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The impact of sharing economy platforms, management accounting systems, and demographic factors on financial performance: Exploring the role of formal and informal education in MSMEs

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ABSTRACT

This study analyzes the effectiveness of sharing economy platforms and management accounting systems (MAS) on the financial performance of Micro, Small, and Medium Enterprises (MSMEs) in Malang City, Indonesia, by considering the moderating effect of demographic factors such as gender, age, and business tenure. The investigation also examines the impact of formal and informal education on financial performance, positing that practical training yields greater financial improvement than theoretical schooling. This research examines 234 MSMEs using structural equation modeling (SEM) with SmartPLS and employs path analysis to investigate the impact of sharing economy platforms on MAS, as well as its consequences for financial performance. The results indicate that sharing economy platforms and MAS have a significant effect on financial performance. Informal education has a significant effect on sharing economy platforms and MAS, whereas formal education has a negative effect on financial performance. Demographic factors were observed to have a significant moderating effect on the path from MAS to financial performance. This study introduces the Adaptive Financial Capability Model (AFCM), a novel framework that uniquely integrates adaptive learning derived from informal education with demographic factors. By bridging practical training with contextual variables, such as gender, age, and business tenure, the AFCM provides an original perspective on enhancing financial management and technology adoption within MSMEs.

1. Introduction

The micro, Small, and Medium Enterprises (MSMEs) sector is one of the nation's economic backbones that contributes a major portion to Gross Domestic Product (GDP) (Sunoko et al., 2022; Tambunan, 2019), employment absorption (Nursini, 2020), and broad-based economic and social benefits (Setyaningrum et al., 2023). The Coordinating Ministry for Economic Affairs of the Republic of Indonesia (2023) reported that MSMEs provide at least 61 % share of GDP, IDR9.580 trillion. MSMEs also employed 97 % of the national workforce or around 117 million employees. With around 66 million business units, MSMEs are the primary drivers of national economic growth, particularly in job creation and unemployment reduction (Indonesian Chamber of Commerce and Industry, 2023). This contribution is evident not only at the national level, but also at the local level, such as in Malang, where the MSME sector plays a crucial role in the regional economy (Prakasa, 2019). However, MSMEs in Indonesia face various challenges (Habiburrahman et al., 2022; Zuhroh et al., 2024), particularly accessing finance and fostering innovation (Marhaeni et al., 2023) and adopting digital technology (Trinugroho et al., 2022).

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MSME owners in Malang often face significant constraints in decision-making owing to limited resources, knowledge, and time, reflecting the principles of bounded rationality within open innovation dynamics (Zuhroh et al., 2024). Recent data show that the productivity of MSMEs in Indonesia lags far behind that of large enterprises (Falentina and Resosudarmo, 2019). Another explanation is that the productivity of Indonesian MSMEs could be around 25 % compared to that of large enterprises (Gamal, 2024). According to the World Economic Forum (2024), in the manufacturing sector, MSMEs realize only 40 % of the productiveness stage observed at Big Companies and within administrative offerings, and their performance is approximately 10 %. However, the productivity gulf has deeper ramifications, MSMEs have low financial performance compared to their larger peers. The shortage of capital, technology, and digital infrastructure are some of the leading reasons why most MSMEs find it hard to keep their businesses afloat.

In the long run, digitalization has been declared as a priority policy by many government levels (Janowski, 2015), thus providing opportunities and motivation for MSMEs to implement technology in their operations using sharing economy platforms such as Gojek or Grab (Sutia et al., 2019; Zuhroh et al., 2024). In addition to helping MSMEs expand their market digitally by focusing on delivery and payment platforms, they also prioritize digital payment habituation (Husainah et al., 2023), which eventually accelerates financial inclusion adoption as well as value-added operational efficiency enhancement by automation design in its process service (Marhaeni et al., 2023). The COVID-19 pandemic has also become a turning point for most MSMEs in Indonesia (Purnomo et al., 2021; Subawa et al., 2022), where they must adapt quickly to market transformation. Prior to the pandemic, many MSMEs still relied on traditional business methods and offline sales. In our nation, the pandemic triggered restrictive policies and local physical store shutdowns, which consequently pushed MSME's to move online as an alternative to them not forced economically into extinction. This increased adoption of e-commerce, online delivery services, and digital payments has resulted in a permanent change in how MSMEs will be conducting businesses (Zuhroh et al., 2024). Since then, several shifts that were catalyzed during the pandemic have taken root in MSMEs' operations, and ongoing digitalization has emerged as one of the strategic importance to their competitiveness and business continuity beyond COVID-19.

Previous research on gender informed the adoption of digital technology (Alam et al., 2022; Raj et al., 2024), especially sharing economy platforms (Marhaeni et al., 2022; Zuhroh et al., 2024). Nevertheless, based on Faqih (2022) and Li and Yan (2021), in general, women are riskier than men with respect to being timid or slow in technology adoption, particularly when no such benefits are apparent from the process they do not see as an operational efficiency improvement of the same variables (Venkatesh et al., 2000). They may have a higher sense of riskiness and are indeed dual owners, owning the business and managing their household. Additionally, based on research from McKinsey and Company (2018), women tend to be more accurate in managing finances so as to have the ability and opportunity to utilize a good Accounting Management System (AMS) that helps them maintain adequate financial records effectively and efficiently (Setyaningrum et al., 2023).

The age of a business entrepreneur also affects technology adoption behavior (Setini et al., 2020; Srisathan et al., 2022; van der Zwan et al., 2016). Younger entrepreneurs are in a better position to adjust and be more flexible, as they can adapt to new technologies faster (van der Zwan et al., 2016); however, lack of experience may lead to weak financial management capabilities. This negatively affects their ability to implement risk management and long-term financial strategies, whereas they are more aware of the benefits associated with digitalization; hence, they have greater efficiency in managing finances together with easier access to information that supports business decisions (Srisathan et al., 2022).

Moreover, business tenure, measured as the period that a company has been in operation, has a significant effect on Management Accounting Systems (MAS) (Anggraini and Thorp, 2020; Pedroso et al., 2020; Zuhroh et al., 2024). It is difficult to convince some businesses that have been operating for years, longer than the MAS. Such systems, even though based on outdated technology compared to modern digital ones, have been in place for many years and are generally more trusted than the existing process. On the other hand, these businesses have access to a greater amount of historical data, facilitating the production of more accurate financial reports and conducting advanced financial analysis. Most long-standing businesses support higher financial stability as they have passed through several economic cycles and increase their customer base (Pedroso et al., 2020). However, the struggle to adapt to new technologies, such as the sharing economy and MAS, could become long-term barriers, especially for the surviving business environment, which currently becomes more competitive as technology takes place (Sutia et al., 2019; Zuhroh et al., 2024).

In addition, the education level of business owners plays a key role in technology acceptance (Altinay and Wang, 2011; Eze et al., 2021), such as the sharing economy and MAS, as well as the financial performance of MSME units. Nevertheless, this investigation elucidates the demarcation between formal and informal education with respect to their distinct effects (Altinay and Wang, 2011; Straub, 2009). Education, especially in technology or business, enables innovation owners to understand and frame it more because of their acquaintance with terminology (Eze et al., 2021). In contrast, owners with only informal education often adopt new technologies more slowly, but tend to value practicality and hands-on experience (Altinay and Wang, 2011; Straub, 2009). According to Choi et al. (2024), entrepreneurs with high education levels tend to adopt financial technology because they are more informed and able to cope with these changes. In contrast, Debarliev et al. (2022) found that the lower an owner's education level, the more they relied on traditional financial management. Nevertheless, given the right training, they should ultimately be able to understand the advantages of MAS and how these can assist them in managing their businesses more efficiently (Debarliev et al., 2022). Informal practice-based training feedback should provide the ability to promote MAS skills, especially if this personal development activity is specifically targeted to fulfill vocational functions (Plant et al., 2019; Wolfson et al., 2018). Owners with higher levels of education generally have better capabilities in cash flow management, financial risk minimization, and long-term business development plans. However, owners who acquire less formal education can learn more about experience and intuition in financial management. They may not have a formal background in financial theory, but their practical experience in managing a business can give them great input to ideas regarding the stability of finance and restructuring based on the environment.

Therefore, a robust theoretical may be elaborated to explore how the sharing economy affects MAS implementation and, in turn, improves MSMEs financial performance by considering business owner characteristics (gender, age, business tenure by the current owner of the MSMEs company at present, and initial educational level based on both formal and informal education). The Dynamic Capabilities Theory (DCT) (Teece et al., 1997) and Absorptive Capacity Theory (ACT) (Cohen and Levinthal, 1990) provide theoretical lenses that guide our discussions on MSME adaptions and capability creation to tackle those challenges. DCT focuses on the way resources are sensed, seized, and transformed by MSMEs in accordance with environmental changes. In the case of COVID-19, MSMEs exhibit dynamic capacities (Teece, 2007). To identify and seize opportunities that arose during this crisis, they were able to respond quickly by adopting digital technology. On the other hand, ACT emphasizes that MSMEs must understand and use external information for commercial success. This learning process was accelerated by the onset of COVID-19, and MSMEs were forced to quickly adapt new knowledge of digital technology if they wanted to survive (Ali et al., 2016; Setyaningrum et al., 2023).

The adoption of sharing economy platforms and MAS has become increasingly critical for MSMEs, particularly in the post-COVID-19 era,

because these tools enable businesses to adapt to rapidly changing market dynamics. The COVID-19 pandemic accelerated digital transformation globally, compelling MSMEs to transition from traditional methods to more agile, technology-driven practices to navigate restrictive policies and store closures. Sharing economy platforms such as Gojek and Grab provide MSMEs with access to digital marketplaces, enhance operational efficiency, and facilitate financial inclusion through streamlined payment systems. Concurrently, MAS offers MSMEs a structured approach to financial decision making, ensuring improved resource allocation, cost control, and financial transparency. These systems are particularly crucial for addressing long-standing issues faced by MSMEs in Indonesia, such as inadequate financial record keeping and the challenge of separating personal and business finances. Moreover, because MSMEs in Indonesia contribute significantly to employment and GDP, enhancing their financial performance through digital platforms and robust accounting systems has broader economic implications.

This study addresses this critical research gap by investigating the interaction between formal and informal education in influencing technology adoption, management system implementation, and financial performance. While previous studies have examined formal and informal education in isolation, this study uniquely demonstrates how these two forms of education interact as complementary factors. By analyzing their distinct yet synergistic roles, this study provides novel insights into how diverse educational experiences shape adaptive capabilities and financial outcomes in MSMEs, particularly within the context of the rapidly evolving digital economy.

The objectives of this study are as follows:

- To investigate the influence of sharing economy platforms on MAS adoption and financial performance.
- To evaluate the direct impact of MAS on financial performance in MSMEs.
- To analyze the moderating effects of owner characteristics, including gender, age, and business tenure, on the relationships between sharing economy platforms, MAS, and financial performance.
- To examine the distinct and complementary roles of formal and informal education in shaping technology adoption, MAS implementation, and financial performance.

This paper is structured as follows: Section two presents the theoretical framework upon which the study model is developed. The third section reviews the literature pertaining to the respective variables and provides support for the developed hypotheses. Section four delineates the research design, including the approach, population, sample, and data analysis methods. The fifth section provides a detailed statistical analysis and a discussion of the findings. The sixth section presents the conclusions, followed by the recommended actions and specific policy recommendations based on the research results.

2. Theoretical foundation

2.1. Dynamic capabilities theory (DCT)

The DCT, proposed by Teece et al. (1997), DCT emphasizes the necessity and firm agility as a brand needs to know ever changing business landscape. This theory posits that the mere possession of valuable resources may not be enough to create and maintain a competitive advantage (Ambrosini et al., 2009). Firms should also hold dynamic capabilities to react proactively to changing surroundings by sensing, seizing, and transforming processes (Teece, 2007; Teece et al., 1997). In the senser stage, an organization has to interpret what is happening in its market, notice changing customer behavior, and other movements that may create danger or opportunity. This includes keeping an open eye on technology development, market trends, and regulatory framing, which might change a company's competitive position. To sense, one will need strong analytical capabilities as well as a deep knowledge of what is happening there along with the means to analyze it. Organizations must quickly set about seizing when they uncover opportunities or threats. In other words, fighting enemies or holding opportunities would be possible only if they are specific in locating resources and best utilizing those resources. Time and accuracy are essential in seizing, and strategic priorities must be effectively translated.

For instance, an Indonesian MSME that finds opportunities to be digitalized may soon utilize new technologies such as e-commerce or financial technology (fintech) for payment platforms and enlarge its market. The final process, transformation, involves changing or reconfiguring the organization's resources and competencies to leverage new requirements that have emerged during the sensing and seizing processes. Transformation is about innovating or disrupting oneself to stay relevant as the business environment changes. In fact The ability to transform allows MSMEs to have an adjusted competitive advantage (Habiburrahman et al., 2022; Konlechner et al., 2018). For example, some successfully transformed MSME will improve their operational efficiency by migrating to a higher MAS level, which supports not only financial management but also helps in making good strategic decisions.

DCT has direct implications because many enterprises in question suffer from resource poverty and have limited access to technology (Cetindamar et al., 2009; Konlechner et al., 2018; Li and Chan, 2019). Educated small business owners who have worked for someone in their role are more easily able to develop the dynamic capabilities associated with receptivity or adapt to a new form of digitalization. However, for example, if the owner of an MSME is more educated and trained, then they will have top accessibility to new technology as well as awareness about how it can help them improve its financial performance (Fahlevi et al., 2022; Yusuf et al., 2023). Thus, education and training for these dynamic capabilities are essential to enable MSME owners to adopt technologies such as sharing economy platforms (e.g., Gojek/Grab) or MAS more effectively to enhance their competitiveness, leading to long-term survival (Zuhroh et al., 2024). This paper suggests that DCT offers a framework for understanding how MSMEs can both survive and thrive in dynamic business environments, as well as the means of adapting quickly.

2.2. Absorptive capacity theory (ACT)

First theorized by Cohen and Levinthal (1990), ACT posits that an organization can understand the value of external knowledge, absorb it, and use such information for commercial benefits. This is because, in a business environment, such change and dynamicism persists over time (Setyaningrum et al., 2023). ACT is not only how well organizations can access new information, but also whether this information they have on to internalize and effectively use (Cohen and Levinthal, 1990). This does not come as a surprise and is an interesting part of the ACT, given that these enterprises struggle to adopt new registration plague forms, such as sharing economy platforms and MAS/blockchains. Knowledge, which is crucial for survival (Sunoko et al., 2022), can be easily digested and used by MSMEs that do not function with substantial resources. MSMEs with high absorptive capacity are better able to learn new technologies quickly, comprehend the benefits of technology, and adapt to their practices more naturally (Habiburrahman et al., 2022; Setyaningrum et al., 2023).

The education and experience of owners have a significant influence on the improvement of absorptive capacity (Camisón and Forés, 2010; Fores and Camison, 2011). This, in turn, helps to enhance the financial performance as well as the long–term competitiveness of MSMEs by supporting the adoption and application of digital technologies, which could be better assessed by business owners with rich experience combined with a strong educational background. For example, tech-savvy owners can leverage sharing economy platforms to viral their market or MAS to increase operational performance efficiency. To cope with the ever-increasing competitive business environment, the absorption and

application of new knowledge have become important success factors (Habiburrahman et al., 2022), which can assist MSMEs in sustaining their operations and growing in a dynamic market. Modernization and digitalization act as the backdrop for ACT in supporting MSMEs to strengthen their absorptive capacity, which leads not only to further modernization, but also deepening of education (Zahra and George, 2002). This means that ACT is not only needed but also very necessary for Indonesia because it needs an effort to encourage the competitiveness and sustainability of MSMEs.

3. Literature review and hypothesis development

3.1. Financial performance

Financial performance is the overall financial success of a firm in managing its resources and is an important benefit accompanying company activities, as it is crucial from a survival perspective (Liu et al., 2021; Meiryani et al., 2023). Financial performance can be assessed using a variety of financial ratios, such as Return on Assets (ROA), Return on Equity (ROE), and the net profit margin (NPM) current ratio (Bacidore et al., 1997). The financial ratio, which is generally used to assess financial performance for either realizing value or losing profit from all investments, could be in the form of loans, in other terms, investing cash and not using money properly. According to Brigham and Houston (2013), financial performance measures not only the effectiveness with which the company generates profits but also its efficiency, and how it can leverage assets and liabilities in a way that supports maximized business growth for the long-term sustainability of this entity (Ameer & Othman, 2012; Mondal & Ghosh, 2012). Financial performance is compared using key indicators, such as profitability, liquidity, solvency, and operational efficiency (Bacidore et al., 1997). ROA, ROE, and NPM are the ratios by which profitability (profit generation) is assessed. Liquidity, or the ability of a company to satisfy short-term obligations) is commonly assessed using current and quick ratios. The Debt-to-Equity Ratio (DER) is a common measure of solvency; it simply measures the relative proportion of long-term debt against equity on an ISS. Asset Turnover and Inventory Turnover ratios are used to measure operational efficiency, as they assess how well a company can use its resources, including but not limited to intangible assets such as goodwill and intellectual property.

According to recent studies, financial performance is the outcome of its internal and external influencing factors. For instance, Al-Matari (2014) suggested that strong corporate governance, such as a well-functioning board of directors and risk management, is associated with improved financial performance. Tsou and Chen (2023) found that digital technological innovations such as MAS can promote efficiency in operations, leading to better financial performance, thus implying the key role of technological innovation in economic sustainability. Setyaningrum et al. (2023) highlights the high-quality financial management practices used by MSMEs and their strong business results, on average higher than those that do not adopted them. This suggests that firm size affects financial performance, but that there is an impact of specific types and use of financial management practices.

Corporate characteristics, such as corporate governance, risk management strategies (Aguilera et al., 2021), financial policies, innovation, and technology, but have been broadly mirrored at the company level, can influence a firm's financial performance (Fahlevi et al., 2023; Maeenuddin et al., 2024). Proper corporate governance practices in a company provide efficient and transparent work environments, where this situation can improve trust from the investors' side, further reinforcing financial performance (Abdullah and Valentine, 2009; Husnah et al., 2023; Juhandi et al., 2020). Together, they shape a sensible risk repertoire, helping companies withstand the fallout during market volatility and economic uncertainty, ensuring financial soundness. Financial policies (capital structure and dividend policy) were also considered with regard to financial performance. However, innovation and technology substitution can significantly create operational advantages for more cost-effective operations (Ameer and Othman, 2012; Meiryani et al., 2023; Mondal and Ghosh, 2012). However, measuring financial performance is also not an easy task because of inconsistencies in the availability of source data and unpredictable effects from outside (Bacidore et al., 1997). Factors that affect financial performance are often beyond the control of a company, such as macroeconomic conditions and regulation changes, which complicate measurement for firms (Maeenuddin et al., 2023).

3.2. Sharing economy platforms

Digital platforms that enable people or organizations to share or trade underutilized goods, services, and resources over digital channels are known as the sharing economy (Sutherland & Jarrahi, 2018). Gojek and Grab (offering platform-to-platform services) are examples most often found in Indonesia with a variety of service transportation options, delivery services such as food delivery to non-food items, and digital payments so that transactions can be done easily without using cash physically directly (Husainah et al., 2023; Sutia et al., 2019; Zuhroh et al., 2024). To put this in perspective, they are P2P-only platforms, where users can both provide and consume a service. New research reveals that MSMEs in Indonesia, including sharing economy platforms, have become a cornerstone of their digital transformation (Sutia et al., 2019; Zuhroh et al., 2024). The change, mainly through the Fourth Industrial Revolution and the COVID-19 pandemic, has accelerated the need for MSMEs to utilize technology essential for survival (Saniuk et al., 2023). However, studies also show that many MSMEs are confronted with difficulties in digitalization due to the lack of personnel resources, low levels of IT literacy, and limited access to the infrastructure.

Trinugroho et al. (2022) and Sunoko et al. (2022) agree with the statement that MSME in Indonesia has the potential to contribute to the nation's economy; however, they also face many internal issues, such as management knowledge and technological capabilities. Therefore, this study is important, as it argues that in advancing the digitalization readiness of MSMEs, there seems to be a need for knowledge creation from universities and other institutions to meet the demands of MSMEs, along with better access to technology and relevant training. Meanwhile, Setyaningrum et al. (2023), a digital ecosystem, became critical in promoting and supporting digital economic inclusion for MSMEs, especially in Indonesia, and the government, as an enabler and regulator, is central tissue to run in a conducive digital economy (Fahlevi et al., 2024; Zuhroh et al., 2024). Sharing economy platforms constitute a central part of this ecosystem, which allows MSMEs to scale their market reach and produce through digitalization.

Sharing economy platforms are vital enablers for small businesses to enhance market access and operational efficiency. MSMEs are helped by such platforms to penetrate new markets (market extension), increase operational efficiency, and enter a wider market or horizontal expansion, which is not only at the regional level but also at the national and global levels (Zuhroh et al., 2024). However, it is still necessary to improve digital literacy and support infrastructure so that all MSMEs in Indonesia can enjoy these benefits collectively (Gamal, 2024). Even though there are still some challenges with digital literacy and infrastructure, the development of a sharing economy platform opens up opportunities for Indonesian MSMEs to finally able to participate in this era.

Hypotheses:

H1. Sharing economy platforms have a significant impact on MAS adoption among MSMEs in Malang City.

H2. Sharing economy platforms have a significant impact on the financial performance of MSMEs in Malang City.

3.3. Management accounting system (MAS)

The MAS is a central system for serving managers with information that will support them in making business decisions (Hülle et al., 2011). The MAS not only controls, but also serves as a means of planning and performance measurement, which is divided into processes such as budgeting, cost control, pricing for products, and especially from the finance area are indicators of measures (Novas et al., 2017). Based on the study by Horngren et al. (2012), in contrast to financial accounting systems that address external reporting, to is tailored for the requirements of management and provides historical data as well as prospective information enabling strategic planning and decision making.

The supporting pillars of effectual administration budgets represent one of the key tools companies use to plan and distribute resources effectively, and also serve as a control device by which actual performance is compared against established budgets (Gago-Rodríguez & Naranjo-Gil, 2016). Cost analysis in MAS enables managers to better understand the costs of production, which, in turn, helps to set competitive prices for products and identify ways that management can reduce costs (Chouaibi et al., 2022). The introduction of other performance measures such as the balance scorecard and Key Performance Indicators (KPIs) thus enables management to deliver company strategic objectives by gauging operational effectiveness elsewhere in an organization (Kaplan & Norton, 2007).

MAS also serves as the backbone of strategic and operational decision making in various businesses, including MSMEs (Zuhroh et al., 2024). For example, Chenhall and Moers (2015) emphasized the importance of MAS if appropriately applied as a means to improve decision accuracy and strengthen business strategy implementation. Empirical research by Singh et al. (2018) demonstrates that an effective adoption of MAS would help small and micro enterprises to overcome the challenge of limited resources and uncertainty in the business environment. This study demonstrates that the level of education and financial literacy of business owners is an important factor that dynamically affects the efficiency of MAS implementation and similarly affects financial performance. However, despite the quality of MAS, its implementation is problematic, especially among MSMEs. It is likely that owners and managers may not realize the benefits they can obtain from implementation because they are not educated or trained on the system and its processes (Setyaningrum et al., 2023). Limited human and financial resources are a major problem in MAS implementation. The literature also identifies technology adoption (Habiburrahman et al., 2022), and only a few MSMEs implement new technologies with their MAS, primarily because of the lack of infrastructure and digital literacy.

There is a considerable body of literature on the positive effect of MAS on several financial performance metrics of companies (Hülle et al., 2011; Novas et al., 2017; Pedroso et al., 2020; Zuhroh et al., 2024). This helps with cost management, enhances operational effectiveness, and provides strategic planning for better profits. For instance, one of the potentially strong positive outcomes would be financial performance, as reported by Abdel-Kader and Luther (2008), who suggest that using MAS in strategic decision-making may lead companies to a higher level of financial orientation than those that do not. Thus, despite the difficulties faced in its implementation, MAS remains a cornerstone for improving operational efficiency and cost management, leading to improved financial performance, especially within MSMEs (Horngren et al., 2012; Hülle et al., 2011). This suggests that enhancing financial literacy and training the MAS for MSME owners are important for improving its adoption, but more research is required to design a framework or strategies to overcome these challenges.

Hypothesis:

H3. MAS has a significant impact on the financial performance of MSMEs in Malang City.

3.4. Gender of owner

Gender is a significant independent variable in research on business ownership (Alam et al., 2022; Fahlevi et al., 2023; Setyaningrum et al., 2023), one that numerous other studies have considered the influence of gender differences on various aspects such as company performance, leadership styles, decision making, and access to resources (Alam et al., 2022). Entrepreneurs' gender can influence business ownership in areas such as strategy, operations, and long-term viability. Women-owned enterprises have traditionally encountered various struggles compared with their male counterparts, ranging from marginal access to external capital (McKinsey & Company, 2018; Setyaningrum et al., 2023). Studies have consistently found differences between male and female business owners in how they operate their businesses. Women-owned firms are smaller in less capital-intensive industries and have lower sales than male-owned firms (Carter, 2000). These discrepancies are often attributed to gender-based financial gateways, societal expectations, and different risk-adverse comfort levels.

For example, Watson (2002) identified that women entrepreneurs are more risk-averse than their male counterparts. In business, as in many other areas of life, this cautious approach is evidenced by decisions regarding the type and amount of funding that will be sought or accepted for growth purposes. Ultimately, it has a cumulative impact on female-owned businesses, helping explain why they scale slower than their male counterparts. Limited resources and access to capital pose some of the greatest challenges to female business owners. Studies show that women face difficulties in obtaining finance from formal financial institutions, which becomes a constraint in the growth of their businesses. Coleman and Robb (2009), note that women are more reliant on personal savings and less likely to have bank loans in planning of their entrepreneurial activities as compared with men. In many cases, these barriers can be compounded by pervasive and harmful gender stereotypes as well as insufficient professional networks of support.

Leadership styles and decision making are also influenced by gender differences (Li and Yan, 2021; Venkatesh et al., 2000). Research suggests that women, compared to men, tend towards a more collaborative and participatory leadership style as opposed to an autocratic one (McKinsey & Company, 2018). It can benefit organizational culture and employee morale and engagement but will also slow down the pace of decisions and strategy. While often smaller and less profitable, research suggests that, in some cases, women-owned businesses are more resilient during economic crises and sustainable over time (Rashid et al., 2020; Setyaningrum et al., 2023). This could be partly due to less risk with a conservative financial model and more careful management of credit decisions, focusing on becoming financially stable first size over significant growth. The gender of the business owner also strongly influences management and development. Many female business owners face significant obstacles, including lack of access to capital and gender bias; however, they come with their own dosages of strength, such as being less likely than men to take unnecessary risks or a more inclusive leadership style. More academic research is needed to understand how gender affects different dimensions of business owner performance and what we might do to address the dysfunctional aspect males of–female entrepreneurial profit disparities.

Hypotheses:

H4a. Gender moderates the influence of sharing economy platforms on MAS adoption among MSMEs in Malang City.

H4b. Gender moderates the influence of MAS on the financial performance of MSMEs in Malang City.

3.5. Age of owner

The entrepreneur's age determines the entrepreneurship profile (Marhaeni et al., 2022; Srisathan et al., 2022; Zuhroh et al., 2024).

Empirical evidence suggests that owners' age is associated with their experience, risk-taking behavior, technology, and valuable strategies for managing the firm (van der Zwan et al., 2016). Advantages and challenges of running a business in each age phase young, middle-aged, older Previous research indicated that younger entrepreneurs are constantly more innovative and open to new technology acceptance (Marhaeni et al., 2022; Setini et al., 2020). If they can get digital technology embedded into their business processes (usually faster than larger companies), it will improve their efficiency of what they do and enable them to exploit new markets. One example can be seen in a study by Parker and van Praag (2012), who showed that younger entrepreneurs are willing to take more risks and innovate than their older peers who may prefer sticking to what is working. On the flip side, older business owners have generally seen more, and therefore, can be assets in strategic decision-making and risk management. Lafontaine and Shaw (2016) posit that longer industry experience allows older privately held firm managers to make more mature decisions in complex or uncertain situations.

Owner age also affects business performance (van der Zwan et al., 2016). Younger owners, being more dynamic and innovative by nature, may find it difficult in risk management as well as long-term planning (Wang et al., 2020). This often results in inconsistent financial performance. Hmieleski et al. (2013) found that young entrepreneurs are often less experienced and more risk tolerant, making them potentially fail because they tend to take on the greatest risks. Conversely, the performance and sustainability of businesses owned by older entrepreneurs should be more stable because they make fewer decisions based on impulsive reactions. This probably makes them less adaptable to changes in either technology or markets, making overseas firms an unavoidable choice for rapidly evolving businesses.

The entrepreneur's age may also affect resource access, as younger entrepreneurs have less capital, networks, and knowledge. Indeed, older entrepreneurs usually benefit from larger and stronger networks, which facilitate resource mobilization (Parker and van Praag, 2012). By contrast, younger entrepreneurs may have to work longer to develop networks and prove themselves to investors and other business contacts (Aldrich and Kim, 2007). The comparison is made as young business owners have limited experience and networks, but they tend to be more open to technology and innovation (Fahlevi et al., 2024; Marhaeni et al., 2022). In the meantime, those who are more risk-averse and possess some institutional knowledge can be patched up in ways that make their businesses less prone to shocks but will need to remain mobile for changes of course. Entrepreneurship age has a considerable impact on entrepreneurship in several managerial and performance strategies (Srisathan et al., 2022). Although younger owners are more likely to be innovators and risk-takers, they may struggle with management issues and longevity. Take conventional, fewer funded directories of older (and more relevant hand) owners who were slower on one's feet but stable and consider that these outlets might also find new life in the digital age. Some adapt more rapidly than others to change technology and markets. Thus, knowing the age dynamics of a businessman can go a long way to formulate strategies that can be more effective at helping businesses grow and survive in future.

Hypothesis:

H5. Age moderates the influence of MAS on the financial performance of MSMEs in Malang City.

3.6. Business tenure

The number of years a business has existed since its creation is a salient continental difference between studies, given that it can impact multiple dimensions related to firm management, strategy, and performance (Boden and Nucci, 2000; van Stel et al., 2018). How long a business has been operating can determine how well it is positioned to respond to environmental changes, establish a brand, and deal with risks and challenges that arise over time. Businesses that have been around for a while tend to draw from their experiences and understanding of the industry. It is pointed out by Sørensen (2000) that skill-based firms are nutritionally fit, meaning that their condition improves with age, causing the older a business has long been all-around, then they get to be a lot more renewable and have mature systems than newly established ones. This experience helps firms create processes and strategies that are more efficient in countering competition and managing changes over the years (Boden and Nucci, 2000).

However, a business that remains alive for 30 years may be too set in its way if it fails to evolve with technological changes and trends in the market. For example, research from Levinthal and March (1993) shows that older firms can also be subject to the «competency trap," where they become locked into routines and strategies which have been successful for them over time but may no longer make sense in a new market context. Business tenure also affects financial performance. However, by and large, the financial performance of older businesses is more stable than that of younger ones as they have developed a proven track record with their customer base through tried-and-true methods built into wider networks supported by solid management systems. Henderson et al. (2012) found that older businesses are usually more resistant towards market boom and bust cycles than young companies that have greater capital access.

Nevertheless, this stability leads to the risk of stagnation (Li and Yan, 2021). Old businesses face long-term challenges in renovating themselves or competitiveness without R&D resources and new technology. This may lead to a decrease in revenue growth or worsen overall financial performance (Stern and Henderson, 2004). Adaptation and innovation are difficult for long-tenured businesses to achieve. According to Ahuja and Lampert (2001), older firms are less inclined to take risks and are less flexible when it comes to adopting new technologies. This research also suggests that, although firms with longer lives are not as likely to be leaders in their respective industries unless they successfully innovate, once again combining experience and the right dose of innovation can carry through this disadvantage. Situations are the only long-term advantage of business innovation, and their surroundings appear to be an excellent source of adaptation. Rosenbusch et al. also supported this finding. Rosenbusch et al. (2011), who argue that innovation is a critical generator of economic results, particularly in more fluid landscapes.

Business tenure has significant implications for growth and survival in MSMEs. The longer the age of an MSME, the stronger its relationship with customers/suppliers/financial institutions, leading to growth stability. Unfortunately, such developments drive the older generation of MSMEs out of business, leading to a clear distinction between success and failure in this sector. Research on Indonesian MSMEs by Tambunan (2019) highlights the fact that older SMEs generally have more extensive access to markets and capital; this type of MSME also tends not to be able to innovate nor capable of adapting themselves amidst changes in the business environment. Hence, old MSMEs must innovate and evolve constantly, or they must be overtaken.

Business tenure plays an essential role in improving management and performance. Businesses that have been around for a long time are usually more stable and experienced but tend to be weaker in terms of flexibility and innovation. Business tenure in the context of MSMEs can provide benefits to access resources and networks as they have been established; however, at the same time, it also requires continuous effort due to the environmental changes that businesses face. Future research should examine how traditional MSMEs can analyze their relevance to changing markets and develop strategic steps for continuously upgrading their own performance.

Hypothesis:

H6. Business tenure moderates the influence of MAS on the financial performance of MSMEs in Malang City.

3.7. Education of owner

Business owner education is one of the most powerful determinants of how a business is carried out and developed (Debarliev et al., 2022; Zuhroh et al., 2024). It can affect the quality of decision making, innovation, risk management, and overall performance in the workplace. Education used in this study refers to a double-edged word, meaning both formal and informal. These two types of education have different effects on enterprises' ability to run and grow (Debarliev et al., 2022; Wolfson et al., 2018). Formal education, including schools, universities, and other institutions, plays a crucial role in developing managerial competencies by providing an abiding body of knowledge (Neelam et al., 2020). Business owners with a powerful formal education background are more adept at understanding the idea of the business, as can accounting marketing and operations management (Fahlevi et al., 2023). Van Der Sluis et al. (2008) find that higher levels of formal education among business owners result in better-performing businesses. This is because of their application of the knowledge and skills learned through formal education in running businesses. Formal education further enhances the capacities of owners and helps them connect with larger resources in terms of information and networks that improve discretion and strategy making by taking care of risk mitigation at the project level.

Informal education refers to learning opportunities gained through activities such as work experience on-the-job training and mentoring in addition to formal educational resources (Straub, 2009; Wolfson et al., 2018). The second type of education, informal education, usually concentrates on practical skills and work experience that can be developed as valuable tools within an entrepreneurship context, especially in a dynamic environment (e.g., MSMEs). This is supported by Cope (2005), who highlights the key role of informal education in nurturing entrepreneurial behaviors such as flexibility, propensity to risk, and coping with adversity. Entrepreneurs who work informally learn to be more flexible, change with the market, and innovate. At the same time, informal education enables you not to be confined within contextual curricula and to stand according to your business needs (Debarliev et al., 2022).

Although both formal and informal education have their own hyperlinks, however based on existing research claims that the combination of these schools will accelerate the benefit for business owners (Zuhroh et al., 2024). Owners with stronger formal education built on the lessons learned from informal education were more likely to make good decisions about how best to run their businesses. Politis (2005) argues that formal education, combined with experiential learning and informal education, extends owners' knowledge capabilities and creates a competitive advantage in innovating to address business challenges. In addition, this combination helps business owners navigate uncertainty and capture the growing market opportunities.

In Indonesia, the educational level of owners impacts business success (Anggraini and Thorp, 2020). MSMEs run by owners with a reasonable level of formal education often possess more business sense and tend to be efficient in their financial and operational management. While ureducated MSME entrepreneurs may lag far behind in the styles of negotiation and management, they are better at adapting quickly to changing environments, which helps them do well when their surrounding market is volatile. Research by Tambunan (2019) showed that in Indonesia, many MSMEs are still dependent on informal education, especially because most business owners do not have formal educational attainment. However, through experience and training. They do not require formal education to startup businesses, as informal knowledge suffices (Greenfield, 2009).

Educating its owners is essential for the success and growth of a business (Debarliev et al., 2022). Formal education provides a robust foundation of expertise and access to resources/networks, while informal education provides much-needed flexibility and adaptability in entrepreneurship. Together, they yield more capable, creative, and resourceful businessmen who can cope better with the challenges of business. Therefore, in the context of MSMEs, Indonesia needs to continue supporting both forms of education so that business owners are capable of developing their businesses.

Formal Education:

H7. Formal education significantly influences the adoption of sharing economy platforms among MSMEs in Malang City.

H8. Formal education significantly influences MAS adoption among MSMEs in Malang City.

H9. Formal education significantly influences the financial performance of MSMEs in Malang City.

Informal Education:

H10. Informal education significantly influences the adoption of sharing economy platforms among MSMEs in Malang City.

H11. Informal education significantly influences MAS adoption among MSMEs in Malang City.

H12. Informal education significantly influences the financial performance of MSMEs in Malang City

3.8. Research framework

The direct and moderating effects of sharing economy platforms, MAS, and business owner characteristics on the financial performance of MSMEs in Indonesia are integrated into a comprehensive explanation, as shown in Fig. 1. The model is built on DCT and ACT, highlighting the significance of adaptation to changes in the business environment. The model is given by the graphical representation below:

The model describes how the use of sharing economy platforms operating with MAS impacts the financial performance of MSMEs. Sharing economy platforms such as Gojek and Grab are presented as factors that can spur the use of MAS, as well as the financial performance of MSMEs. By offering cloud-enabled digital solutions that can improve operational efficiency and increase market reach/penetration for MSMEs, these platforms affect the financial performance of entrepreneurs, arising from increased income. MAS successfully supports MSME in controlling costs, balancing cash flow, and making strategic decisions, thereby boosting enterprise profitability and ensuring financial stability. In addition, the model also considers that business owner characteristics such as gender, age, and business tenure may serve as a moderating variable as well as a direct impact on formal/informal education.

These characteristics are predicted to attenuate the relationship between sharing platforms and MAS with financial performance. The conceptual model depicts the meaning of MSMEs as businesses, what they do, and how they perform differently from other enterprises in comparison to technology adoption effectiveness, while also showing that there are mediating effects across owner aspects. This model has meaningful theoretical and practical implications for efforts to improve the competitiveness and sustainability of MSMEs in Indonesia.

4. Methodology

This study used a quantitative approach to investigate and clarify the linkages among the variables of the research model (Saunders et al., 2009). The chosen methodology was a quantitative research approach that sought to empirically measure and analyze the information systematically and objectively, in addition to attempting to understand the causal relationships between variables (i.e., sharing economy platforms and MAS with financial performance within MSMEs) considering the moderating effects of business owner characteristics (Burns and Burns, 2008). On the other hand, a quantitative approach allows researchers to

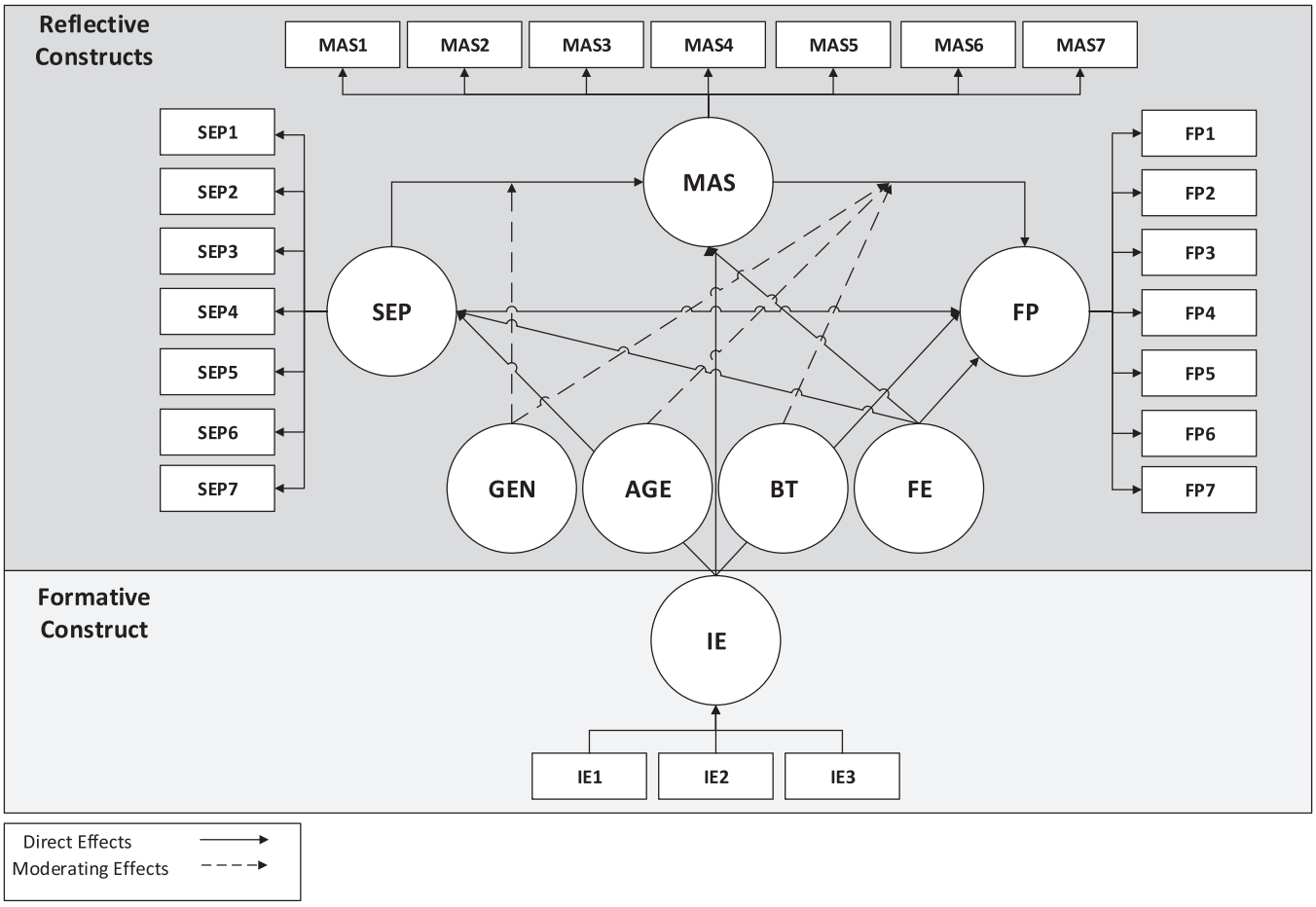

Fig. 1. Research model.

collect numerical data that can be statistically analyzed to test the proposed hypotheses (Lind et al., 2018). The study further explores, through some form of statistical analysis, such as path analysis, the relative strength between independent and dependent variables in the model, and how moderating variables affect or condition these relationships. The process of selecting this needs to be done so that the findings generated from a sample are generalized for an entire population to create valuable inferences. Therefore, the use of a quantitative approach in this study not only helps detect causal relationships between variables within the model but also offers a more profound and concrete analysis of the dynamics that influence the financial performance of MSMEs in a general sense, particularly in Malang City. This study is likely to add to the theoretical and practical implications that are useful for MSMEs management in Malang.

4.1. Research location

The study was conducted in Malang City, a city with significant economic dynamics and rapid development of MSMEs. In economic terms, Malang is a regional growth pole owing to its 85.200 flexible MSME in 2023, making it one of the most dynamic microclimate MSME ecosystem cities in Indonesia. Of these, 21,176 MSMEs were selected by the Malang City Department of Cooperatives Industry and Trade to prepare small businesses to improve their quality and competitiveness.

Meanwhile, approximately 46 % of the Malang City Government procurement budget for MSMEs was also allocated (Prakasa, 2019). Strategic efforts to grow the local economy and improve the competitiveness of its MSME in global markets. Several measures have been taken to boost local potential with endeavors from product exhibitions and international promotions issuing at a time when locals are struggling. This further demonstrates the continued topicality of Malang as a research location because of its impressive government intervention and creative local initiatives that help develop the MSME sector. Malang City was chosen as the research location because of its local government commitment, significant MSME growth, and challenges that can be explored into opportunities. In this context, Malang offered an interesting case study on how cities can support the sustainable growth and development of MSMEs using technology to enhance local entrepreneurs' capabilities in navigating these new but challenging times.

4.2. Population and sample

A total of 85,200 MSME units in Malang City are expected to be formed in 2024, with as many as the MSMEs reviewed by the Department of Cooperatives and SME Industry Trade, totalling around 21,176. However, not all MSMEs in Malang are officially registered under the local government, which is why the actual number of populations might be larger and more accurate. Therefore, we must use a statistical approach that can account for this ambiguity to establish the optimal number of samples needed. Prior to this study, power analysis was conducted using the GPower software to determine the minimum adequate sample size pooling across all cell types (Kang, 2021). We performed a sample size calculation assuming a significance level ($\alpha = 0.05$), power ($1 - \beta = 0.95$), and expected effect size ($|\rho| = 0.3$, which represents a medium effect size in this context; with the calculations made in GPower, approximately 111 samples were needed to achieve an adequate power (0.95) with a P-value of 0.05, at a medium effect size ($|\rho| = 0.3$); in this context, the equation that can help achieve a similar

result for two variables is as follows, especially in point-biserial-correlation test mode.

$$n = \left(\frac{(Z_\alpha + Z_\beta)^2 . (1 - Effect\ Size^2)}{Effect\ Size^2} \right)$$

Information:

- Z_α: Z-value corresponding to the significance level. For a 95 % confidence level, Zα was typically 1.96.
- Z_β: Z-value related to test power. At 95 % power, Zβ was typically approximately 1.645.
- Effect Size^2: The square of the expected effect size representing the magnitude of the relationship between the variables being studied.

This study will continue using a sample size of 234, which is much larger than the required minimum of at least 111 samples necessary to identify significant relationships between variables (Sekaran and Bougie, 2016). In terms of internal validation methodologically, this sample size is not only categorized as the fulfilled criteria but also a statiscally always safe margin for a statistical analysis because it would be calculated very well where we can take many different MSMEs population numbers in Malang City (Kang, 2021). Thus, a convenience sample of 234 individuals is likely the best target for this study to produce true and generalized results for the population in focus (Fig. 2).

4.3. Sampling technique

The study used a stratified random sampling technique and, in particular, an odd-numbered probability simple random sample (Saunders et al., 2009; Sekaran and Bougie, 2016). This approach ensured that every person in the population had an equal likelihood of being sampled, which improved the representativeness of the sample. The method of odd number sampling includes selecting each off-numbered man on the list, which is beneficial in obtaining a more orderly accumulated sample with likely decreased bias.

For instance, Fig. 3 demonstrates that each member of the population has an equal probability of being selected as a sample, thus yielding generalizable research outcomes across the entire population. We obtained a list of MSMEs from multiple sources, including the data provided by stakeholders and community service programs at several universities in Malang. This list encompasses the numerous MSMEs in Malang. The sample size was odd. This methodology involves selecting only an odd number of MSMEs from the entire state as the sample. For example, if the MSMEs are numbered from 1 to n, only those with odd numbers (1, 3, 5, 7, etc.) are selected as the samples. This method is straightforward, yet effective in ensuring a random and evenly distributed sample across the population. Of the 278 questionnaires distributed, 234 were returned with complete and valid responses, resulting in a participation rate of approximately 84.17%.

$$Participation\ Rate = \left(\frac{234}{278} \right) \times 100 \approx 84.17\%$$

A participation rate of 84.17 % indicated that the majority of MSMEs were selected as participants in this study, reflecting a response that is representative of the MSME population in Malang City. The high participation rate also suggests a strong level of respondent engagement, which enhances the validity of the research findings.

4.4. Pre-test

In this study, a pre-test procedure was conducted with 67 respondents to test the measurement instruments (see Table 1). After the pre-test data were collected, a Focus Group Discussion (FGD) was held with the 12 MSMEs. FGD was led by Dr. Mochammad Fahlevi. The primary goal of this FGD was to revise several instruments that were

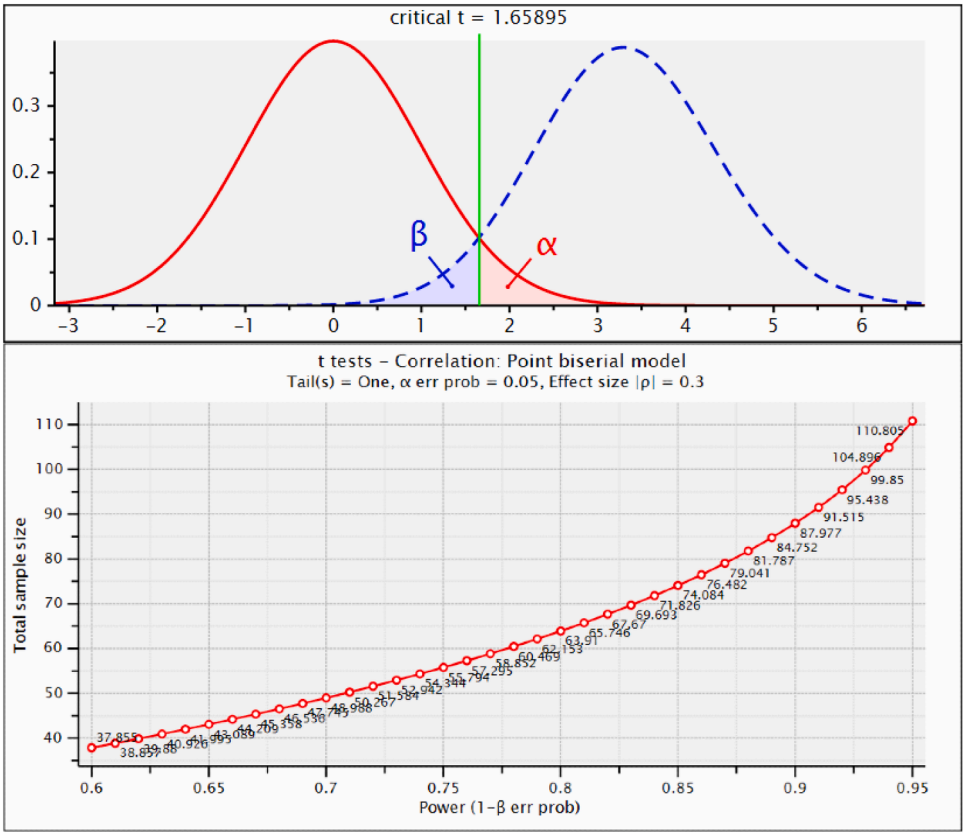

Fig. 2. Sample calculation using G*Power.

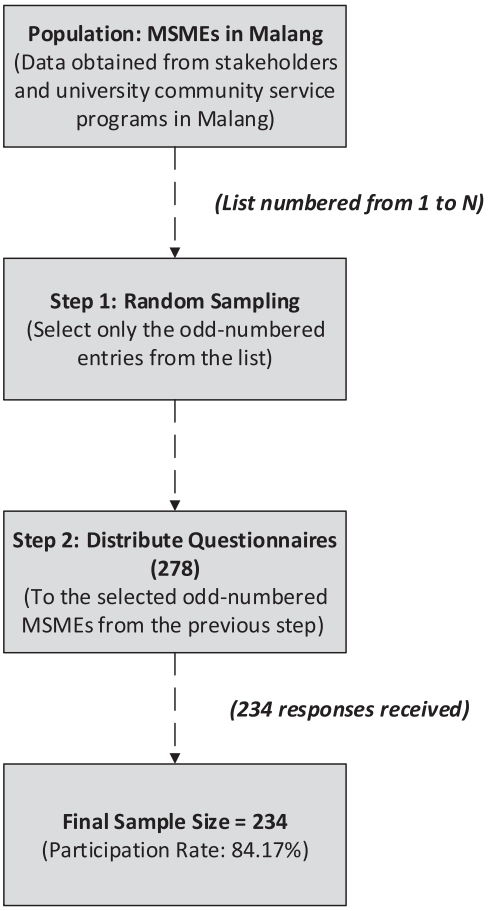

Fig. 3. The sample selection process.

considered confusing and had biases that were somewhat difficult for respondents to understand.

Through this discussion, several instrument items were identified as inadequate for capturing the perceptions of MSME owners and required improvement. The results of the pre-test and FGD helped us refine some measurement items to make them clearer and more relevant to the MSME context, which was the focus of this study. These improvements are expected to enhance the accuracy of capturing the true perceptions of MSME owners, thereby rendering the collected data more valid and reliable for subsequent analysis.

4.5. Measurements

To ensure the accuracy and relevance of the research instruments, we developed a measurement method (Table 2) that summarizes the various variables used in this study. This table includes the definition of each construct, item codes, specific statements measured, scale used, and referenced sources. The purpose of this table is to provide a clear overview of how each variable is defined and measured as well as to ensure that the items used are appropriate for the context of MSMEs in Malang.

The measurement table outlined above includes various key variables, such as gender, age, business tenure, formal and informal education, use of sharing economy platforms, management accounting systems, and financial performance. Each item was carefully designed to capture specific and relevant information within the context of the MSMEs. Following the pre-test and FGD processes, several items were revised to improve clarity and reduce potential biases that could affect the respondents' understanding. Consequently, this measurement table not only aids in the accurate collection of data but also supports the validity and reliability of the research findings (Nayak and Singh, 2021).

4.6. Data analysis

This study employed descriptive analysis and inferential statistical methods, specifically path analysis using Structural Equation Modeling (SEM), implemented using SmartPLS 4 software (Hair et al., 2019; Sarstedt et al., 2017). SmartPLS was selected because of its capability to handle complex models, integrating reflective and formative constructs to examine the relationships among sharing economy platforms, MAS, financial performance, and moderating variables, such as gender, age, and business tenure. Its robustness in analyzing smaller sample sizes, in conjunction with its capacity to accommodate non-normal data distributions and exploratory research models, renders SmartPLS particularly appropriate for this investigation. This study's model was designed by incorporating both reflective and formative constructs to examine the

Table 1
Pre-test procedure.

Variable Name	Original Item Code	Original Item Statement	Revised Item Statement	Reason for Revision
Sharing Economy Platforms (SEP)	SEP1	Use of services available in the Grab application in my business management	I use Grab services (e.g., transportation, delivery) to support my business operations.	Clarified which services are meant to avoid ambiguity.
	SEP2	Use of payment tools through Go-Pay and Ovo applications in my business	I accept payments through Go-Pay and Ovo for my business transactions.	Simplified wording to directly reflect the action being measured, reducing potential confusion.
	SEP3	Use of Go-Ride and Grab-Bike applications in my business	I rely on Go-Ride or Grab-Bike for transportation services in my business.	Made it clearer that the item refers specifically to transportation services.
Management Accounting System (MAS)	MAS1	Cash book is important for supporting my business management	Keeping a cash book helps me manage my business finances effectively.	Changed to a more direct and clear statement that reflects action and outcome.
	MAS4	Comprehensive cost records are important for supporting decision making and controlling the business	I maintain detailed cost records to help make better business decisions and keep control over expenses.	Simplified and made the statement action-oriented to clarify intent.
	MAS6	Cost and price records are important for determining the selling price in my business activities	I use cost and pricing records to set appropriate prices for my products/ services.	Revised to focus on the specific action of setting prices based on these records.
Financial Performance (FP)	FP2	So far, I have not encountered any issues with lack of capital to manage the business	I have sufficient capital to effectively manage my business.	Made the statement positive to reduce potential response bias (respondents might avoid disagreeing with a negative statement).
	FP5	So far, my business continues to generate profit every month	My business has consistently generated profit each month.	Revised for clarity and consistency in wording.
	FP6	So far, I have been able to manage the business using the profits I have earned	I successfully manage my business by reinvesting the profits I earn.	Clarified the action of reinvesting profits to better align with the respondent's potential experience.

Table 2
Measurements.

Construct	Definition	Code	Item	Scale	Source
Gender (GEN)	The gender of the respondent, categorized as male or female	GEN1	Gender of the respondent	Male = 1; Female = 0	Self-reported
Age (AGE)	The numerical age of the respondent	AGE1	Age of the respondent	Numeric value (years)	Self-reported
Business Tenure (BT)	The number of years the business has been in operation	BT1	Duration of business operation	1 = 1–3 years; 2 = 4–6 years; 3 = 7–10 years; 4 = >10 years	Self-reported
Formal Education (FE)	The highest level of formal education completed by the respondent	FE1	Highest level of formal education completed	1 = Junior High School; 2 = Senior High School; 3 = Diploma (D3); 4 = Bachelor's Degree (S1); 5 = Master's Degree (S2)	Self-reported
Informal Education (IE)	The participation in non-formal education, training, or courses related to entrepreneurship	IE1	Non-formal education, training, or courses on entrepreneurship are very important to me	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	(Zuhroh et al., 2024)
	The perceived increase in innovation and creativity after attending training	IE2	Innovation and creativity increased after attending training	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	
	The perceived benefits of entrepreneurship training in shaping attitudes and understanding	IE3	Entrepreneurship training in general is beneficial in shaping my attitude and understanding	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	
Sharing Economy Platforms (SEP)	The use of digital platforms (e.g., Grab, Go-Jek) in business management	SEP1	I use Grab services (e.g., transportation, delivery) to support my business operations.	5-point Likert scale: 1 = Never; 5 = Always	(Capri, 2020; Sutherland and Jarrahi, 2018; Zuhroh et al., 2024)
	The use of Go-Jek services in business management	SEP2	I use Go-Jek services (e.g., transportation, delivery) to support my business operations.	5-point Likert scale: 1 = Never; 5 = Always	
	The use of digital payment tools (Go-Pay, Ovo) in business transactions	SEP3	I accept payments through Go-Pay and Ovo for my business transactions.	5-point Likert scale: 1 = Never; 5 = Always	
	The use of food delivery services in the business	SEP4	I use Go-Food or Grab-Food to manage food delivery orders in my business.	5-point Likert scale: 1 = Never; 5 = Always	
	The use of ride-hailing services in the business	SEP5	I rely on Go-Ride or Grab-Bike for transportation services in my business.	5-point Likert scale: 1 = Never; 5 = Always	
	The use of goods delivery services in the business	SEP6	I use Go-Send and Grab Express for delivering goods in my business.	5-point Likert scale: 1 = Never; 5 = Always	
	The use of car-hailing services in business management	SEP6	I use Go-Car/Grab Car services for business-related transportation.	5-point Likert scale: 1 = Never; 5 = Always	
Management Accounting System (MAS)	The importance of accounting records for supporting business management	MAS1	Keeping a cash book helps me manage my business finances effectively.	5-point Likert scale: 1 = Not Important; 5 = Very Important	(Chenhall and Moers, 2015; Horngren et al., 2012; Pedroso et al., 2020)
	The importance of the accounts receivable book in business management	MAS2	Accounts receivable book is crucial for managing my business's finances.	5-point Likert scale: 1 = Not Important; 5 = Very Important	
	The importance of the general ledger in the preparation of profit and loss reports	MAS3	General ledger records are essential for preparing profit and loss statements.	5-point Likert scale: 1 = Not Important; 5 = Very Important	
	The importance of cost records in supporting decision making and controlling the business	MAS4	Detailed cost records help in making informed decisions and managing expenses effectively.	5-point Likert scale: 1 = Not Important; 5 = Very Important	
	The importance of sales records for knowing business revenue	MAS5	Sales records are vital for tracking the revenue of my business.	5-point Likert scale: 1 = Not Important; 5 = Very Important	
	The importance of cost and price records in determining the selling price in business activities	MAS6	Cost and price records are crucial in setting the correct selling prices for my products/services.	5-point Likert scale: 1 = Not Important; 5 = Very Important	
	The importance of payroll records for labor cost management and employee performance	MAS7	Payroll records help manage labor costs and track employee performance.	5-point Likert scale: 1 = Not Important; 5 = Very Important	
Financial Performance (FP)	The financial health of the business, including income stability and profitability	FP1	Monthly income from the business contributes to overall financial stability.	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	(Bacidore et al., 1997; Mondal and Ghosh, 2012; Zuhroh et al., 2024)
	The financial health of the business, including income stability and profitability	FP2	I have sufficient capital to effectively manage my business.	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	
	The financial health of the business, including income stability and profitability	FP3	I don't need to borrow from the bank to increase my business capital.	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	
	The financial health of the business, including income stability and profitability	FP4	My business has not experienced a significant decline in customers.	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	
	The financial health of the business, including income stability and profitability	FP5	My business has consistently generated profit each month.	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	

(*continued on next page*)

Table 2 (*continued*)

Construct	Definition	Code	Item	Scale	Source
	The financial health of the business, including income stability and profitability	FP6	I successfully manage my business by reinvesting the profits I earn.	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	
	The financial health of the business, including income stability and profitability	FP7	My business has not experienced a significant decline in profit.	5-point Likert scale: 1 = Strongly Disagree; 5 = Strongly Agree	

relationships between the variables (Fig. 4).

This study used the measurement model of the reflective construct and tested it in several steps. Common method bias (CMB) was first assessed by evaluating the Inner Variance Inflation Factor (VIF) per Kock 's(2015) guidelines, and we sought to achieve VIF values under 3.3. Here, outer loading values > 0.7, and Average Variance Extracted (AVE) > 0.5 were expected. Cronbach's Alpha and Composite Reliability tests were used in order to determine reliability, with acceptable values being higher than 0.7 Discriminant validity was assessed by evaluating the Heterotrait-Monotrait Ratio (HTMT) which must be less than 0.9 (Hair et al., 2020).

Convergent validity of the second-level formative construct was examined by block-wise redundancy analysis to assess whether the cross-loading sets approached 0.7. To check for collinearity among the indicators, we calculated the outer variance inflation factor (VIF) for each item. A high positive collinearity suggests that the indicators are correlated with redundancy in formative measurements. In practice, the VIF should be less than five at maximum, and some sources use a stricter threshold of 3.3 (Kock, 2015). Furthermore, this study tested the bootstrapping of outer loadings by adopting a novel approach (Ringle et al., 2020). The outer weight, however, is the principal tool used to review how well each formative indicator contributes to explaining a construct. In turn, the effect of the outer weight is indicative that the indicator significantly contributes to (and should be maintained within) a formative construct. If an indicator's outer weight is not significant, we may retain its indicator as non-contributive or delete it from the model (Sarstedt et al., 2017).

Multiple moderating variables responsible for sullying or diminishing the effects of the independent and dependent variables also worked in this model. Moderator variables, such as gender (GEN), age (AGE), and business tenure (BT), are important in determining how business owner characteristics can affect the effectiveness of sharing economy platforms (SEP) and management accounting systems (MAS) on financial performance (FP). This model tests for moderation, which allows us to examine whether factors can reinforce or weaken the relationship between the use of SEP, MAS, and FP.

1) $MAS = \beta0 + \beta1 \times SEP + \beta2 \times GEN + \beta3 \times (SEP \times GEN) + \epsilon$
2) $FP = \beta0 + \beta1 \times MAS + \beta2 \times GEN + \beta3 \times (MAS \times GEN) + \epsilon$
3) $FP = \beta0 + \beta1 \times MAS + \beta2 \times AGE + \beta3 \times (MAS \times AGE) + \epsilon$
4) $FP = \beta0 + \beta1 \times MAS + \beta2 \times BT + \beta3 \times (MAS \times BT) + \epsilon$

Row 1 tests whether gender moderates the relationship between SEP and MAS. The interaction coefficient β3 is represented by this term to show the role of gender in the SEP and MAS. A statistically significant coefficient on the interaction term indicates that gender moderates the relationship between SEP and MAS adoption. In Row 2, the model examines whether gender also moderates the relationship between MAS

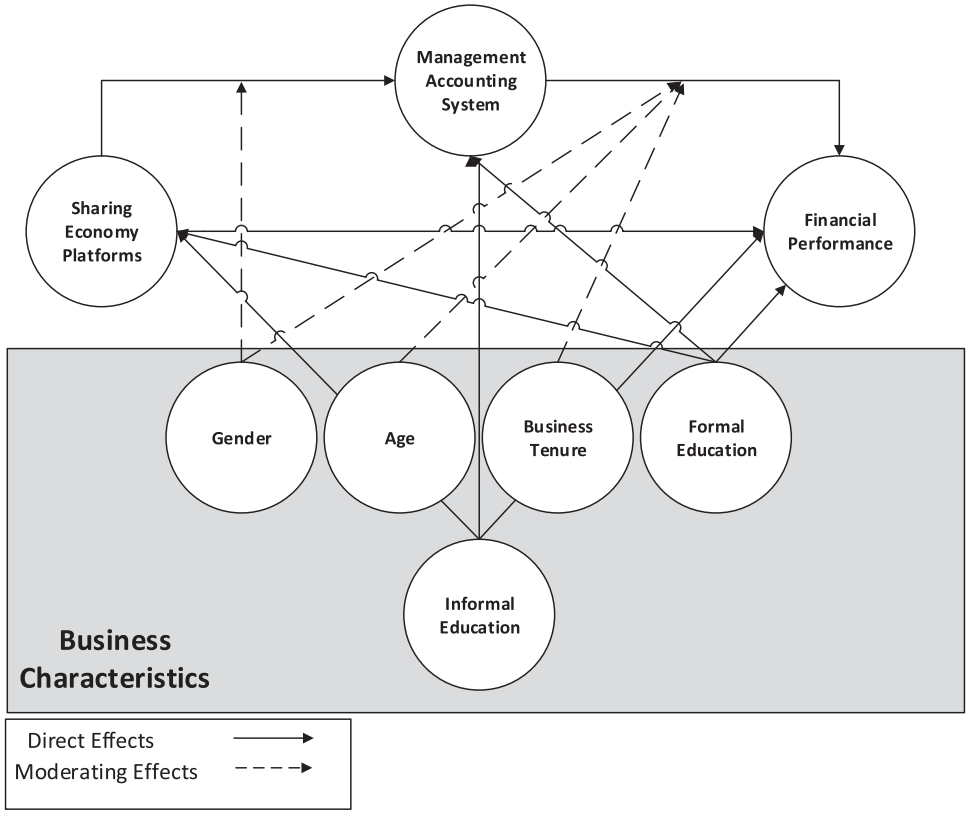

Fig. 4. Full Model.

and Financial Performance (FP). The interaction coefficient β3 here indicates the extent to which Gender affects the relationship between MAS implementation and MSME financial performance. These results are crucial for understanding whether gender influences MAS effectiveness in improving financial performance. Next, in Row 3, the model tests whether the variable Age moderates the relationship between MAS and Financial Performance (FP). The interaction coefficient β3 in this equation indicates whether the age of the business owner affects how effectively MAS can influence financial performance. Finally, in Row 4, the model investigates whether Business Tenure moderates the relationship between MAS and Financial Performance (FP). The interaction coefficient β3 in this equation shows the extent to which business tenure affects the relationship between MAS and financial performance, allowing researchers to understand whether business experience moderates MAS impact on financial performance.

5. Result and discussion

This section discusses the analysis of respondent characteristics, descriptive statistics, measurement models, and structural models, and discusses the research findings, providing an initial introduction of the respondent profile, that is, gender, age, business tenure, level of formal education, and industry sector under which MSMEs are operating. Moreover, a descriptive statistical analysis was performed to describe the distribution of data and the measurement model using the Smart PLS Path Modelling 4.0 software (Ringle et al., 2020).

5.1. Respondent profile

This research took the sample of MSMEs in Malang City as its focus, which is expected to describe who those respondents are barriers interconnected with. The demographic data obtained included the gender, age, and business tenure of the MSMEs, as well as their level of formal education and type (industry) in which they operate. The general characteristics of the respondents are summarized in Table 3.

Based on Table 3, most respondents were classified as female (61.97 %), indicating the important role of women in managing MSMEs, either from Malang City or any other area. In addition, gender might serve as a key moderator in the linkage between sharing economy platforms and MAS. For example, women may be more likely to use technology and digital platforms for operational efficiency, which could cascade into financial performance. This study examines whether gender influences the effectiveness of MAS in enhancing MSME financial performance. Most respondents were between the ages of 30–39 years (51.28 %), representing a productive age group with considerable experience in running a business. Age can moderate how MSMEs adopt MAS and leverage-sharing economy platforms. For example, younger respondents may be more adaptable to new technologies, whereas older respondents may have more experience in traditional management. This study explores whether age affects the relationship between MAS usage and MSME financial performance.

A total of 44.44 % of MSMEs have been in operation for to 4–6 years, indicating that many MSMEs are in a stable growth phase. Business tenure is important because it can influence how MAS is adopted and utilized. MSMEs that have been established longer may have more mature management systems and may be more efficient in implementing MAS than newer MSMEs. This study tests whether business tenure moderates the relationship between MAS use and financial performance. The majority of respondents had formal education up to bachelor's level (31.62 %). Higher formal education often correlates with better financial management skills and the ability to adopt new technology. Therefore, formal education may play a crucial role in the effectiveness of MAS and SEP. This study examines whether formal education level influences the relationship between MAS adoption and financial performance.

Most respondents were involved in the retail (27.78 %) and food and beverage (24.36 %) sectors. The type of industry can also affect how MSMEs adopt and implement MAS and SEP. For example, the retail and culinary sectors may be quicker to adopt digital technology and sharing economy platforms to improve their operational efficiency and competitiveness. This study explores how industry type influences the financial performance of MSMEs using MAS and SEP. The profile of MSMEs in Malang City is highly varied, and each variable (gender, age, business tenure, education, and industry type) can have different impacts on how technology and management systems are adopted and utilized in daily operations. This research will delve deeper into how these variables interact with the adoption of MAS and SEP and how they influence the financial performance of MSMEs.

Table 3
Characteristic of respondents.

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	89	38.03 %
	Female	145	61.97 %
Age	20–29	52	22.22 %
	30–39	120	51.28 %
	40–49	48	20.51 %
	50–59	14	5.98 %
Business Tenure	1–3 years	58	24.79 %
	4–6 years	104	44.44 %
	7–10 years	50	21.37 %
	> 10 years	22	9.40 %
Formal Education	Junior High (SMP)	20	8.55 %
	Senior High (SMA)	65	27.78 %
	Diploma (D3)	43	18.38 %
	Bachelor's Degree (S1)	74	31.62 %
	Master's Degree (S2)	32	13.68 %
Industry	Retail	65	27.78 %
	Food & Beverage	57	24.36 %
	Services	55	23.50 %
	Manufacturing & Production	50	21.37 %
	Healthcare & Wellness	4	1.71 %
	Others	3	1.28 %
Total		**234**	**100.00 %**

5.2. Descriptive statistics

Descriptive analysis was used to outline the data distribution. Table 4 presents the descriptive statistics for each measurement item, including the mean, standard deviation, kurtosis, and skewness. One of the tests that leads to clean data for SEM or any other higher-level analysis is these kinds of tests.

Table 4 shows that the variable, Informal Education (IE) especially item IE2 (innovation and creativity increased after attending training), has a mean value of equal high with a value of 4.265, indicating that respondents considered the training to be absolutely supportive and beneficial for improving their creativity levels. This shows that informal educational activities also play an important role in sustaining the capacity for innovation among Malang MSMEs. Meanwhile, the lowest mean value of an item is for SEP5 ('I rely on Go-Ride or Grab-Bike's transportation services in my business'), which has a rating of 3.137, which means that the use of online ride-hailing services such as Go-Ride or Grab-Bike might not have been widely adopted by MSME. A skewness close to zero for many of the items suggests that most of the data are nearly symmetric, although a few have negative and positive skewness, indicating some deviations from symmetry (Lind et al., 2018). The large magnitudes of some dimensions of informal education indicate an intense interest in training and learning outside the formal educational system. In the meantime, this lower value of SEP5 also suggests a possible area where we could still expand our use of sharing economy services to create more business impacts.

Table 4
Descriptive statistics.

Construct / Item	Mean	Standard Deviation	Excess Kurtosis	Skewness
Age	34.466	7.005	1.340	0.936
Gender	0.380	0.485	−1.769	0.496
Formal Education	3.141	1.210	−1.095	−0.098
Informal Education (IE)				
IE1	3.987	0.954	−0.307	−0.628
IE2	4.265	0.946	0.662	−1.223
IE3	3.632	0.911	−0.594	0.318
Business Tenure	1.850	0.933	−0.001	0.938
Sharing Economy Platforms (SEP)				
SEP1	3.423	1.119	−0.258	−0.505
SEP2	3.688	1.244	−0.349	−0.757
SEP3	3.474	1.258	−0.654	−0.525
SEP4	3.432	1.243	−0.432	−0.690
SEP5	3.137	1.097	−0.134	−0.294
SEP6	3.530	1.209	−0.483	−0.523
SEP7	3.350	1.243	−0.567	−0.488
Management Accounting System (MAS)				
MAS1	3.927	0.910	−0.745	−0.403
MAS2	4.073	1.033	−0.393	−0.848
MAS3	3.842	1.048	−0.617	−0.486
MAS4	3.893	1.005	−0.311	−0.648
MAS5	3.577	0.904	−0.999	0.590
MAS6	3.927	1.016	−0.747	−0.492
MAS7	3.833	1.005	−0.539	−0.397
Financial Performance (FP)				
FP1	3.526	0.979	−0.166	−0.361
FP2	3.863	1.093	−0.481	−0.674
FP3	3.513	1.047	−0.475	−0.293
FP4	3.534	1.005	−0.183	−0.514
FP5	3.402	0.796	0.056	0.530
FP6	3.850	0.929	−0.656	−0.342
FP7	3.547	0.996	−0.256	−0.274

5.3. Measurement model

5.3.1. Common method bias (CMB)

CMB was used to check for collinearity among the indicators in the research model. A VIF value lower than 3.3 is considered to indicate that there are no serious issues related to CMB (Kock, 2015).

It can be observed from Table 5 that most of the VIF values are below the threshold value of 3; therefore, no significant collinearity problem was discerned, which signifies a relatively low risk of CMB in this model. Only a few VIF values exceed or approach 3, such as IE2 -> FP and MAS -> SP, but are still within an acceptable tolerance range because of the nature of the SEM analysis with PLS. The outcome of this test indicates that the model results are trustworthy and not materially distorted by the CMB.

Table 5
CMB test.

Construct	Inner VIF
Age -> FP	2.040
BT -> FP	2.096
FE -> FP	1.147
FE -> MAS	1.094
FE -> SEP	1.027
Gender -> FP	1.068
Gender -> MAS	1.040
IE2 -> FP	3.058
IE2 -> MAS	1.183
IE2 -> SEP	1.027
MAS -> FP	3.253
SEP -> FP	1.204
SEP -> MAS	1.502
Gender x MAS -> FP	1.791
Gender x SEP -> MAS	1.596
Age x MAS -> FP	2.413
BT x MAS -> FP	2.499

5.3.2. Validity and reliability

The validity and reliability of each construct in this model were demonstrated by Factor Loadings (FL), Cronbach's alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE). We excluded items with an FL of 0.7 or lower as they are not indicative enough to represent the intended construct, thus improving our construct validity (Hair et al., 2020).

As Table 6 shows, three items related to Financial Performance were deleted from the model. The first item, FP2 "I have sufficient capital to effectively manage my business," had a remaining factor loading of 0.638. Although this score was just below the threshold, it was better to delete this item and preserve its overall construct validity. The FL for FP5 "My business has consistently generated profit each month' was 0.553, which was low, and the construct FP must not have behaved well. The final item related to FP was FP6 "I successfully managed my business by reinvesting the profits I earn" with an FL of 0.695. There could be an argument made for whether we should add or remove this item because the result was close to the threshold, but this is still neither high nor important. The CR and AVE for the FP construct improved after excluding these three items. Only one item was removed from the construct MAS, and it was MAS2 "The accounts receivable book is crucial for managing my business's finances." Its FL was 0.686, which is approximately the threshold. Although the mentioned MAS2 was slightly less than 0.7, and although the difference was not substantial, removing it increased the validity and internal consistency of this model. As a result, the reliability constructs MAS and FP increased, with better predictive power. Removing these items significantly improved the CR and AVE, which allowed our analysis to provide valid data that reflected the reality of MSMEs.

5.3.3. Discriminant validity

The HTMT is a procedure for measuring the correlations between the constructs of a model. The HTMT is the toughest measure than the Fornell-Larcker criterion, and it usually tests whether discriminant validity exists among different constructs. Under ideal circumstances, HTMT should be lower than 0.90, and some studies have found a threshold of 0.85 is appropriate depending on the research context. If HTMT is greater than these thresholds, it suggests that the constructs are not discriminant, meaning they measure something similar if at all.

Based on HTMT Table 7, this indicates that the discriminant validity of the constructs in this model was adequate. In other words, each construct measures a different concept, and there is no excessively high correlation between them, which suggests issues with construct

Table 6
Validity and reliability.

Constructs	Items	FL	CA	CR	AVE
Sharing Economy Platform (SEP)	SEP1	0.831	0.930	0.940	0.704
	SEP2	0.822			
	SEP3	0.838			
	SEP4	0.857			
	SEP5	0.817			
	SEP6	0.843			
	SEP7	0.865			
Management Accounting System (MAS)	MAS1	0.755	0.902	0.912	0.673
	MAS2	0.686			
	MAS3	0.848			
	MAS4	0.830			
	MAS5	0.705			
	MAS6	0.846			
	MAS7	0.875			
Financial Performance (FP)	FP1	0.763	0.796	0.838	0.629
	FP2	0.638			
	FP3	0.840			
	FP4	0.843			
	FP5	0.553			
	FP6	0.695			
	FP7	0.874			

Table 7
HTMT.

	Age	BT	FE	FP	Gender	MAS	SEP
Age							
BT	0.663						
FE	0.188	0.178					
FP	0.102	0.195	0.094				
Gender	0.053	0.031	0.120	0.061			
MAS	0.092	0.090	0.244	0.624	0.037		
SEP	0.219	0.270	0.035	0.654	0.045	0.299	

discrimination. The HTMT value between the MAS and financial performance is 0.624, indicating a moderate correlation, but still below the 0.90 threshold, so these constructs can be considered well discriminated. The highest value is between the sharing economy platform and financial performance, with an HTMT of 0.654, showing a stronger relationship between these constructs, but still within acceptable limits. This model has sufficient discriminant validity; therefore, the constructs used in this study can be considered as valid measures of different concepts.

5.3.4. Formative measurement model evaluation

This study used several key tests to ensure that the indicators used to measure Informal Education in the formative model met the criteria for validity and reliability. Table 8 presents the results of the tests for Outer VIF, Cross-Loading, Outer Weight, T-Statistics, and P-Value for the three indicators of Informal Education.

The results indicate that the Outer VIF values for all three indicators are below the conservative threshold of 3.3, with the highest value being 1.790 for IE1. This means that the Informal Education indicators do not have strong collinearity, showing that each of these indicators is distinct in its contribution to measuring this construct. Cross-loading values point to the strength of association for each indicator with regard to their intended constructs, whereby IE1 has the highest cross-loading value (.956), which represents a strong relationship with the Informal Education construct. The outer weight describes the common indicator contribution to that construct, and plays a central role in formative assessments. The outer weights were statistically significant based on the high T-statistics values (e.g., 12.167 for IE1), and all P-values < 0.05, indicating that no indicator contributed to the Informal Education construct irrelevantly. All the indicators have a p-value of 0.000, which once again suggests that these indicators are statistically significant for measuring Informal Education The indicators of Informal Education in the formative model were both valid and made a distinct, significant contribution to measuring the intended construct.

5.4. Structural model

Bootstrapping analysis was implemented to test the hypotheses related to the direct and moderating effects of the research questions in this model (Ringle et al., 2020). This test is used to determine whether the moderating variables enhance or diminish the relationship between independent and dependent variables. The direct relationships and interaction effects of the moderating variables were measured using path analysis.

Table 9 shows the findings of hypothesis testing in this study, which describes the direct and moderating effects of the variables discussed. SEP had a significant positive influence on MAS, with a p-value of 0.001 at the level of significance ($\alpha = 5\ \%$) and a coefficient equal to 0.142, which signifies that SEP usage leads MAS. Second, SEP also has a positive and significant effect on FP, with a coefficient 0.516 p-value of 0.000, indicating that using the system for collecting economic potential leads to better MSME financial performance improvements than not enforcing it. The other explanatory variable, MAS, is also significant to FP, with a coefficient of 0.167 and a p-value at the 5 % level; however, this influence is much lower than that of SEP.

Table 8
Formative model test.

Item Formative	VIF	Cross-Loading	Outer weigth	
			T- statistics	**P-value**
IE1	1.790	0.956	12.167	0.000
IE2	1.464	0.733	4.078	0.000
IE3	1.424	0.675	2.523	0.000

Gender had a significant ($p = 0.001$) negative interaction with SEP on MAS, with a coefficient of -0.265, indicating that one gender or both genders affected greater levels via small associations at increasing measures and also in moderation introduced further disparities than another group level. However, the moderating effect of gender on the relationship between MAS and FP was not significant, with a coefficient of 0.143 and p-value of 0.068, leading to the rejection of this hypothesis. Age showed a negative moderating effect on the relationship between MAS and FP, with a coefficient of -0.260 and a p-value of 0.000, indicating that the impact of MAS on FP decreases with increasing age of the business owner. Conversely, business tenure (BT) strengthened the relationship between MAS and FP, with a coefficient of 0.178 and a p-value of 0.020, suggesting that the longer a business operates, the stronger the influence of MAS on FP.

Formal Education (FE) did not have a significant impact on the use of SEP, as evidenced by a coefficient of -0.065 and a p-value of 0.180. However, FE had a positive effect on MAS, with a coefficient of 0.067 and p-value of 0.044, although its impact was relatively small. Interestingly, FE showed a negative impact on FP, with a coefficient of -0.130 and a p-value of 0.004, possibly reflecting the complex dynamics between formal education and business performance. Informal Education (IE) had a significant influence on SEP, with a coefficient of 0.274 and a p-value of 0.001, and showed a very strong impact on MAS with a coefficient of 0.806 and a p-value of 0.000. However, the influence of IE on FP was not significant, with a coefficient of 0.170 and a p-value of 0.050, which was rejected because the t-statistic did not meet the significance criteria, even though the p-value was borderline of significance. These results indicate that factors such as SEP and MAS have significant impacts on the financial performance of MSMEs, while moderating variables such as gender and age can weaken or strengthen these relationships, depending on the context.

In this research model (see Fig. 5), the strongest influence was found in the relationship between Informal Education (IE) and the Management Accounting System (MAS), with a coefficient of 0.806 and p-value of 0.000. This indicates that informal education such as entrepreneurial training and courses has a significant impact on the implementation of management accounting systems in MSMEs. This strong influence suggests that MSME actors who are more engaged in informal education tend to manage their accounting systems better. Conversely, the weakest influence in this model was observed in the relationship between Formal Education (FE) and Financial Performance (FP), with a coefficient of -0.130 and a p-value of 0.004. Although significant, this influence is negative, meaning that formal education does not always positively correlate with the financial performance. This effect is relatively small compared to other relationships in the model, which may indicate that formal education does not have a strong direct influence on financial performance. Within this research model, informal education has the strongest contribution to reinforced MAS among MSMEs, and it also negatively affects MSME's financial performance.

5.5. Discussion

This study demonstrates that sharing economy platforms such as Gojek and Grab play a transformative role in supporting MSMEs by expanding market reach, streamlining operations, and enhancing financial performance, as evidenced by the findings of this study (Sutherland and Jarrahi, 2018; Zuhroh et al., 2024). These platforms provide essential tools, including delivery services (Sutia et al., 2019;

Table 9
Path coefficient.

Hypothesis	Path	(O)	(M)	(STDEV)	(|O/STDEV|)	P values	Decision
H1	**SEP -> MAS**	0.142	0.142	0.046	3.055	0.001	Accepted
H2	**SEP -> FP**	0.516	0.518	0.065	7.936	0.000	Accepted
H3	**MAS -> FP**	0.167	0.179	0.102	1.646	0.050	Accepted
H4a	**Gender x SEP -> MAS**	−0.265	−0.256	0.084	3.159	0.001	Accepted
H4b	**Gender x MAS -> FP**	0.143	0.145	0.096	1.488	0.068	Rejected
H5	**Age x MAS -> FP**	−0.260	−0.254	0.072	3.591	0.000	Accepted
H6	**BT x MAS -> FP**	0.178	0.173	0.086	2.062	0.020	Accepted
H7	**FE -> SEP**	−0.065	−0.063	0.070	0.916	0.180	Rejected
H8	**FE -> MAS**	0.067	0.068	0.039	1.711	0.044	Accepted
H9	**FE -> FP**	−0.130	−0.131	0.049	2.639	0.004	Accepted
H10	**IE -> SEP**	0.274	0.277	0.086	3.191	0.001	Accepted
H11	**IE -> MAS**	0.806	0.805	0.038	21.436	0.000	Accepted
H12	**IE -> FP**	0.170	0.159	0.104	1.642	0.050	Rejected

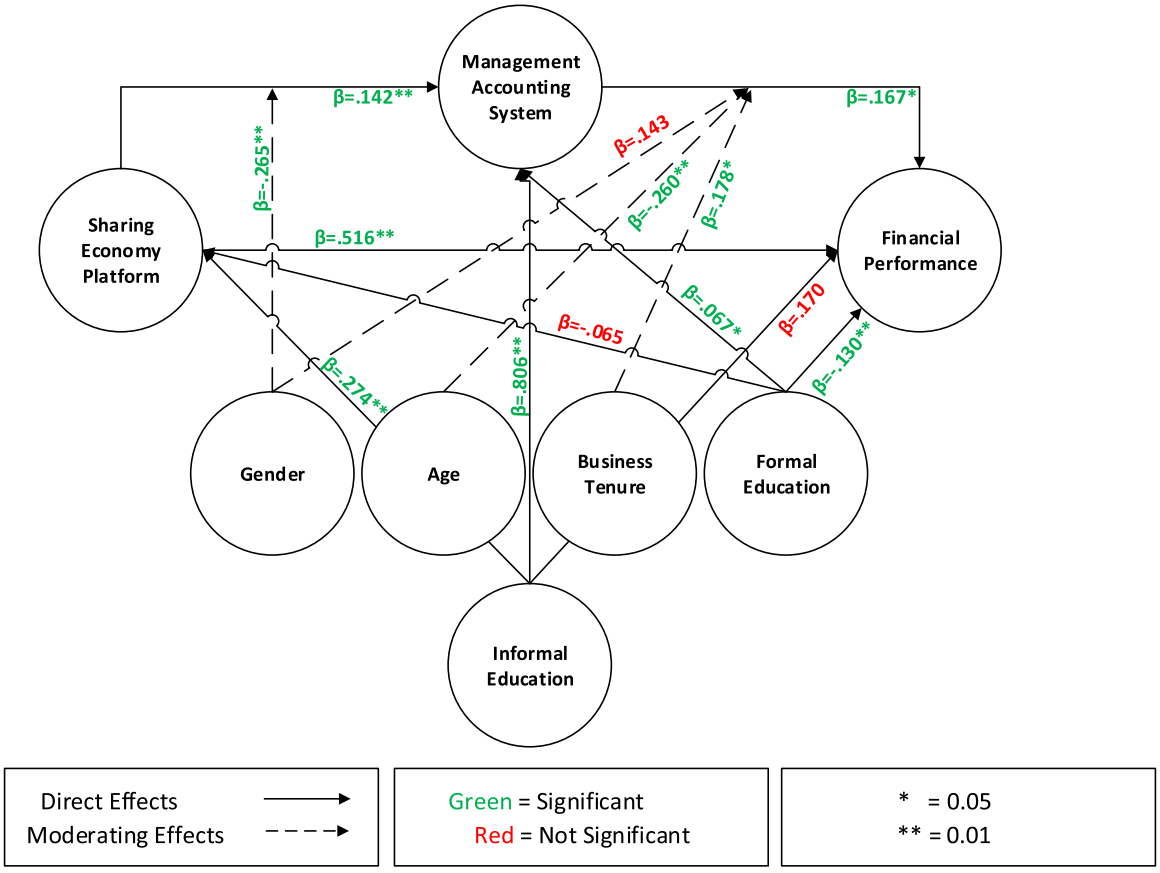

Fig. 5. Summary results.

Zuhroh et al., 2024), digital payment systems, and online marketplaces, which assist MSMEs in Malang in improving their competitiveness within a rapidly digitalized economy. MSMEs in Malang face unique challenges including limited access to traditional markets, fluctuating consumer demand, and financial constraints, all of which have been exacerbated by the COVID-19 pandemic (Purnomo et al., 2021). Sharing economy platforms utilize collective intelligence and open innovation dynamics to establish dynamic ecosystems that benefit the MSMEs in Malang. These platforms aggregate data from users, businesses, and delivery partners, thereby providing insights that enhance service efficiency and customer engagement. For instance, features such as GoFood and GrabFood employ collective intelligence to recommend popular products and optimize delivery routes, thereby assisting MSMEs in improving their operations. Digital payment tools such as GoPay and Ovo facilitate transactions, reduce dependence on cash, and promote financial inclusion. By incorporating feedback loops and collaborative tools, these platforms support individual MSMEs and cultivate a culture of innovation that drives the overall development of the local entrepreneurial ecosystem (Gamal, 2024).

This study has several important findings regarding the educational and demographic characteristics of actors from MSMEs in Malang City. Most MSMEs in this area are managed by people who are included in the productive age group, and many women act as managers (Zuhroh et al., 2024). The statistics represent the socio-economic reality in Malang, which shows that women are actively involved in the MSME area. Most research has found that informal education has a significant effect on MAS implementation in MSMEs (Anggraini and Thorp, 2020; Chenhall and Moers, 2015). One of the key factors contributing to MSME actors' success in business funding management is training and the courses they have attended. The type of informal education is more practical and

directly applicable, so that MSME players can apply what they have learned immediately in operation. This is highly resourceful in the context of MSMEs facing difficulties and needing practical solutions for managing their financial problems (Habiburrahman et al., 2022; Nursini, 2020; Sunoko et al., 2022). One interesting finding of this study is the adverse effect of formal education on MSME financial performance. This is because formal education is somewhat more theoretical and less practical with respect to problems. This means that in the MSME sector, where a higher level of practical business management skills is needed, formal education may not always reward firms with expected competitive advantages (Van Der Sluis et al., 2008).

Moreover, MSME actor classes might like to concentrate on activities that may directly impact their businesses, such as more specific and applicable training rather than general formal education (Debarliev et al., 2022; Setyaningrum et al., 2023). These findings also indicate the significance of policy interventions aimed at enhancing informal education infrastructure. Through subsidizing access to digital learning platforms, community-based workshops, and peer-learning networks, policymakers can facilitate the continuous upskilling of MSME owners in areas most pertinent to their business requirements. The adoption of an agile learning approach that rapidly adapts to new tools and knowledge is crucial for navigating the challenges of a dynamic business environment. Examples include financial literacy workshops organized by government agencies, digital marketing training conducted by private organizations, and community-based mentorship programmes. These initiatives frequently address specific business requirements such as implementing digital payment systems or managing operational costs, enabling MSME proprietors to apply their acquired knowledge immediately to their business contexts. For instance, digital marketing training sessions, such as those offered by *Indonesia's Gerakan Nasional 1.000 Startup Digital*, provide MSME owners with the skills to expand their market reach through online platforms. Similarly, financial literacy workshops assist entrepreneurs in managing their finances more effectively by instructing them on how to create budgets, maintain cash books, and analyze profit margins.

It also delves into the moderating effects of gender, age, and tenure. Gender, as a moderator of the relationship between the sharing economy platform and MAS, was significant, suggesting that gender differences could influence MSME actors to use modern financial management technologies (Coleman and Robb, 2009). Furthermore, when these technologies are integrated, female MSME actors may face different challenges than their male counterparts. According to Li and Yan (2021) and also Setyaningrum et al. (2023) age and business tenure as moderating variables found that the older age group and longer business tenure had weakened positive impact of MAS on financial performance. This could imply that more experienced MSME players may have already put systems in place and are less willing to adapt or try new technology. The performance of employing such management strategies also largely depends on the demographic characteristics and experience displayed by business actors (Fahlevi et al., 2023; Juhandi et al., 2020). Consequently, capacity-building programs regarding MSMEs in Malang City can be more effective in sustaining the growth and sustainability of MSMEs if they are designed considering these differences. These outcomes suggest that MSME players who are potential informal learning actors in managing business constraints may decide to absorb their capacity and apply practical knowledge sources to develop dynamic capabilities (Lafontaine and Shaw, 2016; Van Der Sluis et al., 2008). Sustainability itself is one of the important aspects of MSMEs in Malang to deal with this problem by facing long-term challenges pertaining to economic changes, market competition, and technological shifts (Nursini, 2020; Sunoko et al., 2022).

Without exception, even MSMEs in Malang are difficult to develop sustainably. There are several reasons for this, including limited resources, lack of access to modern technology, and poor managerial capacity. Moreover, many MSME actors are still applying traditional methods in the running of their businesses, which renders them less ready for any rapid change in the business environment (Habiburrahman et al., 2022; Marhaeni et al., 2023). In addition, they still face various problems in having access to financing and low financial literacy, resulting in difficulties for MSMEs Malang urban areas to develop sustainable business strategies. Accordingly, more work is needed to train and mentor continually for the MSME sector in practicing sustainability principles toward their business operations that make them still exist. Collaboration between MSMEs, local governments, and digital platforms, such as Gojek and Grab, exemplifies social open innovation by addressing societal challenges, such as financial inclusion and job creation. In Malang, such partnerships enable MSMEs to access digital infrastructure and resources they would otherwise lack, fostering inclusive economic growth.Top of Form

The findings of this study demonstrate a strong alignment with the principles of DCT and ACT, while offering nuanced insights that both support and extend these frameworks. DCT emphasizes an organization's capacity to sense opportunities, seize them, and transform resources to adapt to a changing environment, which is evident in how MSMEs in Malang utilize sharing economy platforms, such as Gojek and Grab, to expand their market reach and enhance operational efficiency. For instance, the significant positive effect of sharing economy platforms on financial performance (H2) illustrates the dynamic capability to leverage external technological resources to enhance their competitiveness in a digital economy. However, the weaker impact of MAS on financial performance (H3) suggests that, while dynamic capabilities exist, they may be constrained by limited internal resources or insufficient capacity to effectively integrate and utilize MAS for strategic decision-making. From the ACT perspective, the findings on informal education provide empirical evidence demonstrating how external knowledge acquisition and assimilation drive performance improvements. ACT posits that an organization's capacity to recognize, assimilate, and apply external knowledge is a critical determinant of its innovation and financial success. The significant positive impact of informal education on both sharing economy platform adoption (H10) and MAS implementation (H11) underscores the importance of practical experiential training in enhancing MSMEs capacity to effectively absorb and apply external knowledge. For instance, workshops and training programs enable MSME owners to acquire immediate actionable insights into financial management and digital tools, thereby facilitating their ability to adapt to technological advancements.

5.6. Theoretical implications and model development

Theoretically based on DCT and ACT, this study shows how demographic variables explain the process that allows for the development of dynamic capabilities in response to changing market factors and business environments as demography becomes a moderating factor. Validation of these findings suggests that possessing the capability to uptake knowledge through the external environment (training and courses) improved their interpretive, sense-making, and enactment capacity towards daily business functioning. The study reveals that MSMEs that are more open to learning and adaptation tend to reflect better performance, particularly for financial management systems. Given these findings, we suggest a model of what financial capability can look like in practice and would argue for the emergence an Adaptive Financial Capability Model (AFCM). The conceptual framework in this research integrates DCT and ACT with an emphasis on MSMEs, especially regarding the evolution of adaptive financial management accounting practices. This model was developed for MSMEs in developing countries, such as Indonesia, where informal education and practical training are more relevant, and will have a direct effect on the improvement of business performance. The AFCM can serve as an innovative basis for policy and training design for MSMEs, showing that the formal part of education alternatives contributes positively to adapting strategies according to the path-dependent characteristics of business owners.

Policymakers can utilize the AFCM to develop targeted interventions, such as gender-sensitive training programs, digital literacy workshops, and tiered technology adoption strategies, to facilitate MSME's adoption of digital tools, including sharing economy platforms and MAS. Furthermore, AFCM emphasizes the necessity for customized support for older or long-tenured business owners, who may exhibit greater resistance to adopting new technologies. By incorporating these demographic considerations into policy formulation, AFCM ensures that MSME development programs are inclusive, pragmatic, and aligned with the operational realities of small businesses. Consequently, the model not only advances theoretical understanding, but also provides a robust foundation for practical applications aimed at enhancing MSME competitiveness and resilience.

6. Conclusion, suggestions, and policy recommendations

The empirical observation in this study changes the perception of continuing research, namely, that informal education and training play a more important role than previous formal hypothesis testing on sharing economy platform adoption and MAS among MSMEs in Malang. Practical and applied training is more relevant in enhancing MSME owners'/managers' implementation than theoretical formal education, and this work suggests that demographic characteristics such as gender, age, and business tenure significantly influence the use of MAS by MSMEs. All of these factors can play a critical role in supporting or negating the implications of technology adoption on financial performance. The results offer recommendations for developing more pragmatic and situational training, especially for the veterans of MSMEs in Indonesia, who may become skeptical when faced with new technology. In addition, technology adoption strategies should consider gender differences to help many business owners adopt new technology effectively.

In Malang City, limited access to informal training on financial management and technology adoption is recommended by the government of agency-related institutions to spread their policies better. They cover programs that provide support for older MSMEs, who have difficulties in adopting new technologies. Policies that focus on the importance of learning skills and knowledge to nurture dynamic capabilities will help in training and retraining. The AFCM proposed in this study is a new conceptual model that appears for the first time. Our AFCM model combines the elements of formal and informal education and demographic characteristics in the formation processes of dynamic capabilities for MSMEs, focusing on financial management and accounting. This model can be used as a roadmap to develop future policies and training programs for MSMEs, including further studies on financial management and technology adoption in the MSME sector.

To enhance the benefits of informal education and address the challenges faced by MSMEs, policymakers and digital platforms, such as Gojek and Grab, should collaborate to develop targeted, accessible, and practical training programs. These programs should focus on critical areas including digital literacy, financial management, and operational efficiency, delivered through workshops, online tutorials, and mentorship schemes. For instance, Gojek and Grab developed in-application training modules or organized regional workshops to instruct MSME owners on optimizing platform features, such as GoFood, GrabFood, and digital payment tools. Policymakers can further support this initiative by subsidizing training costs, particularly for older MSME owners, who may experience difficulties with technological adoption. To mitigate cost constraints, platforms can implement tiered pricing models or provide financial incentives such as reduced transaction fees for small enterprises during the initial adoption phase. Furthermore, gender-sensitive initiatives should address the specific challenges women entrepreneurs face by offering targeted mentorship and networking opportunities to facilitate their effective utilization of technology. These collective efforts can enhance the capacity of MSMEs in Malang and Indonesia more broadly by leveraging technological advancements for growth, thereby improving their competitive position and financial performance.

Author contributions

Diana Zuhroh and *Mochammad Fahlevi* served as corresponding authors and were responsible for conceptualizing the research framework, overseeing the project administration, and supervising the data analysis. *Diana Zuhroh* led the writing of the initial manuscript drafts and guided the methodology. *Johnny Jermias* contributed significantly to the literature review and theoretical grounding. *Sri Langgeng Ratnasari* and *Sriyono* were instrumental in data interpretation and contributed to reviewing and editing the manuscript. *Elok Nurjanah* provided essential insights into the practical implications of the findings and contributed to the data collection process. *Mochammad Fahlevi* was responsible for validating the data analysis and ensuring the research adhered to the required ethical standards. All authors read and approved the final manuscript.

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Ethical statement

The study complied with the Declaration of Helsinki and followed its ethical codes for individuals, samples and data collection involved in each research procedure. Before the initiation of this study, we have presented the study topic to the Ethics Committee of the University of Merdeka Malang and submitted a proposal stating the purpose of the study, sample, data sources, and details of the written informed consent for respondents. All the above documents were approved by this committee. Prior to the questionnaire, the researchers have asked the respondents to read the written informed consent carefully, introduced the purpose of the study to the respondents and explained that the data would be used for research only and that all information about the respondents would be kept confidential. All respondents were informed and volunteered to complete the questionnaire.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.joitmc.2024.100447.

Data availability

Data are available in Supplementary Material

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