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Article

The role of digital economy engagement in enhancing the performance of local SMEs: An examination of digital adoption and government support

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Abstract: This study explores the impact of digital economy engagement and digital adoption on the entrepreneurship performance of Small and Medium Enterprises (SMEs) in Malaysia, with a specific focus on the PG Mall platform. Through an analysis of SMEs' involvement in digital activities such as e-commerce, digital marketing, and data analytics, the research identifies key factors that enhance business performance. The main objective of this paper is to examines the mediating role of government policies in supporting digital adoption and fostering a conducive environment for digital entrepreneurship. This paper employed a quantitative method to examine the impact of digital economy engagement and digital adoption on the entrepreneurship performance of Small and Medium Enterprises (SMEs) in Malaysia, with a focus on the PG Mall platform. Through data analysis, this research assessed several hypotheses related to the relationship between digital engagement, adoption, and business performance. The findings revealed that the majority of the hypotheses were supported, confirming the positive influence of digital economy engagement and digital adoption on various aspects of entrepreneurship performance. Based on these findings, this paper also proposes a conceptual framework that highlights the elements of digital economy engagement and digital adoption that contribute to SME performance. This framework serves as a valuable guideline for government policymakers, practitioners, and scholars in shaping strategies to foster digital entrepreneurship. It underscores the importance of supportive government policies, such as financial incentives and training, in facilitating the digital transformation of SMEs. By providing a structured approach to understanding the role of digital tools in enhancing business outcomes, the framework offers a foundation for future research and policy development aimed at promoting digital entrepreneurship in an evolving economic landscape.

Keywords: digital economy; SMEs; digital adoption; government policies; PG Mall; Malaysia; entrepreneurship performance

1. Introduction

The digital economy primarily focuses on digital technology, such as the internet, software, and numerous digital tools and platforms used to perform business and economic activity. It includes a wide range of activities, such as e-commerce and digital marketing, data analytics, and the creation of digital products and services. Companies that adopt innovation using digital technology can enhance performance and advance in becoming innovative companies (Sedera et al., 2016). In recent years, the digital economy has emerged as a transformative force, reshaping traditional business models, and providing new opportunities for entrepreneurs. Small and Medium Enterprises (SMEs) play a pivotal role in the economic landscape of

Malaysia, contributing significantly to the country's Gross Domestic Product (GDP) and employment. With the increasing prevalence of digital technologies, the engagement of SMEs in the digital economy has become crucial for their sustained growth and competitiveness.

The digital economy encompasses a wide array of activities, including e-commerce, digital marketing, and the adoption of digital tools and platforms. Malaysia, like many other nations, has witnessed a surge in digital adoption, especially among SMEs eager to leverage online platforms to expand their market reach. E-commerce platforms, such as PG Mall, have provided SMEs with a gateway to overcome geographical constraints and tap into a global customer base (Wang and Wang, 2018). SMEs in Malaysia have embraced e-commerce to expand their businesses, which is a key component of the digital economy's growth.

Several studies emphasize the positive correlation between active engagement in the digital economy and entrepreneurship performance among SMEs (Bergmann and Hundt, 2016). By actively participating in the digital economy, SMEs gain access to a broader market, enhance customer engagement, and harness data-driven insights for strategic decision-making (Porter and Donthu, 2016). The specific context of PG Mall, as a local e-commerce platform, introduces unique dynamics that necessitate a focused investigation. Digital adoption, encompassing the integration of e-commerce platforms, digital marketing, and online payment systems, has been identified as a key factor in improving the operational efficiency of SMEs (Alalwan et al., 2017). For SMEs on PG Mall, a platform-centric understanding of digital adoption is crucial, considering its potential impact on revenue growth and overall performance (Lee and Ismail, 2020).

PG Mall provides several key advantages for Malaysian SMEs, making it highly relevant for this study. The platform offers user-friendly tools, lower fees compared to larger competitors, and comprehensive logistics support, allowing entrepreneurs to scale their operations efficiently. Additionally, it provides integrated marketing tools and analytics, helping businesses optimize customer engagement and performance. PG Mall focus on local businesses is especially beneficial for entrepreneurs seeking to cater to a domestic audience, and its simplified onboarding process, coupled with seller support and training, makes it accessible for small and medium-sized enterprises. Furthermore, PG Mall offers competitive conditions such as lower transaction fees, flexible subscription plans, and promotional opportunities, which enhance the digital presence of SMEs and improve overall entrepreneurship performance.

Despite the apparent benefits, local SMEs often struggle with limited access to both domestic and international markets. Malaysia's SMEs frequently lack the resources and infrastructure to expand their reach. The role of government policies in shaping the digital landscape for SMEs cannot be understated. Supportive policies, including financial incentives, training programs, and regulatory frameworks, can create an enabling environment for SMEs to actively participate in the digital economy (UNCTAD, 2019). However, there are limited academic studies or in-depth research specifically focusing on the impact of the digital economy, especially e-commerce platforms like PG Mall, on local SME entrepreneurship in Malaysia. While there are many studies on e-commerce in Malaysia, they often focus on general trends or major

platforms like Lazada or Shopee. PG Mall, as a local e-commerce platform, may have unique dynamics that remain unexplored. Such context-specific knowledge is crucial for both SMEs and policymakers in Malaysia.

The rise of the digital economy has brought about significant disruptions and transformations across industries, including the Small and Medium Enterprises (SMEs) sector in Malaysia. As the digital landscape evolves at an unprecedented rate, SMEs confront unprecedented opportunities and challenges in leveraging digital technologies to drive innovation, compete in the global market, and ensure long-term sustainability. SMEs are likely to be more vulnerable, typically have fewer internal resources and are less capable of weathering liquidity gaps and rapidly adapting their business models, operating procedures, and marketing channels (Abu Hasan et al., 2022). However, the precise effect of the digital economy on entrepreneurship among SMEs in Malaysia remains unexplored, and policymakers, business owners, and industry stakeholders must have a comprehensive understanding of its implications. Most of the existing research tends to focus on broad trends in e-commerce or major platforms, overlooking the unique dynamics and contextual factors that characterize SMEs' experiences on a local scale (Tan et al., 2016). The role of government policies as mediators between digital economy engagement and entrepreneurship performance has not been adequately explored, particularly in the Malaysian context (Abdullah, 2019; Raji et al., 2020).

The problem at hand is figuring out how the digital economy affects small and medium-sized businesses in Malaysia in many ways. Some SMEs have been able to thrive in the digital age by embracing e-commerce platforms, adopting digital marketing strategies, and using data analytics to improve their operations. In Malaysia, entrepreneurs and small and medium-sized businesses are likely to face a lack of technological adoption or digitalization. To help small and medium-sized businesses grow and innovate, it's important to figure out what makes digital entrepreneurship work and what stops other people from using digital tools. While broader studies acknowledge the competitive advantages of digital adoption (Alalwan et al., 2017), there is a lack of research on how SMEs on local platforms such as PG Mall differentiate themselves and navigate the competitive landscape. The existing research on the digital economy and entrepreneurship is predominantly focused on developed economies. The literature briefly touches upon the benefits of collaboration for SMEs (Makipaa et al., 2019), but there is a need for detailed insights into how collaborative initiatives in the digital economy, such as joint ventures or partnerships, contribute to entrepreneurship performance on platforms like PG Mall. The context of developing countries like Malaysia, with its unique economic, social, and cultural characteristics, is often overlooked. This gap in the literature limits the applicability of existing research findings to the Malaysian context and hinders the development of effective policies and strategies to promote digital entrepreneurship in the country.

Furthermore, the rapid pace of digital transformation means that new trends and challenges are constantly emerging. Issues such as the digital divide, cybersecurity, data privacy, and regulatory uncertainties are becoming increasingly important in the digital economy. In the digital economy, companies may face problems such as the insecurity and dynamism of competitive advantage provided by rapidly changing digital technologies, increased competition, a lack of management experience, and a

lack of understanding of the high priority of digital transformation (Alexandrova et al., 2020). Therefore, there is a pressing need for a comprehensive study that explores the effect of the digital economy on entrepreneurship in Malaysia for SMEs. Such a study would not only contribute to academic understanding of the topic but also provide valuable insights for policymakers, entrepreneurs, and other stakeholders.

The distinction between digital economy engagement and digital adoption is subtle but important in the context of this research. Digital economy engagement refers to the broader, strategic involvement of SMEs in the digital economy, which includes activities like participating in online platforms, leveraging e-commerce, and exploring new digital markets. In contrast, digital adoption focuses specifically on the operational aspect—how SMEs integrate digital tools and technologies into their day-to-day business processes, such as the use of e-commerce platforms, customer management systems, or digital marketing tools. While both concepts are part of the digital transformation process, they capture different stages and dimensions of this journey. An entrepreneur can adopt digital tools without fully engaging in the digital economy (e.g., using basic digital tools without expanding to online marketplaces or new customer bases). Conversely, SMEs may engage in digital markets without fully optimizing digital tools (e.g., listing products online but not adopting advanced digital analytics). Therefore, examining these separately allows us to capture nuances in how SMEs interact with digital platforms and the broader digital economy.

The research objectives of this study are as follows:

- To investigate the influence of digital economy engagement in Malaysia on SME entrepreneurship performance on the PG Mall platform.
- To investigate the influence of digital adoption in Malaysia on SME entrepreneurship performance on the PG Mall platform.
- To investigate the mediating role of government policies in the relationship between digital economy engagement and SME entrepreneurship performance on the PG Mall platform.
- To investigate the mediating role of government policies in the relationship between digital adoption and SME entrepreneurship performance on the PG Mall platform.

The remainder of this paper is organized as follows: Section 2 presents a comprehensive literature review. Section 3 outlines the adopted methodology. Section 4 discusses the findings. Finally, Sections 5 and 6 conclude the research, summarizing key insights and implications.

2. Literature review and hypotheses development

2.1. Digital economy engagement and entrepreneurship performance

Digital economy engagement refers to the extent of local SMEs' involvement and interaction with digital technologies, platforms, and channels. Entrepreneurship performance, on the other hand, signifies the overall success and outcomes of SMEs in the entrepreneurial domain, encompassing both financial and non-financial indicators. Numerous studies have suggested a positive relationship between digital economy engagement and entrepreneurship performance among SMEs. As SMEs actively engage in the digital economy, they gain access to a broader market and

customer base, leading to increased opportunities for growth and expansion (Bergmann and Hundt, 2016). Through digital channels and e-commerce platforms, SMEs can reach customers beyond their physical location, thereby enhancing their market reach and potential revenue streams (Huang and Rust, 2018).

Digital economy engagement also fosters improved customer engagement and personalized interactions. SMEs that leverage digital marketing and customer relationship management tools can provide tailored solutions and timely responses to customer needs, leading to higher customer satisfaction and loyalty (Porter and Donthu, 2016). Positive customer experiences can drive repeat business and word-of-mouth referrals, contributing significantly to entrepreneurship performance.

Furthermore, the adoption of digital technologies can significantly improve SMEs' operational efficiency and effectiveness. Automation and digital solutions streamline processes, reduce manual errors, and enable better inventory management, thus reducing costs and enhancing profitability (Eid, 2016). By freeing up resources, SMEs can focus on strategic initiatives and business development, positively influencing entrepreneurship performance.

Digital economy engagement also offers SMEs access to vast amounts of data and insights. Through data analytics and market research, SMEs can better understand customer behavior, market trends, and competitors' strategies (Choudhury and Harrigan, 2014). These data-driven insights facilitate informed decision-making, allowing SMEs to align their products and services with market demands, ultimately impacting entrepreneurship performance positively.

However, it is essential to note that the relationship between digital economy engagement and entrepreneurship performance may be influenced by various factors such as digital literacy and the availability of resources. SMEs that lack the necessary digital skills or face resource constraints may not fully harness the potential benefits of the digital economy, limiting the impact on entrepreneurship performance (Bharati and Chaudhury, 2014). Additionally, the level of competition and the dynamic nature of the digital landscape can create challenges for SMEs to stand out and sustain their competitive advantage (Yoo et al., 2012).

In summary, while digital economy engagement offers numerous benefits that can enhance entrepreneurship performance among SMEs, the extent of these benefits may vary based on factors such as digital literacy, resource availability, and market competition. Understanding these nuances is crucial for developing strategies that effectively leverage digital technologies to drive entrepreneurial success. Thus, the authors advance the hypothesis that:

H1: There is a significant relationship between digital economy engagement and entrepreneurship performance among local SMEs in Malaysia in PG Mall.

2.2. Digital adoption and entrepreneurship performance

Digital adoption, encompassing the use of e-commerce platforms, digital marketing tools, and other digital technologies, has been shown to enhance the operational efficacy of small and medium-sized enterprises (SMEs) (Alalwan et al., 2017). Improved operational efficiency can significantly impact entrepreneurial performance, particularly for businesses on platforms like PG Mall. By leveraging

digital tools, SMEs can streamline their processes, reduce costs, and optimize resource allocation, all of which contribute to better business outcomes.

Customer engagement is another critical aspect influenced by digital adoption. Promoting products and services through digital tools, including search engines and social media, increases visibility and customer interaction (Liang and Turban, 2011). Enhanced consumer engagement often correlates with improved entrepreneurial performance, as engaged customers are more likely to make repeat purchases and recommend the business to others.

SMEs that confidently adopt new digital tools and technologies are typically more innovative (Kohli and Melville, 2019). Innovation is a key driver of entrepreneurial performance, enabling businesses to introduce new products, improve services, and differentiate themselves from competitors. For PG Mall, fostering innovation through digital adoption can lead to better business outcomes and a stronger competitive position.

Building digital competencies through training and staying updated with digital trends positively impacts entrepreneurship performance (Kohli and Devaraj, 2003). Active participation in webinars, seminars, and training sessions demonstrates a commitment to continuous learning and adaptation (Chin et al., 2003). This learning-oriented approach enhances the ability of SMEs to leverage digital tools effectively, thereby improving their performance on platforms like PG Mall.

Recognizing and addressing specific digital skill gaps is crucial for optimizing business performance (Venkatesh et al., 2003). By developing new competencies, SMEs can better navigate the digital landscape and capitalize on opportunities for growth and innovation. PG Mall's business performance can be significantly improved through targeted efforts to enhance digital skills and knowledge.

Collaboration is another important factor in the relationship between digital adoption and entrepreneurship performance. Collaborative initiatives and partnerships among entrepreneurs can generate synergies that enhance business outcomes (Makipaa et al., 2019). On PG Mall, such collaborations can lead to shared resources, knowledge exchange, and collective innovation, contributing to the long-term success and sustainability of participating SMEs.

The integration of digital technologies is essential for the long-term sustainability of businesses (Teece, 2010). Sustainable enterprises are more likely to thrive and adapt to shifting market conditions. For SMEs on PG Mall, digital adoption is not just about immediate gains but also about ensuring their ability to remain competitive and resilient in the future.

In summary, the relationship between digital adoption and entrepreneurship performance is multifaceted. Various aspects of digital adoption, including operational efficiency, customer engagement, innovation, competency development, and collaboration, play a crucial role in determining how SMEs perform on platforms like PG Mall. By embracing digital technologies, SMEs can enhance their entrepreneurial performance and achieve sustainable growth. Based on the discussion, the subsequent hypothesis was devised:

H2: There is a significant relationship between digital adoption and entrepreneurship performance among SMEs operating on the PG Mall platform in Malaysia.

2.3. Digital economy engagement, government policies, and entrepreneurship performance

Government policies play a crucial role in shaping the environment for digital economy engagement and subsequently influencing entrepreneurship performance. These policies can significantly impact the ease of doing business on platforms like PG Mall, determining the level of engagement by SMEs. The regulatory environment, shaped by government policies, can either facilitate or hinder business operations in the digital economy (OECD, 2019). Favorable policies create an enabling environment for businesses, promoting active participation and engagement on digital platforms.

One significant way government policies influence digital entrepreneurship is through financial incentives. Such incentives can stimulate digital entrepreneurship by reducing the financial burden on SMEs, encouraging them to invest in digital technologies and platforms (UNESCO, 2017). Moreover, government-funded training programs are instrumental in enhancing the digital skills of entrepreneurs (Eurofound, 2019). These programs empower SMEs to navigate the digital landscape effectively, improving their performance on platforms like PG Mall.

Navigating legal and compliance challenges is another area where government support can significantly influence the ease of doing business in the digital economy. Policies that provide clear guidelines and support in legal and compliance matters are beneficial for entrepreneurs on platforms like PG Mall (European Parliament, 2020). Clear and consistent policies help build trust between the government and digital entrepreneurs, which can lead to improved engagement on digital platforms (UNDP, 2020).

Government initiatives promoting the digital economy through campaigns and awareness programs can also increase participation. Entrepreneurs are more likely to engage with platforms like PG Mall when they are aware of the benefits and opportunities that digital engagement can bring (World Bank, 2016). Additionally, international trade agreements facilitated by government policies can open up new markets and promote cross-border digital trade, thereby positively impacting digital economy engagement (WTO, 2021).

Ensuring digital inclusion, especially in remote or underserved areas, is another critical aspect of government policies. Policies aimed at bridging the digital divide help entrepreneurs on platforms like PG Mall access a broader customer base and participate more fully in the digital economy (OECD, 2020). These policies ensure that all citizens and entrepreneurs have access to digital technologies, which is fundamental to fostering digital economy engagement (UN, 2021).

In Malaysia, government policies actively support and encourage digital engagement among SMEs through various initiatives such as financial incentives, training programs, and regulatory frameworks. These policies serve as a bridge connecting the advantages of digital engagement with the operational environment of local SMEs (Baldwin et al., 2017). Digital skills development initiatives are particularly significant as they mediate the acquisition of essential digital competencies, positively affecting the performance of SMEs in the digital economy (Razak et al., 2019).

Moreover, government policies influence the overall business environment by affecting factors such as ease of doing business, regulatory compliance, and access to financing. These factors mediate entrepreneurship performance by creating a supportive ecosystem for businesses (Acar et al., 2016). Support systems provided by government policies, including mentorship, funding, and networking opportunities, are necessary to improve the performance of entrepreneurship and foster collaboration within the digital economy (Al-Debei et al., 2015).

Government policies also act as a buffer for SMEs facing challenges and disruptions. Through supportive measures, these policies enhance a business's resilience in a dynamic digital business landscape, ultimately affecting entrepreneurship performance (Baldwin et al., 2017). In the digital economy, government policies addressing critical issues such as cybersecurity and data protection are vital. These policies mediate the security and trust aspects of entrepreneurship, which have significant implications for performance (Kraus et al., 2021).

In conclusion, government policies are integral to shaping the digital economy landscape and influencing entrepreneurship performance. By providing financial incentives, enhancing digital skills, ensuring regulatory clarity, and promoting digital inclusion, government policies create a supportive environment for SMEs to thrive in the digital economy. Understanding the interplay between digital economy engagement, government policies, and entrepreneurship performance is crucial for developing strategies that effectively leverage digital technologies to drive entrepreneurial success. Therefore, this study formulates the following hypotheses:

H3: There is a significant relationship between digital economy engagement and government policies among SMEs on the PG Mall platform in Malaysia.

H5: Government policies significantly influence entrepreneurship performance among SMEs on the PG Mall platform in Malaysia.

H6(a): Government policies significantly mediate the relationship between digital economy engagement and entrepreneurship performance among SMEs on the PG Mall platform in Malaysia.

2.4. Digital adoption, government policies, and entrepreneurship performance

Digital adoption refers to the extent to which SMEs in Malaysia incorporate digital technologies and strategies into their operations, such as e-commerce, digital marketing, and the use of online platforms. Despite the significant potential of these technologies, studies indicate that digital adoption among SMEs in Malaysia remains relatively low (Tan et al., 2016). Many businesses have yet to fully embrace digital technologies, which can hinder their competitive edge and overall performance.

Government policies play a crucial role in mediating the relationship between digital adoption and entrepreneurship performance. By providing financial incentives, offering training and support programs, and reducing regulatory barriers, government policies can significantly enhance the adoption of digital technologies among SMEs. Ismail and Yusof (2018) emphasize the importance of government initiatives such as grants and training programs in promoting digital adoption among SMEs in Malaysia.

These initiatives not only provide the necessary resources but also create an encouraging environment for digital transformation.

Training programs and policies that emphasize skill development are essential in fostering greater digital adoption. Entrepreneurs equipped with the necessary knowledge and skills are more likely to utilize digital tools proficiently (Rahayu and Day, 2015). These initiatives help bridge the digital skills gap, enabling SMEs to leverage digital technologies effectively, thus improving their entrepreneurial performance. Furthermore, government policies that ensure the availability of information regarding digital adoption are vital. Entrepreneurs can make informed decisions about adopting digital technologies when they have access to readily available resources and guidance (Haque et al., 2019).

The implementation of cybersecurity policies by the government plays a critical role in fostering digital adoption. Entrepreneurs are more likely to embrace digital tools when they have confidence in the security of their digital operations. Chen and Huang (2017) highlight that government policies ensuring cybersecurity instill entrepreneurs with a crucial assurance of protection, thereby fostering their adoption of digital technologies. This sense of security is vital for encouraging SMEs to participate in the digital economy.

Moreover, government policies that establish a transparent and encouraging regulatory framework can significantly influence digital adoption. Policies that reduce ambiguity and apprehensions regarding compliance encourage organizations to embrace digital technologies (Hernández-Mogollón et al., 2020; Kamalrudin et al., 2022). A supportive regulatory environment reduces the perceived risks associated with digital transformation, thus promoting greater digital adoption among SMEs.

The Malaysian government has introduced several initiatives aimed at promoting digital adoption among SMEs. The National E-Commerce Strategic Roadmap and the Digital Free Trade Zone are examples of policies designed to enhance the digital ecosystem in Malaysia. These initiatives create an environment conducive to digital adoption, thereby positively impacting entrepreneurship performance. Raji et al. (2020) provide evidence of the positive impact of government policies on the relationship between digital adoption and SME performance in Malaysia.

Government policies also facilitate the development of a digital infrastructure that supports SMEs in their digital transformation journey. By investing in digital infrastructure and providing support for digital innovation, the government creates a foundation for SMEs to leverage digital technologies effectively. This infrastructure is essential for ensuring that SMEs can access and benefit from digital tools and platforms.

In conclusion, the relationship between digital adoption and entrepreneurship performance is significantly mediated by government policies. By providing financial incentives, offering training and support programs, implementing cybersecurity measures, and creating a supportive regulatory environment, government policies facilitate greater digital adoption among SMEs. These policies create a favorable atmosphere for entrepreneurs to embrace digital tools, thereby improving their readiness to participate in the digital economy and enhancing their overall entrepreneurial performance. Understanding the interplay between digital adoption, government policies, and entrepreneurship performance is crucial for developing

strategies that effectively leverage digital technologies to drive entrepreneurial success in Malaysia. Accordingly, this study posits the following hypotheses:

H4: There is a significant relationship between digital adoption and government policies among SMEs on the PG Mall platform in Malaysia.

H6(b): Government policies significantly mediate the relationship between digital adoption and entrepreneurship performance among SMEs on the PG Mall platform in Malaysia.

2.5. Conceptual framework

Figure 1 outlines the conceptual framework of the study. Digital Economy Engagement encapsulates the active involvement of SMEs in the digital economy, including their utilization of digital technologies in the PG Mall platform.

Digital adoption refers to the incorporation of digital technologies and tools into SME business operations, particularly on the PG Mall platform. It encompasses the effective integration of digital solutions, impacting business processes, customer engagement, and overall operations.

Government Policies are the regulatory and policy measures put forth by the Malaysian government to guide and govern business activities in the digital economy. Government policies create an overarching structure for SME operations within the digital landscape.

Entrepreneurship performance encompasses a range of performance indicators such as sales growth, customer acquisition, and profitability. These indicators collectively reflect the success and effectiveness of SMEs on the PG Mall platform.

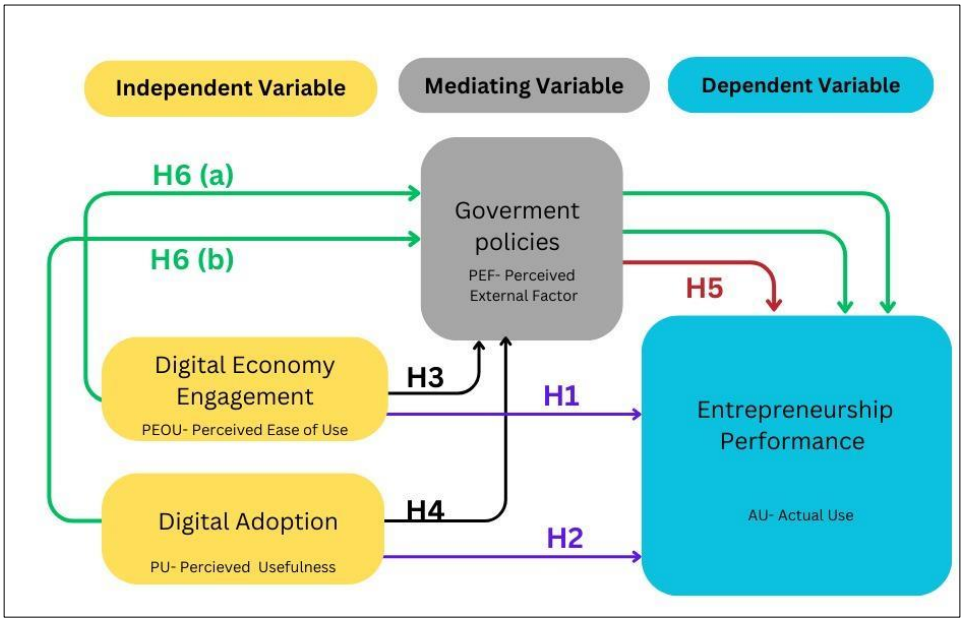

Figure 1. Conceptual framework.

3. Methodology

This study employs a conclusive research design to examine the relationship between digital economy engagement, digital economy adoption and entrepreneurship performance, as well as the mediating effect of government policies on the relationship

between independent and dependent variables. Additionally, a single cross-sectional research design was utilized due to its efficiency in data collection. A quantitative approach and convenience sampling were employed due to limited research resources.

Population and sampling

- Population: 514 active entrepreneurs from PGMall.my, chosen based on its ranking as the second most visited local shopping platform (iPrice Group, 2021).
- Sample Size: Based on Krejcie and Morgan (1970), a sample size of 226 was deemed necessary.
- Questionnaire Distribution: To ensure a sufficient response rate, 1200 questionnaires were distributed via: WhatsApp, Email, and Seller chat box on PG Mall.
- Sampling Technique: Simple random sampling was employed by assigning numbers to each entrepreneur and randomly selecting 229 participants to minimize bias (Trochim and Donnelly, 2001).
- Data Analysis: The data collected from the respondents was analyzed using Structural Equation Modeling (SEM) via Smart PLS. Smart PLS was chosen for its robust ability to model complex relationships between variables, including direct, indirect, and mediating effects, making it suitable for testing the hypotheses of this study.

Data collection was conducted through questionnaires divided into five sections:

- Section A gathered demographic information
- Section B assessed digital economy engagement
- Section C measured entrepreneurship performance
- Section D explored government policies and support
- Section E examined digital adoption.

Sections B, C, D, and E utilized 5-point Likert scales for closed-ended responses. This research was conducted with the utmost commitment to ethical principles and standards. The confidentiality and anonymity of all participants were strictly maintained, and no identifiable information was collected or reported in the study. Participation in this research was voluntary, and all participants were provided with informed consent before completing the questionnaires.

4. Results

4.1. Demographic analysis

A Google form link containing questionnaires was sent to 1200 respondents, achieving a response rate of 19% with 229 completed responses. This rate, while below the American Association for Public Opinion Research (AAPOR) benchmark of 60%, still provides valuable insights. The demographic analysis of respondents revealed that 69% were female and 31% male. Age distribution showed 52.4% were 41 years and above, 23.6% were 25–35 years, 19.2% were 36–40 years, and 4.8% were 18–24 years. Educationally, 53.3% held degrees, 17.9% were postgraduates, 17.5% had diplomas, and the remainder had other qualifications. Most businesses (60.7%) were operational for 1–3 years, with 24.9% for 4–7 years, 8.3% for over 12 years, and

6.1% for 8–11 years. Business sectors included 41% in retail, 34.5% in services, 22.3% in other sectors, and 2.2% in manufacturing. Operation modes were predominantly online (61.1%), with 36.7% both online and offline, and 2.2% exclusively offline. Additionally, 62.4% used platforms other than PG Mall, while 37.6% used only PG Mall. Monthly customer activity showed 83.8% served 50 or fewer customers, 7.9% served 51–100 customers, 5.7% served 101–200 customers, and 2.6% served over 200 customers. Lastly, 58.1% had received PG Mall training, whereas 41.9% had not.

4.2. Preliminary data analysis

The data set was screened for multivariate outliers using Mahalanobis distance (D2) before analysis. D2 is the distance of "a case from the centroid of the remaining cases where the centroid is the point created at the intersection of the means of all the variables" (Tabachnick and Fidell, 2007). Cases with a probability associated with their D2 less than 0.001 were considered outliers. There were no cases detected as an outlier, hence all 164 responses were taken for further analysis. After testing for outliers, the dataset was subjected to a normality analysis.

According to Tabachnick and Fidell (2007), normality assumes that each variable is normally distributed. Testing for normality is crucial before finalizing any statistical analysis, as it examines the data distribution. A perfectly normal distribution is bell-shaped, symmetrical, and has equal mean, median, and mode values (Pallant, 2016). If variables are not normally distributed, the statistical test results may be compromised (Tabachnick and Fidell, 2007). In this study, normality was assessed using skewness and kurtosis values. Skewness indicates distribution symmetry, while kurtosis indicates the peak. According to Hair et al. (2014), data is normal if skewness is between −2 and +2, and kurtosis is between −7 and +7. **Table 1** shows that the skewness and kurtosis values for each variable fall within these thresholds, indicating normal distribution.

4.3. Measurement and structural models assessments

This section presents data analysis using Partial Least Squares (PLS) version 4 software, a tool for Structural Equation Modelling (SEM). PLS-SEM was used for the present study as its objective was to predict the effects of perceived behavioral control, openness to experience, conscientiousness and purchase intention on purchase behavior. The model of this study was assessed in two stages. First, a confirmatory factor analysis (CFA) was conducted using consistent PLS algorithms to assess the reliabilities and validities of the constructs (measurement model). Second, bootstrapping the Smart-PLS software version 4 (Smart-PLS 4) was used to test the hypothesized relationship among study variables (structural model assessment).

4.3.1. Measurement model

The measurement model defines the relationship between items and latent variables (Henseler et al., 2015). There are 35 items corresponding to 4 latent variables:

- Digital Economy Engagement (DEE)—10 items.
- Digital Adoption (DA)—5 items.
- Government Policies (GP)—10 items.

- Entrepreneurship Performance (EP)—10 items.

Following Hair et al. (2014), the measurement model includes both reflective and formative constructs. The study used composite reliability (CR) and Cronbach's alpha to evaluate internal consistency, and average variance extracted (AVE) and factor outer loadings to assess convergent validity.

Indicator reliability

The consistency of the constructs was evaluated using the factor loadings of their items. The threshold for factor loadings varies according to previous studies and established guidelines: Chin (1907) suggests a range from 0.5 to 0.707, Straub (1989) recommends 0.5, Lewis et al. (2005) propose 0.450, Hair et al. (2014) recommend 0.4 to 0.7, and Lewis et al., 2005) suggest 0.3 for exploratory research. This study followed Hair et al. (2014), retaining factor loadings between 0.4 and 0.7 only if the Average Variance Extracted (AVE) was above 0.5 and composite reliability exceeded 0.6. Therefore, factors with loadings between 0.40 and 0.95 were included for further analysis.

Internal consistency reliability

Internal consistency was assessed using Cronbach's alpha, with a threshold of 0.6 or higher considered acceptable (Hair et al., 2014). Additionally, composite reliability was evaluated, retaining constructs with values of 0.6 and above. Together, these tests provide evidence of internal consistency reliability. As shown in **Table 1**, all latent constructs met these criteria, demonstrating strong reliability.

Table 1. Construct reliability.

Construct	Skewness	Kurtosis	Cronbach's alpha	CR	AVE
Digital Economy Engagement	−0.192	0.927	0.932	0.933	0.681
Digital Adoption	−0.296	−0.517	0.834	0.836	0.750
Government Policies	−0.602	1.636	0.899	0.909	0.622
Entrepreneurship Performance	−0.452	−0.290	0.930	0.934	0.672

Convergent validity

The next criterion assessed was convergent validity, which measures how well individual indicators reflect their construct compared to other constructs (Urbach and Ahlemann, 2010). This was evaluated using the Average Variance Extracted (AVE). According to Hair et al. (2014), an AVE value above 0.5 is considered valid. As shown in **Table 1**, all variables met the minimum criteria for AVE, thereby establishing the study's convergent validity.

Discriminate validity

Discriminant validity assesses how well a construct differs from other constructs (Hair et al., 2014), ensuring that it has the strongest relationships with its own indicators within the PLS path model. Historically, the Fornell-Larcker criterion (1981) was used to test discriminant validity, but it has been largely replaced by the Heterotrait-Monotrait (HTMT) ratio of correlations introduced by Henseler et al. (2015). Their Monte Carlo simulations demonstrated HTMT's superior performance, with specificity and sensitivity rates of 97% to 99%. This study employed HTMT.85,

HTMT.90, and HTMT inference to evaluate discriminant validity. **Table 2** presents the results, confirming the study's discriminant validity.

Table 2. HTMT.85, HTMT.90 and HTMT inference results.

	Digital Adoption	**Digital Economy Engagement**	**Entrepreneurship Performance**	**Government Policies**
Digital Adoption				
Digital Economy Engagement	0.463			
Entrepreneurship Performance	0.557	0.759		
Government Policies	0.879	0.482	0.542	

Table 2 illustrates that the highest HTMT value observed was 0.879, falling below the 0.90 threshold (Henseler et al., 2015), signifying the establishment of discriminant validity for HTMT.90. Furthermore, the HTMT inference outcomes reveal no zero values within the confidence intervals, with all upper confidence limits remaining below 1. Consequently, all HTMT values are deemed significantly distinct from one another, as affirmed by comprehensive bootstrapping. Hence, discriminant validity is confirmed.

Summary of the measurement model assessment

The measurement model has demonstrated reliability, convergent validity, and discriminant validity. As all items satisfied the minimum criteria, none were excluded. Therefore, the measurement model is deemed suitable for the subsequent phase: the assessment of the structural model. Section 4.5 will provide an analysis of the structural paths.

4.3.2. Assessment of structural model

Following the assessment of the measurement model, the analysis of the structural model commenced, aiming to understand its predictive power and the relationships among latent variables. This phase encompassed several steps: initially, evaluating collinearity among constructs using the variance inflation factor (VIF); next, scrutinizing path coefficients, mediation, and significance employing algorithms and bootstrapping techniques; subsequently, assessing the coefficient of determination (R^2) to gauge predictive accuracy; further, examining the effect size (f^2) of latent constructs on the dependent variable; finally, reporting predictive relevance (Q^2) and model fit.

Collinearity assessment

Collinearity arises when two or more exogenous variables measure the same concept, potentially causing redundancy if used simultaneously. In this study, the collinearity results derived from the Smart-PLS 4 output, presenting the variance inflation factors (VIF) for all items, which the VIF values consistently fall below the threshold levels of 5 (Hair et al., 2014) and 3.3 (Diamantopoulos and Siguaw, 2006; Hakimi et al., 2023). Consequently, it was determined that collinearity had not reached a critical level for any formative constructs, posing no hindrance to estimating the PLS path model. This indicates that the constructs are not correlated, and thus, all constructs are retained for further analysis.

The path coefficients, which represent the hypothesized relationships between constructs, are examined. These standardized values vary between −1 and +1, with estimates closer to +1 signifying a strong positive relationship and those closer to −1 indicating a strong negative relationship. Values near zero indicate weak relationships, whether positive or negative. The significance of these coefficients was assessed using bootstrapping. The findings for each construct in this study yielded positive indications.

Coefficient of Determination Value (R^2)

The coefficient of determination (R^2) is a standard measure used to assess the structural model, computed as the squared correlation between specific exogenous and endogenous constructs. It quantifies the variance explained by exogenous variables on the endogenous variable, with values ranging from 0 to 1. A higher value suggests greater predictive accuracy. Traditionally, values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively. For Entrepreneurship Performance construct, the R^2 was 0.562, indicating that 56.2% of the variance was accounted for by its exogenous constructs. For Government Policies construct, the R^2 was 0.896, suggesting that exogenous variables explained 89.6% of the variance. Overall, the coefficients of determination for these variables were substantial.

Assessment of effect size (f^2)

This assessment involves observing the change in R^2 when one exogenous variable is removed from the model (Hair et al., 2014). In simpler terms, f^2 measures the extent to which a predictor variable contributes to the overall R^2 value of that construct in the structural model. Interpretations of f^2 values are: 0.02 indicating a weak effect, 0.15 indicating a moderate effect, and 0.35 indicating a large effect (Cohen, 1998). The results suggest that Government Policies has no significant effect on Entrepreneurship Performance, as its effect size was 0.000. Additionally, small effect was demonstrated by Digital Adoption on Entrepreneurship Performance and Digital Economy Engagement on Government Policies with f^2 values 0.016 and 0.038 respectively. However, large effect was observed for Digital Adoption on Government Policies and Digital Economy Engagement on Entrepreneurship Performance with f^2 values 6.706 and 0.688 respectively. **Table 3** shows the summary of f^2 values for the studied constructs.

Table 3. Summary of f^2 values.

Constructs	***f*-square**
Digital Economy Engagement → Entrepreneurship Performance	0.688
Digital Adoption → Entrepreneurship Performance	0.016
Digital Economy Engagement → Government Policies	0.038
Digital Adoption → Government Policies	6.706
Government Policies → Entrepreneurship Performance	0.000

Assessment of predictive relevance (Q^2)

The model's predictive capability is evaluated using Stone-Geisser's Q^2 and Hair et al.'s criterion. A Q^2 value above zero indicates good predictive relevance,

determined through a blindfolding procedure where each data point is systematically removed and predicted. Two conditions are considered: specifying endogenous reflective constructs and setting a distance omission (*D*) value. With 229 cases, a *D* value of 7 was selected. The obtained Q^2 values were 0.574 for Entrepreneurship Performance and 0.915 for Government Policies, both exceeding zero, affirming the model's predictive relevance as shown in **Table 4**.

Table 4. Summary of Q^2 values.

Constructs	***Q*-square**
Government Policies	0.915
Entrepreneurship Performance	0.574

Summary of structural model assessment

The structural model has provided empirical support for collinearity, path coefficients, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2) of the constructs. These evaluations demonstrate that the model satisfies the minimum requirements for each aspect. Consequently, the structural model is deemed appropriate and ready for the subsequent phase of analysis, which entails hypothesis testing and mediation analysis.

4.4. Hypothesis testing

4.4.1. Direct relationship

To validate the proposed hypotheses and the structural model, the path coefficient between two latent variables was scrutinized. Based on the rule of thumb, a path coefficient value of at least 0.1 is required to indicate a significant impact within the model. In this study, hypotheses were evaluated by assessing the statistical significance of the path coefficients using *t*-values and confidence intervals. This analysis was conducted via bootstrapping, a resampling technique involving 5000 samples. Chin (1997) describes bootstrapping as a non-parametric method employed to estimate the precision of the PLS estimate. The results are presented in **Table 5** below, and further discussion on the hypotheses decisions follows.

Table 5. Summary of hypotheses testing results.

Direct Relationship	**Original sample (O)**	**Sample mean (M)**	**Standard deviation (STDEV)**	***T* statistics (|O/STDEV|)**	***P* values**	**Decision**
Digital Economy Engagement → Entrepreneurship Performance	0.612	0.609	0.062	9.859	0.000	Supported
Digital Adoption → Entrepreneurship Performance	0.250	0.253	0.053	4.695	0.000	Supported
Digital Economy Engagement → Government Policies	0.069	0.068	0.022	3.079	0.002	Supported
Digital Adoption → Government Policies	0.916	0.917	0.014	67.445	0.000	Supported
Government Policies → Entrepreneurship Performance	−0.002	−0.005	0.190	0.009	0.993	Not Supported

4.4.2. Mediation analysis

This study utilized bias-corrected bootstrapping to assess mediation. This approach determines mediation presence when zero lies between the upper and lower confidence interval values. If zero falls within these intervals, it indicates that the constructs may lack a relationship at certain points, thus casting doubt on sustained mediation. **Table 6** outlines the specifics of indirect relationships and the conclusions drawn from the mediation analysis.

Table 6. Hypothesis testing for indirect relationships and mediation.

Indirect Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	*T* statistics (|O/STDEV|)	*P* values	Decision
Digital Economy Engagement → Government Policies → Entrepreneurship Performance	0.000	−0.002	0.013	0.009	0.993	Not supported
Digital Adoption → Government Policies → Entrepreneurship Performance	−0.002	−0.004	0.175	0.009	0.993	Not supported

5. Discussion

The study revealed a strong positive relationship between digital economy engagement and entrepreneurship performance. This finding aligns with existing literature emphasizing the transformative impact of digital engagement on business outcomes. Previous studies, such as those by Baldwin et al. (2017), have highlighted the positive correlation between active participation in the digital economy and enhanced business performance. Our findings reinforce this notion, indicating that businesses actively leveraging digital technologies, such as those observed on platforms like PG Mall, are more likely to experience improved entrepreneurship performance. The literature consistently emphasizes the advantages of digital economy engagement, including increased market reach, enhanced customer interaction, and improved operational efficiency (Baldwin et al., 2017). These advantages contribute to the overall positive relationship observed in our study between digital economy engagement and entrepreneurship performance. In conclusion, our findings not only align with established literature but also provide empirical evidence specific to the context of PG Mall in Malaysia. The strong positive relationship underscores the significance of digital economy engagement as a driving force for entrepreneurship performance, offering valuable insights for businesses and policymakers navigating the evolving landscape of the digital economy.

To contextualize these findings, comparisons with other platforms and regions shed light on the broader applicability of digital economy engagement. For example, research on Lazada in Southeast Asia showed similar results, where digital adoption significantly boosted entrepreneurship performance by expanding market reach and improving operational efficiency (Tan and Lim, 2020). Similarly, a study on Jumia, a leading e-commerce platform in Africa, found that digital engagement provided local entrepreneurs with access to wider markets and improved customer relations, contributing to enhanced business performance (Agyekum and Boateng, 2019). These comparisons with platforms in diverse settings suggest that the positive relationship between digital economy engagement and entrepreneurship performance observed in

PG Mall holds across regions, demonstrating the universal benefits of digital integration for businesses.

Similarly, positive relationship between digital adoption and entrepreneurship performance was reported based on the results presented in the earlier section. This aligns with existing literature that underscores the impact of technology adoption on business outcomes. The positive relationship suggests that businesses embracing digital tools and technologies, as indicated by their adoption of platforms like PG Mall, experience tangible benefits in terms of entrepreneurship performance. Previous research has highlighted that the adoption of modern digital technologies can trigger the digital transformation of start-up SMEs. Digital transformation refers to helping enterprises radically improve their performance. In conclusion, our findings corroborate the theoretical and empirical evidence regarding the positive impact of digital adoption on entrepreneurship performance. This information is valuable for businesses seeking to optimize their performance through strategic integration of digital tools, especially on e-commerce platforms like PG Mall.

Digital adoption has a profound impact on various performance metrics within entrepreneurship, particularly in the context of market expansion, customer engagement, and operational efficiency. For instance, a study by O'Reilly and Tushman (2013) found that companies embracing digital technologies reported a 20%–30% increase in market share within two years of implementation. This is largely attributed to enhanced online visibility and accessibility, allowing businesses to reach wider audiences beyond geographical constraints. Additionally, customer engagement metrics often see significant improvement. According to a survey by McKinsey and Company (2020), businesses that leveraged digital tools experienced a 25% increase in customer interaction rates, driven by personalized marketing efforts and real-time feedback mechanisms. Furthermore, operational efficiency is markedly enhanced through automation and streamlined processes. Research by Brynjolfsson and McAfee (2014) highlights that organizations adopting digital tools for supply chain management reported a 50% reduction in operational costs, resulting from improved inventory management and reduced lead times. These findings underscore the tangible benefits of digital adoption, illustrating how platforms like PG Mall can serve as catalysts for significant improvements in entrepreneurial performance across various metrics.

On another note, the study found that government policies do not mediate the relationship between digital adoption, digital economy engagement and entrepreneurship performance. This finding contradicts the existing literature, which emphasizes the crucial role of supportive government policies in fostering a conducive business environment. For instance, Baldwin et al. (2017) highlighted the importance of government policies in promoting innovation and entrepreneurship by offering financial incentives, training programs, and regulatory frameworks. A similar view is echoed in China, where government-backed initiatives, such as subsidies and tax relief, have significantly encouraged the digital transformation of SMEs on platforms like Alibaba, driving entrepreneurial success (Luo and Zhang, 2020). In contrast, this study suggests that government policies may not have the same level of influence in the Malaysian context, potentially due to variations in policy implementation or the rapid evolution of digital technologies. Policies that offer financial incentives, training

programs, and regulatory support can significantly influence businesses' engagement with the digital economy and, subsequently, their overall performance. These policies act as catalysts for creating an ecosystem that encourages entrepreneurship and facilitates the effective utilization of digital tools (Baldwin et al., 2017).

The discrepancy in findings could be attributed to several factors. It is possible that the context in which the current study was conducted differs significantly from those in previous research. Variations in economic, social, and regulatory environments might influence the effectiveness of government policies as mediators. Additionally, the measurement and operationalization of key variables, such as the scope and nature of government policies and digital economy engagement, might differ across studies, leading to inconsistent results.

Another potential explanation could be the dynamic nature of the digital economy, where rapid technological advancements and changing market conditions might diminish the relative influence of government policies over time. Furthermore, the direct impact of digital economy engagement on entrepreneurship performance could be stronger than the indirect effect mediated by government policies, making the latter's role less significant in this particular study.

The findings of this study provide critical insights for both policymakers and business practitioners regarding the role of digital economy engagement and adoption in enhancing entrepreneurship performance. For policymakers, the lack of a mediating effect of government policies on this relationship suggests a need to reassess existing frameworks that aim to support digital engagement among SMEs. While literature emphasizes the importance of government initiatives in fostering innovation (Baldwin et al., 2017), this study indicates that the direct benefits of digital engagement may be overshadowing these supportive measures. Policymakers should consider implementing more targeted strategies that not only incentivize digital adoption but also actively address the unique challenges faced by businesses in the digital landscape. For business practitioners, the strong positive correlation between digital tools and entrepreneurship performance highlights the necessity of embracing digital technologies to improve operational efficiency, market reach, and customer engagement. As noted by McKinsey (2020), businesses that invest in digital transformation can achieve significant revenue growth, reinforcing the importance of integrating digital solutions into their strategies. By leveraging these insights, both policymakers and entrepreneurs can better navigate the complexities of the digital economy, fostering an environment conducive to sustainable business growth.

In conclusion, this finding aligns with the broader literature on the positive relationship between digital economy engagement and entrepreneurship performance, as evidenced by studies on platforms like Lazada, Jumia, and Shopify across various regions. However, the role of government policies as mediators may vary depending on the local context, suggesting that businesses and policymakers should consider region-specific factors when navigating the digital economy landscape.

6. Conclusion

The research highlights that digital adoption and digital economy engagement, including the use of e-commerce platforms and online marketing tools, is vital for the

success and sustainability of SMEs on platforms like PG Mall. Entrepreneurs engaging with digital technologies are better positioned for growth and competitiveness. This study contributes to the academic understanding of the digital economy's impact on SME entrepreneurship by exploring SMEs' performance on online platforms and the factors influencing it. By examining digital adoption and digital economy engagement in SME entrepreneurship, the study enhances knowledge on how SMEs leverage digital tools for growth, offering valuable insights for scholars at the intersection of technology and business.

This study reveals a strong and positive relationship between digital economy engagement and entrepreneurship performance among SMEs, particularly those utilizing the PG Mall platform. The findings align with existing literature that underscores the transformative role of digital technologies in improving business outcomes (Kraus et al., 2019). Engaging in digital activities such as e-commerce, digital marketing, and data analytics enhances market reach, customer interaction, and operational efficiency. Similarly, digital adoption is found to drive entrepreneurship performance, consistent with previous studies that highlight the benefits of technological integration in SMEs (Bouwman et al., 2018). However, contrary to earlier research that emphasizes the importance of supportive government policies in mediating the impact of digital adoption on entrepreneurship performance (Zhou et al., 2021), our study finds no significant mediating effect of government policies. This discrepancy could be attributed to the specific economic, social, or regulatory context of Malaysia, where SMEs may derive more direct benefits from digital engagement than from government interventions. The evolving nature of the digital economy may also contribute to this finding, as the pace of digital transformation often outstrips the ability of policy frameworks to adapt.

These results suggest that while government policies remain important in promoting digital adoption and engagement, their mediating role may vary depending on the context. For policymakers, this highlights the need for more flexible and context-specific policies that can support SMEs in a rapidly changing digital landscape. For businesses, the study reinforces the importance of proactively engaging in digital transformation to enhance entrepreneurship performance. Future research should explore the contextual factors that influence the effectiveness of government policies in supporting SMEs' digital engagement and consider longitudinal studies to capture the long-term impact of digital adoption on entrepreneurship performance.

The study was efficiently conducted to meet its objectives, but it faced several limitations. Data collection was challenging due to the required sample size; although 514 respondents were targeted to obtain 226 samples as per Krejcie and Morgan (1970), 1200 surveys had to be distributed to ensure sufficient data within the limited timeframe. Future studies are recommended to adopt a mixed-methods approach, integrating both quantitative and qualitative techniques, to enhance the robustness of the findings, and include a larger sample size by incorporating semi-active entrepreneurs to enhance the generalizability of the findings. Organizations should use the study's findings as guidelines to improve entrepreneurship performance in PG Mall and provide more training to entrepreneurs to fully utilize the seller's application.

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