



Innovation capability and risk attitude mediate the effects of knowledge management and financial literacy on MSME performance

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ABSTRACT

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Halal micro, small and medium enterprises (MSMEs) play an important role in the economy, supporting the rapid development of the world's halal industry. The performance of halal MSMEs is influenced by knowledge management and financial literacy. Based on knowledge-based theory, which focuses on internal factors to explain business strategies, innovation capabilities and risk attitudes can mediate the influence of knowledge management and financial literacy on the performance of halal MSMEs. Data collected using quantitative proximity from a sample of 195 owners of halal MSMEs in Malang Raya, Indonesia, was analyzed using structural equation modeling (SEM). The findings showed that knowledge management and financial literacy affect the performance of MSMEs. The innovation ability and risk attitude of MSME owners mediate the effects of knowledge management and financial literacy on the performance of MSMEs. When knowledge is managed effectively, it creates unique capabilities that contribute to improved performance through innovation, realized through innovative products, and risk attitude, realized through optimized opportunities.

Contribution/Originality: This research contributes to the knowledge-based theory that MSMEs that want to achieve good performance can do so by utilizing intangible assets such as knowledge management (through knowledge acquisition), financial literacy (through budgeting literacy), innovation ability (through product innovation), as well as risk attitude, realized through optimized opportunities.

1. INTRODUCTION

In 2020, Indonesia's Muslim population is estimated to number 229,620,000 or around 12.085% of all 1.9 billion Muslims worldwide (databooks.metadata.co.id/). The consequence is that the Indonesian state is ranked among the first consumers of halal products in the food sector. The halal industry has become one of the fastest-growing industries in the global market, and as the Muslim population is expected to reach 3 billion ([Nurrachmi, 2018](#)), the halal market is currently experiencing unparalleled growth ([Soon, Chandia, & Regenstein, 2017](#)). [Gunawan \(2020\)](#) noted that halal products have become common in the global community and are not only enjoyed by Muslims. A report by Thomson Reuters on the state of the global Islamic economy showed that spending on the halal food and lifestyle industry reached \$1.8 trillion in 2014 and was expected to continue to grow to \$3.1 trillion by 2022; halal products are thus continuing to grow rapidly on a global scale.

The state's efforts to protect and provide guarantees for halal products in Indonesia are formalized in Law Number 33 of 2014 concerning the Halal Product Guarantee, which confirms that halal certification and labeling of each product is mandatory and no longer voluntary (Ahyar, 2019). Halal certification is one of the tools Indonesian micro, small and medium enterprises (MSMEs) use to advance themselves. The reason is that the halal status of MSME products can contribute to Indonesia's competitive advantage in the international market. It is the vision of the President of the Republic of Indonesia that by 2024 all MSMEs in Indonesia will be halal certified. Creating a free halal certification process for MSMEs is the Indonesian government's first step in supporting Indonesian MSMEs, not only domestically but also globally (Komite Nasional Keuangan Syariah, 2021).

One empirical study on halal MSMEs in Indonesia was carried out by Maisaroh, Hilal, and Hanif (2022), who concluded that halal MSMEs in Lampung are still small in number and display low production performance. Razalia, Angga, and Dan (2021) showed that the performance of halal MSMEs in Aceh was less than optimal. Komariah, Nursal, and Rianto (2022) showed that the marketing performance of halal MSMEs in Bekasi still required improvement. The results of a study conducted by Soriana and Sihite (2022) revealed that in Jakarta, MSMEs' readiness to adopt halal certification is still too low; therefore, the number of halal MSMEs is also low and shows poor performance. Azam and Abdullah (2020) demonstrated that the Indonesian halal industry has yet to grow to its full potential.

The results of previous empirical studies suggest a need to review how to improve halal MSMEs' performance. According to Prisca (2016), MSMEs must recognize their resources to maximize their performance and generate revenue. MSME owners consistently strive to achieve goals when managing their businesses. Prisca (2016) stated that the performance of an MSME is the result of the company's work, which is achieved by a person or group with a division of activities in the form of tasks and roles over a certain period and according to established standards.

The performance of MSMEs can be improved through knowledge management. Knowledge management is a set of processes for using knowledge as a key factor in adding value to a company (Aliyu, 2016) to ensure the survival of the organization (Samir, 2020) and overcome business competition challenges (Gharakhani & Mousakhani, 2012). The results of research conducted by Aliyu (2016), Gholami, Asli, Nazari-Shirkouhi, and Noruzy (2013), Souza, Castro, Ziviani, and Parreiras (2016), Lee, Kim, and Kim (2012) and Zack, McKeen, and Singh (2009) has shown that knowledge management influences the performance of MSMEs. In contrast, however, Santoso, Pasaribu, and Subagja (2020), Byukusenge and Munene (2017) and Massaro, Handley, Bagnoli, and Dumay (2016) showed that knowledge management does not affect the performance of MSMEs.

Another factor that can contribute to improving MSME performance is financial literacy. Financial literacy is considered an important component of MSMEs' success because it helps in understanding and evaluating the data used to make decisions that financially impact daily business operations (Eniola & Entebang, 2017). Rahim and Balan (2020) argued that the proper implementation of financial literacy assists in fulfilling financial obligations through financial planning, resource allocation, and demand for financial services to maximize profits (Babajide et al., 2021). The results of research conducted by Mabula and Han (2018), Eniola and Entebang (2017), Halabi, Dyt, and Barrett (2010) and Kasenda and Wijayangka (2019) revealed that financial literacy affects the performance of MSMEs. However, studies by Idawati and Pratama (2020) and Yanti (2019) concluded that financial literacy does not affect the performance of MSMEs.

Based on the results of previous research on the influence of knowledge management and financial literacy on MSME performance, there is still a research gap that suggests the necessity of retesting the influence of knowledge management and financial literacy on MSME performance with innovation capabilities and risk attitude as mediating variables. The reason for including innovation ability and risk attitude as mediating variables is because, conceptually, the performance of MSMEs can be improved through the use of knowledge, which is the most valuable resource owned by MSMEs, according to knowledge-based theory; this approach is the novel contribution made by this study.

Innovation capability is the ability to continuously transform knowledge and ideas into new products, processes and systems for the company's and stakeholders' benefit (Mahmoud Mohammad Migdadi, 2022). Innovation makes an important contribution to improving organizational success, performance and survival. Innovation applies not only to large companies but also to the MSME sector (Baregheh, Rowley, & Sambrook, 2009). The MSME sector becomes innovative when MSMEs develop innovation capabilities, which is one of the basic elements of an innovative organization. One of the efforts made to improve innovation capabilities is through knowledge management in the form of knowledge acquisition, creation and utilization, which encourages the ability to innovate. The results of previous research by Durmuş-Özdemir and Abdulkhoshimov (2018), Nawaz, Hassan, and Shaukat (2014) and López-Nicolás and Meroño-Cerdán (2011) prove that knowledge management influences innovation capabilities.

Innovation capabilities can also be improved through financial literacy. Financial literacy, expressed by MSMEs through budgeting, planning and the ability to compile financial reports, can encourage MSMEs to make daily operational decisions that include innovating (Yuliani, Umrie, & Bakar, 2020). The results of studies by Eniola and Entebang (2016) and Liu, Wang, Chan, and Fung (2021) show that financial literacy is a key factor that can influence innovation and enable MSMEs to run their business operations more effectively and successfully.

MSMEs can improve their financial and non-financial performance by developing innovation capabilities to create new products and more innovative processes. Rosli and Sidek (2013) revealed that the ability to innovate helped MSMEs rise to a higher level. The results of empirical studies by Otache, Usang, and Usang (2021), Issau, Senyo, and Acquah (2021), Sanawiri and Iqbal (2020) and Maldonado-Guzmán, Garza-Reyes, Pinzón-Castro, and Kumar (2018) show that the ability to innovate contributes to improving the performance of MSMEs, increasing their operational effectiveness (Nybakk, 2012) and ability to solve problems (Bahta, Yun, Islam, & Ashfaq, 2021).

Risk attitude is the attitude of the manager or business owner towards the risks faced in business (Saurabh & Nandan, 2018). A business owner's risk attitude guides them to pursue risky financial opportunities with previously unknown outcomes (KMMCB, Jianmu, & Weerathunga, 2019). Hillson and Webster (2005) noted that risk attitude is influenced by cognitive and emotional factors, including knowledge management. A study by Hock-Doepgen, Clauss, Kraus, and Cheng (2021) showed that MSMEs with good internal knowledge management will effectively have low risk-taking tolerance. The results of a similar study conducted by Liu, Shang, and Lai (2015) showed that in MSMEs that conduct e-commerce, the effects of knowledge complementarity and knowledge integration can affect the risk attitude when dealing with external uncertainties so that MSMEs can maintain their survival.

Financial literacy allows MSMEs to manage risk through strategies such as maintaining financial reserves, diversifying investment portfolios and purchasing insurance policies. Therefore, in a complex, competitive and risky business setting, financial literacy helps MSMEs to manage financial resources productively through upskilling while effectively managing the risks arising from financial decisions (KMMCB et al., 2019). The results of a study by Saurabh and Nandan (2018) show a correlation between financial literacy and risk attitudes. Iswari (2021) found a positive relationship between financial literacy and risk attitude.

Business owners' attitudes towards risks can improve the performance of MSMEs. Buchdadi, Sholeha, and Ahmad (2020) concluded that a risk attitude can help in the case of business uncertainty and thus improve the ability to perform financially and strategically. The results of empirical studies by Games and Rendi (2019), Aisyah, Wahyulina, and Widiana (2018) and Buchdadi et al. (2020) have shown that risk attitude influences the performance of MSMEs.

Based on this background, there remains a fundamental question of how to improve the financial performance of halal MSMEs. This paper adopts a knowledge-based theory approach that supports the idea that when knowledge is managed effectively, it creates the ability to improve performance. Knowledge management, including financial literacy, can generate new ideas and improve business owners' creative ability and attitude to the risks faced. Based on this explanation, innovation ability and risk attitude can be analyzed as variables that mediate the

influence of knowledge management and financial literacy on the performance of halal MSMEs; this paper develops this model and employs knowledge-based theory as its main theory.

2. LITERATURE REVIEW

2.1. Knowledge-Based Theory

Grant (1997) described knowledge-based theory as a psychological concept that explains how a person can perform tasks or make decisions by utilizing knowledge stored in their long-term memory or knowledge base. According to Migdadi, Zaid, Yousif, Almestarihi, and Al-Hyari (2017), knowledge-based theory explains that effective decision-making depends on a person's ability to access and utilize knowledge stored in their knowledge base. In this theory, the knowledge base is seen as a collection of knowledge, information and experience that a person has acquired during their life, which is continuously updated and expanded with new experiences and learning. In this theory, knowledge can be accessed and used to solve problems or make decisions. The knowledge stored in the knowledge base can be grouped into various categories, such as concepts, principles, facts and skills. These categories help one to understand and utilize knowledge effectively (Martínez Serna, Del, Vega Martínez, & Vega Martínez, 2016).

In practice, knowledge-based theory can be used in field management. This theory can help managers make better decisions by utilizing the knowledge base they already have and developing it through learning and new experiences. Kengatharan (2019) and Sveiby (2001) stated that when knowledge is effectively managed, it can create unique capabilities that contribute to improving company performance through innovation (Migdadi et al., 2017; Munawar, Hurriyati, Disman, & Gaffar, 2023); thus, superior business performance and sustainable competitive advantage can be achieved through effective management that promotes innovation (Durmuş-Özdemir & Abdulkhoshimov, 2018).

2.2. Performance

MSMEs are essential as a corporate growth hub for entrepreneurs and financial backers to tackle unemployment, job creation, innovation and long-term economic development (Eniola & Entebang, 2016). According to Prisca (2016), MSMEs must recognize their resources to maximize performance and generate revenue. MSME owners consistently strive to achieve their goals when managing their businesses. Ng, Kee, and Ramayah (2020) explained that performance measurement scales for MSMEs typically use financial performance measures, such as return on investment (ROI) and return on equity (ROE). Meanwhile, performance can be measured using several indicators (Mel, Andi, & Mike, 2001), including financial performance, operational performance (dimensions of time, quality and flexibility), and cultural and environmental aspects (through the human resources dimension). Hafeez, Mohd Shariff, and Mad Lazim (2013) explained that MSME performance should be seen from a financial and market perspective. Operating profit and ROI per year measure financial performance. Meanwhile, market performance is judged by an MSME's sales and market share for three years. Karadag (2017) explained that financial performance is measured using financial, innovation, production and market indicators.

2.3. Knowledge Management

Knowledge management means processing data or information effectively and efficiently to achieve an organization's goal of being more adaptive, innovative (Aliyu, 2016), intelligent, and sustainable (Darroch, 2005; Samir, 2020). Management is seen as capable of generating value by utilizing intangible assets (Salojärvi, Furu, & Sveiby, 2005), which includes all operations in all relevant managerial areas (Massaro et al., 2016). Furthermore, Baregheh et al. (2009) showed that knowledge management studies are not only conducted in the large enterprise sector but also in the MSME sector, which is an increasingly important area of research in many countries.

According to Li et al. (2020), knowledge management in the context of MSMEs is the main key to exploiting and commercializing science, technology, and research and development (R&D) to support a wider scope of business activities. Many research results have proven that MSMEs that apply knowledge management will encourage innovation and avoid value chain fragmentation in an increasingly global industrial environment (Shahzad, Bajwa, Siddiqi, Ahmid, & Raza Sultani, 2016), which, in turn, will increase the sophistication of the industry and provide more intense product development solutions to improve business performance (Lee et al., 2012).

Sugiarti, Kumaladewi, Rahmawati, and Nanang (2019) described four elements of knowledge management: the acquisition, storage, dissemination and use of knowledge. According to Byukusenge, Munene, and Orobia (2016), knowledge management includes the collection of knowledge, its application and responsiveness. According to Lee and Wong (2015), another definition of knowledge management is the process of collecting, organizing, understanding, disseminating and applying knowledge. Samir (2020) asserted that using knowledge management constructs consists of acquiring, sharing and being responsive to knowledge. Based on Wirakurnia, Nuanmark, Sudarsono, and Ramadhana (2021), Souza et al. (2016) and Hussain, Jusoh, Jamil, Rehman, and Gul (2022), knowledge management indicators consist of the acquisition of knowledge, its creation and generation, its application and utilization, its transfer and distribution, and finally, the storage and documentation of knowledge.

2.4. Financial Literacy

Financial literacy is the knowledge and cognitive ability to manage finances and make effective financial decisions (KMMCB et al., 2019). According to Eniola and Entebang (2017), financial literacy is an individual's ability to understand and manage finances effectively. Financial literacy includes the knowledge and skills needed to make wise financial decisions and understand the consequences of those decisions. According to Agyapong and Attram (2019), financial literacy is an individual's ability to understand financial concepts and manage their finances effectively. This includes an understanding of financial products such as savings, investments and insurance, as well as the ability to make sound financial decisions (Esiebugie, Richard, & Emmanuel, 2018).

Rahim and Balan (2020) argued that properly implementing financial literacy will help fulfil financial obligations through financial planning, resource allocation, and employing financial services to maximize profits. As described by Ratnawati, Sudarmiati, Soetjipto, and Restuningdiah (2022), studies on financial literacy in MSMEs have revealed that financial literacy indicators include financial management, savings management, credit management, risk management and investment management. Mabula and Han (2018) noted that financial literacy can be measured using four indicators: financial attitudes, financial behaviors, general financial knowledge, and specific financial knowledge. Babajide et al. (2021) measured financial literacy using the indicators of record keeping, managing excess assets over liabilities, managing cash, investment knowledge, insurance knowledge, credit management, and savings knowledge and attitudes. According to Huston (2010), financial literacy indicators include debt management, bookkeeping, budgeting, and financial analysis.

2.5. Innovation Capability

Innovation plays an important role for both large companies and MSMEs (Ali, Hao, & Aijuan, 2020; Issau et al., 2021). According to Bahta et al. (2021), innovation entails a change and increase of resources that helps SMEs create new wealth. The process of generating ideas and inventions in areas ranging from goods and procedures to customer service is often called innovation (Sanawiri & Iqbal, 2020). Baregheh et al. (2009) argued that innovation is one of the most important competitive tools and is generally seen as a core value for measuring a company's capabilities. Rosli and Sidek (2013) explained that innovation may result from activities, R&D, methodologies, items and new technologies. According to Migdadi (2022), an innovation output can be a new concrete product, service, managerial practice, or new marketing strategy that is different from before. Byukusenge et al. (2016) noted that the innovation indicators of MSMEs include product innovation, processes, and product processes. At the same

time, the innovation indicators used by Migdadi (2022) were product innovation, process innovation, and output innovation. Rosli and Sidek (2013) measured innovation using product, process and market innovation indicators. Meanwhile, Nybakk (2012) stated that the MSME innovation indicators consist of product innovations, processes and business systems.

2.6. Risk Attitude

Risk attitude is the manager or business owner's attitude towards the risks a business faces (Saurabh & Nandan, 2018). A business owner's risk attitude guides them when pursuing risky financial resource opportunities with previously unknown outcomes (KMMCB et al., 2019). Hillson and Murray-Webster (2007) explained that risk attitude is a type of emotional literacy in risk management, which takes the form of a person or group's self-awareness. The process of understanding and managing risk attitudes comprises four aspects, namely, understanding the feelings that an uncertain condition arouses, the reasons behind these feelings, responses relevant to the achievement of goals, and potential alternative solutions. According to Aisyah et al. (2018), risk attitude indicators include betting on self-creation, capitalizing on opportunities, accurate purchasing, a lack of fear of losing, and confidence in the stability of one's income. Risk attitude measurement, according to KMMCB et al. (2019), uses the indicators of risk perception and risk propensity/aversion, whereas according to Buchdadi et al. (2020), the risk attitude indicators consist of risk aversion, risk-seeking, risk tolerance and risk neutrality.

3. HYPOTHESIS DEVELOPMENT

Knowledge management is a strategic resource and is considered MSMEs' best business tactic to increase their level of competition (Byukusenge & Munene, 2017). This is because, with knowledge management capabilities, MSMEs can innovate and compete at a higher level. Knowledge-based theory suggests that, if managed properly, intangible assets such as the knowledge of owners and their employees will give an organization a competitive advantage (Zack et al., 2009). Likewise, the results of Hussain et al. (2022) show that knowledge management practices such as creating, sharing, implementing and storing knowledge are critical to achieving superior business performance. Knowledge-based theory further emphasizes that MSMEs that want to remain competitive must focus on managing their knowledge resources because they are an important factor in increasing revenue, profits and market share (Shahzad et al., 2016). Several studies have proven that knowledge management has a positive influence on the performance of MSMEs (Alaarj, Mohamed, & Bustamam, 2017; Desouza & Awazu, 2006; Gharakhani & Mousakhani, 2012; Gholami et al., 2013; Ha, Lo, & Wang, 2016; S. Lee et al., 2012; Migdadi, 2022; Salojärvi et al., 2005; Zack et al., 2009). Therefore, based on the previous findings concerning the relationship between the variables, the first hypothesis of this study is:

H1: Knowledge management significantly influences MSME performance.

Financial literacy is a major factor in improving a company's wealth accumulation and the effectiveness of its performance (KMMCB et al., 2019). Thus, it is one of the most important driving forces in strategic long-term financial decision-making and planning (Agyei, 2018). Furthermore, Prisca (2016) explained that companies that master financial management have good financial insight into strategic issues, which will improve the company's performance. Xiao (2020) expressed the importance of financial literacy for the survival of MSMEs in both developed and developing countries. Similarly, Damayanti et al. (2018) found that MSMEs with strong financial knowledge are more likely to invest in complex assets and improve their performance. Several studies confirm the positive influence of financial literacy on MSME performance (Agyapong & Attram, 2019; Agyei, 2018; Esiebugie et al., 2018; Jati, De Rosary, Fanggalda, & Makatita, 2021). Therefore, the second hypothesis in this study is:

H2: Financial literacy significantly influences the performance of MSMEs

Innovation is not only relevant in large companies but also in the MSME sector (Baregheh et al., 2009). When MSMEs operate in uncertain environments, developing innovation capabilities is critical to the success of the

business (Saunila, Pekkola, & Ukko, 2014). One way to improve innovation capabilities is through knowledge management in the form of the acquisition, creation, generation, utilization, and dissemination of knowledge and skills, which will boost the ability to innovate (Souza et al., 2016). When group members share and exchange knowledge, the participation rate increases, which helps create innovative ideas (Lee et al., 2012). Wirakurnia et al. (2021), Lee and Wong (2015) and Hussain et al. (2022) found that the knowledge management components (acquisition, application and responsiveness of knowledge) had a significant impact on innovation capabilities.

Innovation ability has a role in improving the performance of MSMEs (Sanawiri & Iqbal, 2020). Otache et al. (2021) stated that entrepreneurs need innovation to improve their company's performance. Migdadi (2022) and Durmuş-Özdemir and Abdulkhoshimov (2018) stated that knowledge management can improve innovative activities and abilities because the knowledge gained can be used to make appropriate practical business decisions to improve business performance. Rosli and Sidek (2013), Sanawiri and Iqbal (2020), Bahta et al. (2021), Ratnawati (2017), Kolbe, Frasquet, and Calderon (2022), Ng et al. (2020) and Saunila et al. (2014) concluded that innovation affects the performance of MSMEs. Based on the previous evidence regarding the relationship between the variables, a hypothesis is formulated as follows:

H3: Innovation capabilities mediate the effect of knowledge management on the performance of MSMEs.

MSMEs with good financial literacy will be able to make the right decisions about financing options for business development, which will improve their ability to respond positively to competitive challenges, innovate, overcome problems and create value (Hewitt-Dundas, 2006). Similarly, Eniola and Entebang (2017) stated that MSMEs with good financial literacy will be able to access the right financial resources and carry out good financial management to support their development, as well as support the role of new technologies that will make the MSME more innovative, productive and competitive. Yuliani et al. (2020) explained that MSMEs' financial literacy in the form of the ability to budget and compile financial reports could encourage them to make good operational decisions, including innovating to introduce new products or services. Studies by Eniola and Entebang (2016), Eniola and Entebang (2017), Liu et al. (2021) and Yuliani et al. (2020) have shown that financial literacy is a key factor that affects innovation, allowing MSMEs to run their business operations more effectively and successfully.

Innovation capabilities relate to the implementation of new ideas to create products, services and processes that are different from before (Otache et al., 2021). According to Ali et al. (2020), innovation capabilities enhance an organization's ability to set higher quality standards in their products, services and processes to improve the MSME's operational performance. Ng et al. (2020) stated that for MSMEs, innovation is a vital tool for improving company performance. Several previous studies have shown that product and process innovation has a positive relationship with MSME performance through increased productivity (Huhtala, Sihvonen, Frösén, Jaakkola, & Tikkanen, 2014; Oly & Iftikhar, 2012) and internal efficiency (Kocak, Carsrud, & Oflazoglu, 2017; Ratnawati, 2017) as it reduces production costs and positively impacts financial performance, specifically sales growth (Bahta et al., 2021; Wolf, Kaudela-Baum, & Meissner, 2012) and increased profits (Saunila et al., 2014). Based on previous evidence on the relationship between the variables, the fourth hypothesis is formulated as follows:

H4: Innovation capabilities mediate the effect of financial literacy on MSME performance.

A business owner's risk attitude guides them when pursuing risky financial resource opportunities of which the outcomes are not yet known (KMMCB et al., 2019). Knowledge management is a cognitive factor that can affect risk attitude (Hillson & Webster, 2005). Hock-Doepgen et al. (2021) showed that MSMEs with good internal knowledge management will display low risk-taking tolerance. Similarly, Liu et al. (2015) showed that the complementarity and integration of knowledge can influence the attitude toward risk when dealing with external uncertainties, enabling MSMEs to survive in a challenging environment. Lammers, Willebrands, and Hartog (2010) stated that risk perception is the most important characteristic of risk attitude and positively influences profits. Entrepreneurs with a better perception of financial risks will obtain higher profits (Buchdadi et al., 2020). Despite higher costs and revenues, they can operate their business on a larger financial scale with controlled risks

that can generate high profits. Willebrands, Lammers, and Hartog (2012) also noted that it is the entrepreneur with higher risk awareness, which leads to careful action, who will be able to increase sales volumes. Previous research (Aisyah et al., 2018; Bandara & Ekanayake, 2020; Buchdadi et al., 2020; Games & Rendi, 2019; Qazi, Daghfous, & Khan, 2021) has concluded there is a correlation between risk attitude and improved performance. Based on this idea, the fifth hypothesis was formulated:

H5: Risk attitude mediates the effect of knowledge management on MSME performance.

Financial literacy helps improve managerial knowledge and skills, leading to the effective management of financial resources and organizational affairs (Saurabh & Nandan, 2018). Buchdadi et al. (2020) found a correlation between financial literacy and education level, along with risk attitude. Managers with high financial literacy and a high level of education will have a risk attitude that benefits the organization. Inga and Wilhelmsson (2017) also found a positive relationship between financial literacy and risk attitude. Furthermore, Duréndez, Dieguez-Soto, and Madrid-Guijarro (2023) stated that increasing financial literacy within a company boosts the achievement of relevant knowledge and attitudes when facing financial risks and challenges.

Lammers et al. (2010) stated that the perception of risk positively influences profits. Buchdadi et al. (2020) stated that companies that have a better perception of financial risk can generate higher returns. Previous research (Aisyah et al., 2018; Bandara & Ekanayake, 2020; Buchdadi et al., 2020; Games & Rendi, 2019; Qazi et al., 2021; Willebrands et al., 2012) has found a correlation between risk attitude and improved performance. Financial literacy and the right risk attitude will help MSME owners cope with business uncertainty and achieve better financial and strategic performance (KMMCB et al., 2019). Based on these considerations, the sixth hypothesis is formulated:

H6: Risk attitude mediates the effect of financial literacy on MSME performance.

4. METHODS

This study used a quantitative approach to develop a model of and test MSMEs' innovation ability and risk attitude and how these mediate the influence of knowledge management and financial literacy on MSME performance. The population comprised halal-certified MSMEs registered with the Cooperatives and Industry Office in the local area that had been in operation for more than one year: a total of 195 MSMEs. A full sample was utilized, meaning that all MSMEs in the population were used as research samples, so no sampling technique was required.

Table 1. Operational matrix of research variables.

Variables	Indicators	Sources
Knowledge management	Knowledge acquisition	Lee and Wong (2015); Byukusenge et al. (2016); Samir (2020); Wirakurnia et al. (2021); Souza et al. (2016); Hussain et al. (2022)
	Knowledge creation and generation	
	Knowledge application and utilization	
	Knowledge transfer and sharing	
	Knowledge storage and documentation	
Financial literacy	Bookkeeping literacy	Ratnawati et al. (2022); Mabula and Han (2018); Rahim and Balan (2020); Babajide et al. (2021)
	Budgeting literacy	
	Debt literacy	
Innovation capability	Product innovation	Byukusenge et al. (2016); Migdadi (2022); Rosli and Sidek (2013)
	Process innovation	
	Market innovation	
Risk attitude	Capitalizing on opportunities	Aisyah et al. (2018); KMMCB et al. (2019); Buchdadi et al. (2020)
	Accurate purchasing	
	No fear of losing	
	Confidence in the stability of income	
MSME performance	Financial performance	Hafeez et al. (2013); Karadag (2017); Mel et al. (2001); Ng et al. (2020)
	Production performance	
	Marketing performance	

This study used primary data obtained directly from respondents and collected through questionnaires with the operational variables outlined in Table 1.

Table 1 shows that knowledge management is measured by 5 indicators, financial literacy is measured by 3 indicators, innovation capability is measured by 3 indicators, risk attitude is measured by 4 indicators, and MSME performance is measured by 3 indicators.

A Likert scale was used to measure the research variables with scores of 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. The research data was analyzed using structural equation modelling (SEM-Amos). Several types of *fit* indexes were used to measure the degree of conformity between the hypothesized model and the data presented to test the feasibility of the model. After the model was qualified, the hypotheses were tested using the critical ratio (CR), which was assessed with the probability value (p). If the p-value < 0.05, the influence was significant; p > 0.05 indicated an insignificant influence. Meanwhile, to determine whether a variable could act as a mediating variable, the approach of Baron and Kenny (1986) was employed. The mediation test was used to determine whether the mediating variable resulted in complete or partial mediation.

5. RESULTS

5.1. Characteristics of the Respondents

The characteristics of the study's respondents, including the demographic characteristics of the business owners and the characteristics of their MSMEs, can be seen in Table 2.

Table 2. Profile of the respondents.

Respondent profile		Frequency	Percentage (%)
Gender	Male	41	21.0
	Female	154	79.0
Education	Junior high school	35	17.9
	Senior high school	107	54.9
	Diploma	11	5.6
	Undergraduate	38	19.5
	Postgraduate	3	1.5
Region	Malang city	55	28.2
	Malang district	80	41.0
	Batu city	60	30.8
Certification	2018	12	6.2
	2019	28	14.4
	2020	12	6.2
	2021	88	45.1
	2022	55	28.2
Income	< Rp 50.000.000	134	68.7
	Rp 51.000.000 – Rp 100.000.000	43	22.1
	Rp 101.000.000 – Rp 200.000.000	4	2.1
	Rp 200.000.000 – Rp 300.000.000	8	4.1
	> Rp 300.000.000	6	3.1
Number of employees	1-4 people	163	83.6
	5-19 people	29	14.9
	20-99 people	3	1.5

Note: n = 195 samples.

5.2. Confirmatory Factor Analysis (CFA) Results

Confirmatory factor analysis (CFA) was used to measure the variable indicators that can form latent variables and determine the factor loading values of the indicators of the variables of knowledge management, financial literacy, innovation capabilities, risk attitudes and MSME performance. A summary of the CFA test results for the indicators that make up the variables of knowledge management, financial literacy, innovation capabilities, risk attitudes and MSME performance is shown in Table 3:

Table 3. Loading factors of the indicators.

Variables and indicators	LF
X1.1. Knowledge acquisition → Knowledge management	0.687
X1.2. Knowledge creation and generation → Knowledge management	0.660
X1.3. Knowledge application and utilization → Knowledge management	0.675
X1.4. Knowledge transfer and sharing → Knowledge management	0.657
X1.5. Knowledge storage and documentation → Knowledge management	0.602
X2.1. Bookkeeping literacy → Financial literacy	0.838
X2.2. Budgeting literacy → Financial literacy	0.850
X2.3. Debt literacy → Financial literacy	0.638
Y1.1. Product innovation → Innovation capability	0.753
Y1.2. Process innovation → Innovation capability	0.563
Y1.3. Market innovation → Innovation capability	0.669
Y2.1. Capitalizing on opportunities → Risk attitude	0.778
Y2.2. Accurate purchasing → Risk attitude	0.750
Y2.3. No fear of losing → Risk attitude	0.673
Y2.4. Confidence in the stability of income → Risk attitude	0.717
Y3.1. Financial performance → MSME performance	0.757
Y3.2. Production performance → MSME performance	0.649
Y3.3. Marketing performance → MSME performance	0.638

Based on the results in Table 3, knowledge acquisition is an important indicator for the variable of knowledge management. Budgeting literacy is an important indicator for financial literacy. The product innovation indicator is important in forming the variable of innovation capability. Capitalizing on opportunity is an important indicator of the risk attitude variable. Finally, the financial performance indicator is the most important indicator of the MSME performance variable.

5.3. SEM Analysis Results

The results of testing with SEM are presented in Figure 1.

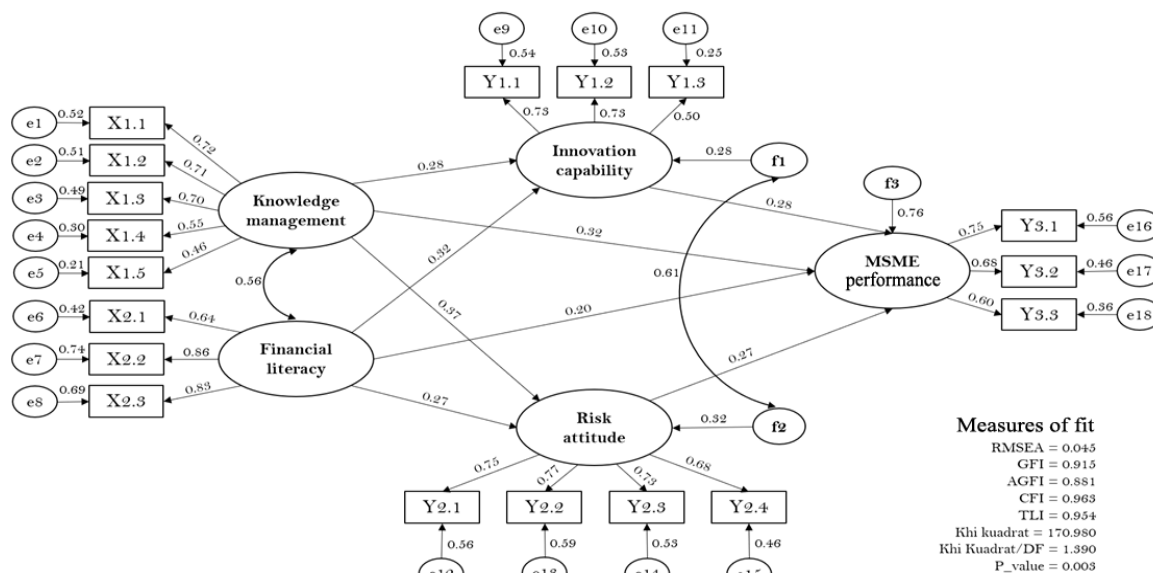


Figure 1. The result of the model's overall goodness-of-fit test.

The final model test results presented in Figure 1 were evaluated based on the criteria of the goodness-of-fit indices. The evaluation of the proposed model against the construct as a whole has produced a value above critical. Byrne (2001) revealed that the best criteria to use as an indication of a model's goodness of fit were the minimum sample discrepancy function divided by the degree of freedom (CMIN/DF) value, which should be less than two,

and the root mean square error of approximation (RMSEA), which should be below 0.08. In this study, the CMIN/DF value was 1.390, and the RMSEA value was 0.045, so the criteria were met. As the values were close to the cut-off values of the adjusted goodness-of-fit index (AGFI) and the Tucker–Lewis index (TLI), they were accepted. A good cut-off value for AGFI is above or equal to 0.90 and for TLI above or equal to 0.95. The results of this study showed an AGFI value of 0.881 and a TLI value of 0.954. Overall, based on the goodness-of-fit testing, the model can be categorized as suitable for use in further analysis.

5.4. Hypothesis Testing Results

The results of hypothesis testing, both for the direct and indirect effects, are detailed in Table 4:

Table 4. Results of hypothesis testing.

Category	Estimate	CR	p-value	Result
Knowledge management → MSME performance	0.325	2.719	0.007	Significant
Financial literacy → MSME performance	0.200	2.173	0.030	Significant
Mediation 1 KM-IC-MP				
Knowledge management → Innovation capability	0.438 ^a	3.769	0.000	Significant
Innovation capability → MSME performance	0.532 ^b	5.090	0.000	Significant
Knowledge management → MSME performance	0.446 ^c	3.753	0.000	Significant
Knowledge management → MSME performance	0.689 ^d	5.068	0.000	Significant
Mediation 2 KM-RA-MP				
Knowledge management → Risk attitude	0.504 ^a	4.492	0.000	Significant
Risk attitude → MSME performance	0.531 ^b	5.258	0.000	Significant
Knowledge management → MSME performance	0.409 ^c	3.488	0.000	Significant
Knowledge management → MSME performance	0.689 ^d	5.068	0.000	Significant
Mediation 3 FL-IC-MP				
Financial literacy → Innovation capability	0.483 ^a	4.932	0.000	Significant
Innovation capability → MSME performance	0.545 ^b	4.839	0.000	Significant
Financial literacy → MSME performance	0.379 ^c	3.837	0.000	Significant
Financial literacy → MSME performance	0.644 ^d	6.144	0.000	Significant
Mediation 4 FL-RA-MP				
Financial literacy → Risk attitude	0.479 ^a	5.202	0.000	Significant
Risk attitude → MSME performance	0.562 ^b	5.402	0.000	Significant
Financial literacy → MSME performance	0.375 ^c	4.102	0.000	Significant
Financial literacy → MSME performance	0.644 ^d	6.144	0.000	Significant

Note: KM (Knowledge management), FL (Financial literacy), IC (Innovation capability), RA (Risk attitude), MP (MSME performance) (a), (b) and (c) are the results of the path coefficients and the overall model, and (d) are the results of the path coefficient of the overall model without any mediating variables. CR = critical ratio.

Table 4 shows that the effect of knowledge management on MSME performance had a CR value of 2.719 with a p-value of 0.007. Also, the effect of financial literacy on MSME performance had a CR value of 2.173 and a p-value of 0.030. Therefore, the hypotheses that knowledge management and financial literacy directly affect MSME performance are accepted.

Based on the confidence test results of mediation path 1, the knowledge management variable mediated by innovation capability significantly affects the performance of MSMEs with a coefficient value of 0.446 (c). The value of the coefficient is smaller than that of the direct influence of knowledge management on MSME performance without innovation capability as a mediating variable, which has a coefficient value of 0.689 (d). The results of the confidence test on mediation path 2, namely the mediation of the effect of the knowledge management variable by the risk attitude, suggest a significant effect on MSME performance, with a coefficient value of 0.409 (c). However, the value of the coefficient is smaller than the influence of knowledge management on MSME performance in the absence of risk attitude as a mediating variable, which has a coefficient value of 0.689 (d).

The results of the confidence test on mediation path 3, namely the financial literacy variable mediated by innovation capability, showed a significant effect on MSME performance with a coefficient value of 0.379 (c). The

value of the coefficient is smaller than the effect of financial literacy on MSME performance without the mediating variable of innovation capability, which has a coefficient value of 0.644 (d). Meanwhile, the confidence test results of mediation path 4, namely the financial literacy variable mediated by risk attitude, show a significant effect on MSME performance with a coefficient value of 0.375 (c). However, the value of the coefficient is smaller than the influence of financial literacy on MSME performance without risk attitude as a mediating variable, which has a coefficient value of 0.644 (d).

Thus, based on the criteria (Baron & Kenny, 1986), innovation ability and risk attitude partially mediate the effects of knowledge management and financial literacy on MSME performance.

6. DISCUSSION

6.1. *The Effect of Knowledge Management on MSME Performance*

Based on the results of hypothesis testing, it can be concluded that halal-certified MSMEs in Malang Raya that can acquire knowledge can improve their performance, particularly financially, as indicated by increases in operating profit, revenue, fixed assets and current assets owned by halal-certified MSME owners in Malang Raya. Knowledge can be acquired by MSME owners enrolling their employees in training to gain new knowledge about halal certification and pursuing updated knowledge from customers, suppliers and competitors. The results of this study corroborate the findings of a previous study by Shahzad et al. (2016), who concluded that MSME knowledge management will help businesses become more competitive, thereby increasing revenue, profits, and market share. According to (Byukusenge & Munene, 2017), if a business can manage knowledge resources in a strategic and structured manner, then a competitive advantage can be achieved, and the company's performance will increase. Hussain et al. (2022) suggested that knowledge management is a fundamental determining factor of a company's performance and competitive advantage in the present and future. The results of this study corroborate those of Gholami et al. (2013), Migdadi (2022), S. Lee et al. (2012), Zack et al. (2009), Gharakhani and Mousakhani (2012), Desouza and Awazu (2006), Ha et al. (2016), Salojärvi et al. (2005) and Alaarj et al. (2017), which concluded that knowledge management has a positive influence on the performance of MSMEs.

6.2. *The Effect of Financial Literacy on MSME Performance*

Based on the hypothesis testing results, halal-certified MSMEs in Malang Raya that display financial literacy by making plans at the beginning of the business, setting budgets to stay on target, and comparing the costs incurred with the income obtained can improve their financial performance, as indicated by increases in operating profit, revenue, fixed assets and current assets.

This study aligns with KMMCB et al. (2019), who expressed that financial literacy is a major factor in improving wealth accumulation and the effectiveness of company performance and is thus one of the most important driving forces in strategic long-term financial decision-making and planning (Agyei, 2018). Furthermore, Prisca (2016) explained that companies that master financial management could have good insight into strategic issues from a financial perspective, which can improve the company's performance. The results of this study corroborate those of KMMCB et al. (2019), Agyei (2018), Prisca (2016), Xiao (2020), Damayanti et al. (2018), Jati et al. (2021), Esiebugie et al. (2018), Agyei (2018) and Agyapong and Attram (2019), which concluded that financial literacy influences the performance of MSMEs.

6.3. *The Ability to Innovate Mediates Knowledge Management's Influence on MSME Performance*

Innovation makes an important contribution to organizational success, performance and survival. Innovation applies not only to large companies but also to the MSME sector (Baregheh et al., 2009). The results of hypothesis testing prove that an MSME's innovation ability can mediate the influence of knowledge management on the MSME's performance. This result means that halal-certified MSMEs in Malang Raya that are oriented towards

acquiring knowledge, as demonstrated by MSME owners enrolling their employees in training to obtain knowledge about halal certification and always striving to get updated knowledge from customers, suppliers and competitors, improve their ability to implement product innovation by creating products with new materials, new product functions and new designs, as well as new products that suit consumer needs. The contribution of knowledge management to innovation capabilities has an impact on improving the financial performance of MSMEs, as indicated by increases in operating profits, revenue, fixed assets and current assets owned by halal-certified MSME owners in Malang Raya.

This result is the same as that of [Saunila et al. \(2014\)](#), who stated that MSMEs operate in an uncertain environment, meaning that developing innovation capabilities is very important for business success, and one of the efforts made to improve innovation capabilities is through knowledge management in the form of the acquisition, creation, generation, utilization and deployment of knowledge and skills, which will boost the ability to innovate ([Souza et al., 2016](#)). When group members share and exchange knowledge, the participation rate will increase, which helps create original, innovative ideas ([Lee et al., 2012](#)). According to [Ali et al. \(2020\)](#), innovation capabilities enhance organizations' ability to set higher quality standards in their products, services and processes, which in turn improves the operational performance of MSMEs. [Ng et al. \(2020\)](#) stated that for MSMEs, innovation is a vital tool for improving company performance.

The results of this study corroborate those of [Wirakurnia et al. \(2021\)](#), [Lee and Wong \(2015\)](#) and [Hussain et al. \(2022\)](#), who found that the components of knowledge management (acquisition, application and responsiveness of knowledge) had a significant impact on innovation capabilities. Innovation ability contributes to improving the performance of MSMEs ([Otache et al., 2021](#); [Sanawiri & Iqbal, 2020](#)). Moreover, [Rosli and Sidek \(2013\)](#), [Sanawiri and Iqbal \(2020\)](#), [Bahta et al. \(2021\)](#), [Ratnawati \(2017\)](#), [Kolbe et al. \(2022\)](#), [Ng et al. \(2020\)](#) and [Saunila et al. \(2014\)](#) concluded that innovation influences the performance of MSMEs. These findings further corroborate the research of [Migdadi \(2022\)](#) and [Durmuş-Özdemir and Abdulkhoshimov \(2018\)](#), who concluded that innovation capability is a mediating factor that strengthens the influence of knowledge management on MSME performance.

6.4. Risk Attitude Mediates the Influence of Knowledge Management on MSME Performance

The results of hypothesis testing prove that risk attitudes can mediate the influence of knowledge management on the performance of MSMEs. This result means that halal-certified MSMEs in Malang Raya that are oriented towards knowledge acquisition, as demonstrated by MSME owners enrolling their employees in training to obtain knowledge about halal certification and always striving to get updated knowledge from customers, suppliers and competitors, can improve their risk attitude and utilization of opportunities because the owner will always take advantage of the business opportunities that arise and believe that the existing business opportunities will provide benefits. The contribution of knowledge management to risk attitudes improves the financial performance of MSMEs as indicated by increases in operating profits, income, fixed assets and current assets of owners of halal-certified MSMEs in Malang Raya.

The results of this study are in line with the concept of development proposed by [Saurabh and Nandan \(2018\)](#), who suggested that risk attitude is the attitude of business owners towards the risks the business faces and leads business owners to pursue risky financial opportunities with previously unknown results ([KMMCB et al., 2019](#)). [Hock-Doepgen et al. \(2021\)](#) showed that MSMEs with good internal knowledge management will effectively have lower risk-taking tolerance and obtain higher profits ([Buchdadi et al., 2020](#)). [Willebrands et al. \(2012\)](#) expressed that higher awareness of risks leads to prudent action, which can increase sales volumes.

The results of this study corroborate those of [Liu et al. \(2015\)](#), who showed that knowledge complementarity and integration can influence risk attitudes when dealing with external uncertainties, enabling MSMEs to survive and take risks that can provide performance improvements ([Aisyah et al., 2018](#); [Bandara & Ekanayake, 2020](#); [Buchdadi et al., 2020](#); [Games & Rendi, 2019](#); [Qazi et al., 2021](#)).

6.5. The Ability to Innovate Mediates Financial Literacy's Influence on MSME Performance

The results of hypothesis testing prove that innovation ability can mediate the influence of financial literacy on MSME performance. This result means that halal-certified MSMEs in Malang Raya that display financial literacy by making plans at the beginning of the business, setting budgets to stay on target, and comparing the costs incurred with the income obtained can improve their ability to implement product innovation by creating products with new materials, new product functions and new designs, as well as new products that suit consumer needs. The contribution of financial literacy to innovation capabilities has the effect of improving the financial performance of MSMEs, as shown by increases in operating profits, revenue, fixed assets and current assets owned by halal-certified MSMEs in Malang Raya.

The results of this study align with the development concept proposed by [Hafeez et al. \(2013\)](#), which stated that companies with strong financial literacy will have a stronger ability to innovate than other companies. Innovation capabilities can be increased through financial literacy in the form of the ability to budget, plan and compile financial reports, which can encourage MSMEs to make daily operational decisions that include innovation ([Yuliani et al., 2020](#)). [Eniola and Entebang \(2016\)](#) and [Liu et al. \(2021\)](#) showed that financial literacy is a key factor influencing innovation and enabling MSMEs to run effective and successful business operations.

The results of this study also corroborate those of [Duréndez et al. \(2023\)](#) and [Patimah and Maulana \(2022\)](#). [Widyaningsih, Siswanto, and Zusrony \(2021\)](#) showed that financial literacy has a positive effect on the innovation of MSMEs and that innovation is a vital tool for improving a company's performance ([Ng et al., 2020](#)). [Oly and Iftikhar \(2012\)](#), [Ndubisi and Iftikhar \(2012\)](#), [Saunila et al. \(2014\)](#), [Issau et al. \(2021\)](#), [Maldonado-Guzmán et al. \(2018\)](#), [Huhtala et al. \(2014\)](#) and [R. Ratnawati \(2017\)](#) concluded that innovation influences MSME performance.

6.6. Risk Attitude Mediates the Influence of Financial Literacy on MSME Performance

The results of hypothesis testing prove that risk attitudes can mediate the influence of financial literacy on the performance of MSMEs. This result means that halal-certified MSMEs in Malang Raya that display financial literacy by making plans at the beginning of the business, setting budgets to stay on target, and comparing the costs incurred with the income obtained can improve their risk attitude and utilization of opportunities because the owner will always take advantage of the business opportunities that arise and believe that the existing business opportunities will provide benefits. The contribution of financial literacy to risk attitudes has the effect of improving the financial performance of MSMEs as indicated by increases in operating profits, income, fixed assets and current assets owned by halal-certified MSMEs in Malang Raya.

The results of this study are in line with the concept proposed by [Saurabh and Nandan \(2018\)](#) that companies that have strong financial literacy will have a better risk attitude than other companies, and an appropriate risk attitude can help to mitigate business uncertainty and thus improve financial and strategic performance ([Buchdadi et al., 2020](#)).

The results of this study corroborate those of [Inga and Wilhelmsson \(2017\)](#) and [Duréndez et al. \(2023\)](#), who showed that financial literacy has a positive effect on MSME actors' risk attitudes, contributing to improving MSME performance ([Aisyah et al., 2018](#); [Buchdadi et al., 2020](#); [Games & Rendi, 2019](#)). [Lammers et al. \(2010\)](#) stated that MSME owners who have good risk perception will be able to improve their business performance. [Willebrands et al. \(2012\)](#) and [KMMCB et al. \(2019\)](#) concluded that risk attitude influences the performance of MSMEs.

7. IMPLICATIONS

The focus of this study was on improving the performance of halal MSMEs through the role of knowledge, which, in knowledge-based theory, is the most valuable resource for achieving a sustainable competitive advantage. This study's knowledge-based theory approach explains that halal MSMEs in Malang Raya, Indonesia, will improve their performance if their owners are able to effectively master and utilize knowledge by implementing

good knowledge management and sound financial literacy. MSME owners can improve knowledge management by enrolling their employees in training to acquire new knowledge about halal certification and striving to obtain updated knowledge from customers, suppliers and competitors. Financial literacy knowledge can be displayed by making plans at the beginning of the business, setting budgets to stay on target, and comparing the costs incurred with the income obtained.

Good knowledge management and financial literacy provide a solid foundation for innovation ability, which is expressed through the ability to create products with new materials, new product functions and designs, as well as new products that suit consumer needs. Moreover, they contribute to MSMEs' risk attitude, which is demonstrated by a willingness to take advantage of business opportunities and confidence that the existing business opportunities will provide benefits.

The application of knowledge-based theory in the development of this research model was in accordance with a study conducted by Grant (1996), which showed that effective knowledge management can influence innovation, which in turn improves organizational performance. Knowledge-based theory confirms the idea that when knowledge is effectively managed, it can create unique capabilities that help improve company performance through innovation (Maldonado-Guzmán et al., 2018; Migdadi, 2022). Therefore, superior business performance can be achieved through effective management that promotes innovation (Durmuş-Özdemir & Abdulkhoshimov, 2018).

8. CONCLUSIONS

Knowledge management and financial literacy influence the performance of MSMEs, and the innovation ability and risk attitudes displayed by owners of halal MSMEs in Malang Raya mediate the relationship between knowledge management and financial literacy and the performance of these MSMEs. The results of this research can enrich the understanding of the science related to knowledge-based theory by proving that halal MSMEs will achieve high performance if they master and utilize knowledge effectively, which is implied in their level of knowledge management and financial literacy and expressed through their innovation capabilities and risk attitudes.

For halal MSME actors in Malang Raya, it is necessary to improve knowledge management in the area of knowledge storage and documentation by increasing awareness of the need for good documentation for business improvement and progress and by teaching them how to store documents efficiently. Owners of halal MSMEs in Malang Raya should increase their understanding of debt literacy to make the right debt decisions and choose loan products that align with their business level. In addition, MSME owners need to improve their process innovation through improved equipment and process improvements in all stages of production, distribution and logistics. Owners of halal MSMEs in Malang Raya need to be more aware of the risks they face. In the current era of globalization, every business faces complexity, change and increasingly fierce competition; therefore, MSMEs must be able to adapt. Subsequent researchers should conduct studies on how the business environment, technology and business networking can help improve the performance of MSMEs.

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