID-19 pandemic has made the world economy experience uncertainty and crisis, including in Indonesia and Malaysia. Social mobility restrictions implemented by governments in both countries have made many SMEs experience a crisis that encourages them to adapt to limited resources to survive. This

research was conducted to find out what factors make SMEs in Indonesia and Malaysia have high resilience to be able to survive during and after the pandemic is over. The results of this study show that in both countries, compliance costs, government support, and technology adoption directly affect business resilience. The results also show the negative moderation effect of technology adoption on the relationship between financial resources and business resilience in Indonesia and on the relationship between government support and business resilience in Malaysia.

Recognizing the pivotal role of SMEs in driving post-pandemic recovery, particularly within the private sector, efforts should be directed towards enhancing their medium-to-long-term resilience. Financial resources and well-designed government support programs emerge as critical drivers for the widespread adoption of digital technology among SMEs in both Indonesia and Malaysia. As part of a comprehensive strategy, policymakers should consider the implementation of digital governance policies that not only encourage digitalization but also address the existing barriers. Mitigating costs associated with digitalization, improving technical skills within the workforce, and implementing a balanced framework of competition and data protection regulations are pivotal elements of this approach. As highlighted from direct effect results, cost is matter to SMEs as they are lack of financing and difficult to access to the source of finance. Hence, more financial assistance should be crafted by the government to assist SMEs not only for their sustain in the business operation, however, transform them from traditional business into digital business. Policies can be developed to encourage universal digitalization by businesses, bridge the digital divide between firms in the burgeoning digital economy, and build an inclusive digital economy so that all parties can reap the benefits of the digital age. In addition to having the right digital governance policies, it is also important to consider reducing the costs of digitalization and improving the technical skills of the workforce, along with a combination of competition and data protection regulations. Efforts should be made to enhance the medium-to-long-term resilience of this sector, especially considering that the post-pandemic recovery will largely be driven by the private sector. In this regard, financial resources and government support programs are crucial to drive digital technology adoption among Indonesian and Malaysian SMEs.

Through a comparison between SMEs in Indonesia and Malaysia, this study investigates factors of SMEs' business resilience in the post-pandemic crisis of COVID-19 with technology adoption as a moderator. From the analysis results, the study derives several policy implications for policymakers and SME owners or managers. Given the importance of compliance costs in technology adoption, government intervention is crucial for developing and promoting accessible financing mechanisms for SMEs such as low-interest loans, grants, or venture capital support to fund technology adoption projects. To maximize the efficient use of available resources and ensure that technology investments are well-managed, SMEs should practice financial planning and management by implementing rigorous financial planning, budgeting, and cost control measures. SME owners or managers should also conduct a thorough cost-benefit analysis prior to adopting new technologies; they must assess the expected return on investment (ROI) and prioritize technologies that provide the most significant resilience improvements for the resources invested. Furthermore, government support is vital and the support programs designed should help SMEs access technology-related grants, subsidies, or tax incentives. The relevant government agencies in charge of these programs must also ensure that information reaches the SME owners or managers, as it is important that these programs are well-publicized and offer clear guidelines for application and utilization. Besides, the government should highlight peer learning and collaboration and share the best practices in technology adoption by encouraging more university-industry linkage and business networks to facilitate knowledge exchange among SMEs. Nonetheless, all government support programs must be continuously monitored in terms of their effectiveness and ability to enhance robust business resilience plans that incorporate technology as a core element. These plans should also outline how technology can help businesses respond to various challenges, including pandemics, economic downturns, and market disruptions.

Limitations are acknowledged in this study, it will be considered in future lines of research where the sample of the SMEs should include both survival and non-survival in both countries for more meaningful findings and able to offer a comprehensive understanding of the full spectrum of SME responses to the crisis. Hence, future studies that incorporate both surviving and non-surviving SMEs will be consider which could provide a more comprehensive and nuanced understanding of the challenges and opportunities for SMEs in the aftermath of the pandemic. In addition, future research could delve deeper into

the long-term impacts of these regulatory and policy measures on SMEs, examining how sustained efforts in regulatory coherence, policy integration, and technological adoption contribute to the overall resilience and growth of the SME sectors in Indonesia and Malaysia. As these nations navigate the post-COVID-19 era, understanding the dynamics of their SME ecosystems will be essential for policymakers, researchers, and business leaders alike.

Authors contributions

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 Formal Analysis: Elissa Dwi Lestari
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 Supervision: Elissa Dwi Lestari and Nadiah
 Validation: Elissa Dwi Lestari and Nadiah
 Writing – original draft: Nadiah and Elissa Dwi Lestari
 Writing – review & editing: Nadiah, Elissa Dwi Lestari, Roszilah and Zalilawati

Disclosure statement

No potential conflict of interest was reported by the author(s).

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The subject provides a clear overview of the research focus, scope, and methodology, setting the stage for a comprehensive examination of the factors influencing SME resilience post-COVID-19 in the Indonesian and Malaysian contexts, with a particular emphasis on the moderating effect of technology adoption.

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Data availability statement

The corresponding author's data supporting the study's findings are available upon reasonable request.

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