

UNDERSTANDING DIGITAL ADOPTION AMONG INDONESIAN MSMEs: THE ROLE OF BEHAVIOURAL BIASES, FINANCIAL LITERACY, AND HEDONIC MOTIVATION

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ABSTRACT

This study is quantitative research that examines the role of financial literacy and behavioural biases among MSME actors in Indonesia in shaping decisions related to digital adoption. This study uses data from 180 MSME owners and managers operating in Indonesia and applies Partial Least Squares Structural Equation Modelling (PLS-SEM) for data-analysis. The findings show that financial literacy has a positive influence on digital adoption, while heuristics, loss aversion, and overconfidence have negative effects on digital adoption. Hedonic motivation, as a moderating variable, strengthens the relationship between financial literacy and digital adoption and reduces the negative effects of heuristics and overconfidence. However, hedonic motivation does not reduce the influence of loss aversion on digital adoption. This study contributes to the literature by developing an integrated framework that combines financial literacy, behavioural biases, and hedonic motivation in explaining digital adoption decisions among MSMEs, while extending behavioural research through the identification of the moderating role of hedonic motivation in shaping bias-driven decision-making, and providing empirical evidence from the Indonesian MSME context, where such integrated analyses remain limited. Digitalisation should be accompanied by improvements in financial literacy and the development of user-friendly and enjoyable digital systems.

Keywords: *Digital adoption, Behavioural Biases, Financial Literacy, MSME, Hedonic Motivation.*

1 INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) serve as one of the primary drivers of Indonesia's economy. This sector accounts for 61.9% of the nation's GDP, with approximately 65.5 million enterprises operating nationwide as of 2025. Recent statistics further indicate a total of 59,519,650 MSMEs formally registered in Indonesia, consisting of both non-agricultural sectors and the agricultural-fisheries sectors. Non-agricultural MSMEs constitute 50.7% of registered enterprises, a total of 30,178,617 units, and are predominantly composed of micro business units. Meanwhile, agricultural and fisheries MSMEs represent 49.3% of registered enterprises, amounting to 29,341,033 units, the vast majority of which operate as individual agricultural businesses. These figures underscore that MSMEs are not only the

backbone of Indonesia's economic activity, but also a critical source of employment, absorbing around 97% of the national workforce and representing approximately 99% of business units.

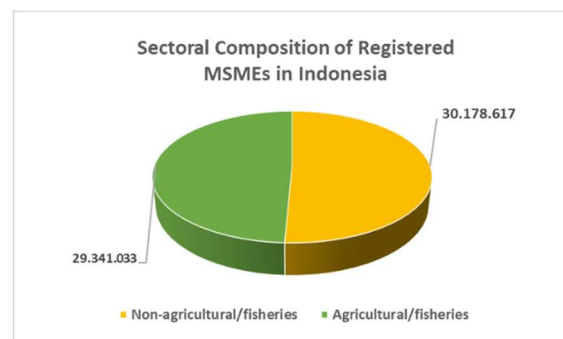


Figure 1: Sectoral Composition of Registered MSMEs in Indonesia.

Given their pivotal role in the economy, MSMEs' competitiveness and sustainability are strongly influenced by their level of financial literacy, as it strengthens their ability to navigate market uncertainties and capitalise on available opportunities [1]. Nevertheless, many MSMEs continue to struggle to implement effective financial management, largely due to insufficient financial literacy [1]. Sari et al. [2] suggests that this is partly explained by MSME actors' tendency to prioritise business survival above other strategic considerations. Such circumstances increase susceptibility to cognitive biases, systematic patterns in judgement and information processing that can lead to suboptimal decisions [3], [4], [5], [6]. Such distortions frequently manifest into biases such as overconfidence, heuristics, and loss aversion [7], [8], collectively constraining rational decision-making within MSMEs. Compounding this issue, a majority of MSMEs are found to lack the managerial and digital expertise required to effectively implement and benefit from digital transformation [9]. These limitations lead to irrational financial judgement, impede strategic planning, and threatens long-term sustainability.

In response, the importance of financial literacy has been widely affirmed as a key determinant of sound financial behaviour [10], [11], [12], [13], [14]. Empirical evidence by Dewi et al. [15] demonstrates that financial attitudes and competencies are strongly linked to improved financial management behaviour among MSME actors. Similarly, MSME performance, reflected on the ability to manage financial resources and carry out effective decision making, has been shown to be closely associated with the level of financial literacy of MSME actors [11].

Alongside financial capability considerations, Indonesia's rapid digital transformation introduces both opportunities and challenges for MSMEs [2], [9], [16], [17], [18]. Policymakers and industry stakeholders widely acknowledge that digitalisation plays a crucial role in enabling MSMEs to capitalise on emerging opportunities and substantially enhance operational effectiveness [19], [20]. In parallel with this shift, digital adoption among Indonesian MSMEs has increased by approximately 24% since 2024, rising to 50% of MSMEs having transitioned to digital platforms as of 2025.



Figure 2: MSME Growth Amid Indonesia's Digital Transformation (2024–2025).

Despite the growing rate of adoption, scholarly understanding of MSME digital decision-making remains fragmented. Prior research on MSME digital adoption revolves around examining financial literacy, fintech usage, or behavioural biases separately resulting in a disjointed understanding of decision-making in digital contexts [2], [21], [22], [23], [24]. Evidence has shown that fintech adoption can yield inconsistent results when behavioural and capability constraints are present, yet integrated models capturing these interactions remain limited [23]. The Indonesian MSME landscape observed resistance to digital adoption further suggests that behavioural influences are not fully explored [2], while mixed empirical findings question whether managerial biases and fintech usage consistently improve MSME financial behaviour [24]. Moreover, studies examining hedonic motivation are primarily concentrated on consumer technology adoption, with limited exploration of its moderating function within MSME digitalisation decisions [21], [25], [26]. Consequently, a gap persists in establishing a unified framework that integrates behavioural biases, financial literacy, and motivational drivers to explain digital adoption among Indonesian MSMEs.

To address this gap, this study investigates the integrated effects of financial literacy, behavioural biases, namely overconfidence, heuristics, and loss aversion, and hedonic motivation on digital adoption among Indonesian MSMEs. Specifically, hedonic motivation is positioned as a moderating factor that conditions the relationship between the behavioural biases and financial literacy on digital adoption, thereby providing a more comprehensive understanding of the interplay between financial and non-financial determinants shaping MSME openness towards digital technologies. In doing so, this study contributes to the existing literature by developing an integrated framework that

simultaneously captures cognitive, financial, and motivational influences on digital adoption, while extending prior behavioural research through the examination of the moderating role of hedonic motivation in reducing the negative effects of cognitive biases. In addition, this study provides empirical evidence from the Indonesian MSME context, where such integrated analyses remain limited.

From a practical perspective, the findings of this study offer important implications for policymakers and stakeholders in designing more effective and inclusive digitalisation strategies targeted towards MSMEs. By demonstrating the role of financial literacy, behavioural biases, and hedonic motivation, this study suggests that digital adoption initiatives should not solely focus on enhancing technical capabilities but also address behavioural constraints and improve the perceived ease, enjoyment, and usability of digital platforms to encourage broader MSME participation.

2 LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Literature Review

Technological developments have progressed at a rapid pace and have now transformed economic activities, particularly in the fields of financial services and business operations. Digitalisation is often seen as an effective means of improving efficiency, expanding business access, and maintaining business competitiveness in this increasingly dynamic market. However, the decision to adopt digital technology is not solely determined by the availability of the technology itself, but also by behavioural and psychological factors that influence how an individual thinks and makes decisions. Not all SMEs think rationally when making decisions. Often, MSMEs are influenced by certain psychological biases rather than evaluating the information they receive comprehensively.

One of the most common biases is overconfidence. This bias reflects a tendency among business owners to overestimate their knowledge, abilities and level of control. This leads decision-makers to become overconfident, causing them to disregard structured digital systems and external information as they rely too heavily on their own judgement. According to previous research, this bias can hinder business owners from embracing fintech

and digital solutions, which ultimately slows down the adoption process [27], [28].

Another bias is loss aversion. Loss aversion refers to a business owner's tendency to fear losses far more than they enjoy gains, which makes them afraid to try new things or take the wrong steps in decision-making. This bias is a major barrier to the adoption of fintech and technology. Various studies show that due to uncertainty, data security issues, and operational procedures that are not yet fully understood, digital platforms are often misinterpreted as something risky [27], [29]. MSMEs perceive traditional business practices as safer and easier to manage; therefore, MSME decision makers who exhibit loss aversion tendencies tend to postpone or even avoid digital initiatives [30].

Another bias that affects digital adoption is heuristics. Heuristics represent a behaviour in which MSMEs make decisions based on past experience or long-standing habits without deep consideration, which leads them to resist change or new innovations. Previous research states that heuristics such as representativeness bias and availability bias influence technological and financial decisions, including decisions related to the use of digital platforms [28]. Based on other studies, decision making driven by heuristic bias can limit MSMEs in conducting a thorough evaluation of the actual benefits of digital technology, resulting in digital adoption behaviour that is inconsistent or tends to be hesitant [31].

In contrast to heuristics and loss aversion, which hinder digital adoption, financial literacy instead plays an important role as a capability that can help reduce the negative impact of behavioural biases. Financial literacy is not only related to the understanding of financial concepts but also includes the skills and confidence of MSME actors in managing financial products and using digital tools in business decision making. Previous research has shown that business owners with higher levels of financial literacy are better able to understand digital systems, assess potential risks, and adopt digital financial services more effectively [14], [32]. Furthermore, previous research has also found that better financial literacy can help SMEs manage their finances in a more structured manner, utilise fintech solutions, and achieve a higher level of readiness for digitalisation. [24], [30].

In addition to these biases, there is hedonic motivation, which refers to the tendency for MSME operators to adopt technology when it is perceived as enjoyable, easy to use, and provides a comfortable user experience. Previous research has shown that an individual's intention to adopt digital technology increases when the digital platform offers a positive and enjoyable experience [33]. In the context of fintech and digital finance, this sense of enjoyment makes users more active, encourages more frequent use, and promotes sustained usage, particularly among those already accustomed to digital technology [24].

This study employs behavioural economics as its primary theoretical framework, as this theory emphasises that decision-making is not always rational and logical. In practice, the decisions made by business owners are often influenced by cognitive biases and cognitive limitations, particularly when individuals face uncertainty and are bombarded with excessive information [34]. In the context of MSMEs, this perspective is relevant because business owners must consider many factors before deciding to adopt digital technology. Previous research has also shown that behavioural economics is increasingly being used in financial and business studies, where loss aversion, overconfidence, and heuristics are factors that frequently influence the decision-making process [35].

In addition to Behavioural Economics Theory, this study also refers to the UTAUT3 framework to explain the role of hedonic motivation in digital adoption. Previous research shows that when digital platforms are perceived as enjoyable and easy to use, individuals become more open and willing to accept and utilise them, even when uncertainty and perceived risk are still present [33]. Therefore, hedonic motivation is positioned as a moderating variable in this study, as it is expected to influence the strength or weakness of the role of behavioural biases and financial literacy in shaping digital adoption decisions among MSMEs [33].

Despite the rapid advancement of digital technology, it has proved highly beneficial for SMEs in developing their businesses. However, not all business owners are consistent in adopting digital technology. Previous research has shown that decision-making is not always rational, as many SMEs are often influenced by behavioural biases such as overconfidence, loss aversion and heuristics. However, these factors are usually studied separately

and are rarely combined within a single research framework to explain digital adoption.

Furthermore, there are financial literacy and hedonic motivation, both of which influence decision-making regarding the adoption of digital technology. However, the role of hedonic motivation as a moderating factor in the relationship between behavioural biases, financial literacy, and digital technology adoption has been limited in previous studies.

Therefore, given the limited research integrating these variables, this study aims to examine the role of behavioural bias, financial literacy, and hedonic motivation in shaping digital adoption among SMEs in Indonesia.

2.2 Research Questions

Based on the research question below, this study proposes several hypothesis as preliminary answers that will be tested. These hypothesis are grounded in previous studies, which aimed to investigate the relationship between behavioural biases, financial literacy, hedonic motivation, and digital adoption. These hypothesis provide a clear direction for testing whether the research questions are supported by the data.

1. How does heuristics influence digital adoption among Indonesian MSMEs?
2. How does overconfidence influence digital adoption among Indonesian MSMEs?
3. How does loss aversion influence digital adoption among Indonesian MSMEs?
4. How does financial literacy influence digital adoption among Indonesian MSMEs?
5. How does hedonic motivation moderate the relationship between heuristics and digital adoption among Indonesian MSMEs?
6. How does hedonic motivation moderate the relationship between overconfidence and digital adoption among Indonesian MSMEs?
7. How does hedonic motivation moderate the relationship between loss aversion and digital adoption among Indonesian MSMEs?
8. How does hedonic motivation moderate the relationship between financial literacy, and digital adoption among Indonesian MSMEs?

2.3 Hypothesis

2.3.1 Heuristics and digital adoption

Time constraints reduce the cognitive capacity available for careful information

evaluation, increasing uncertainty in decision making [36]. Moreover, excessive information may impede rather than facilitate decisions, as information overload reduces individuals' ability to effectively compare alternatives [37]. Under such conditions, decision-makers are more likely to rely on heuristic-based processing instead of engaging in systematic analytical reasoning [4]. Supporting this, Meier et al. [38] find that during heuristic processing tends to dominate during periods of low cognitive engagement. These behavioural and cognitive patterns are critical in shaping adoption outcomes, as individuals' behavioural responses significantly influence their adoption of digital technologies [33]. Based on these considerations, the following hypothesis is proposed: H1. HR has a negative effect on DA amongst Indonesian MSMEs

2.3.2 Overconfidence and digital adoption

Overconfidence refers to an inflated subjective belief in one's abilities that distorts objective judgement, leading individuals to overestimate their competence bases on personal reasoning rather than evidence-based evaluation [27], [39]. Empirical evidence indicates that such cognitive bias may hinder the adoption of digital innovations, as overconfidence reduces individuals' propensity to adopt fintech and other emerging digital technologies. Overconfident individuals also tend to rely excessively on existing routines or familiar systems, perceiving little need for change or external technological support, which increases the risk of overestimating positively perceived outcomes while underestimating potential negative consequences [27]. Based on the implications above, the following hypothesis is proposed: H2. Overconfidence has a negative effect on digital adoption amongst Indonesian MSMEs.

2.3.3 Loss aversion and digital adoption

Individuals are said to be more loss averse when the perception of potential losses outweighs the equivalent gains, causing decision-making to focus on avoiding losses even at the expense of potential benefits [38]. In the context of digital adoption, this perception manifests as financial risk, defined as the possibility of losses or unforeseen costs associated with digital financial services, which is often viewed as a major barrier despite the operational advantages of digitalisation [40], [41]. Conversely, some studies suggest that loss aversion

may also motivate adoption, as individuals may engage in digitalisation to mitigate future losses [42]. Accordingly, the following hypothesis is proposed: H3. Loss aversion significantly affects digital adoption amongst Indonesian MSMEs.

2.3.4 Financial literacy and digital adoption

Prior studies have extensively explored the link between financial literacy, defined as a fundamental understanding of economics and finance required for personal financial decision-making [32], and digital adoption. Greater financial literacy enhances decision-making capability, reduces hesitation toward new technologies, and lowers resistance to technology by mitigating cognitive biases, thereby encouraging MSMEs to adopt digital innovations [27]. Country-level evidence further shows that financial literacy promotes the use of digital payments and financial services while reducing barriers such as distrust and risk aversion [41], [43]. Although it does not eliminate cognitive biases entirely, financial literacy significantly reduces their impact, enabling MSME decision-makers to make more informed judgements regarding digital adoption [27]. Based on the information above, the following hypothesis is proposed: H4. Financial literacy has a positive effect on digital adoption amongst Indonesian MSMEs.

2.3.5 Heuristics, digital adoption, and hedonic motivation

Derived from the UTAUT3 model, hedonic motivation, the enjoyment or pleasure users obtain from technology, promotes digital acceptance by increasing both adoption intentions and continued use, with evidence showing strong positive effects in digital financial services and other emerging technologies [25], [26], [44], [45]. At the same time, decision-making under information overload and limited cognitive capacity increases reliance on heuristics, which may influence MSME digital adoption [4], [33], [37]. As hedonic motivation serves as a positive predictor of users' inclination toward technology [46], it is therefore expected to condition how heuristic-based decision-making shapes digital adoption outcomes. Based on this discussion, the following hypothesis is proposed: H5. Hedonic motivation moderates the relationship between heuristics and digital adoption amongst Indonesian MSMEs.

2.3.6 Overconfidence, digital adoption, and hedonic motivation

Hedonic motivation, conceptualized in the UTAUT3 framework as the pleasure derived from technology use, acts as a strong behavioural driver of digital adoption by reinforcing both initial intention and continued engagement [26], [44], [45]. Empirical studies associate this motivation with greater adoption of digital financial services and other emerging technologies [25], [44]. Conversely, overconfidence, characterized by inflated self-assessment, can distort judgement and suppress openness to digital innovation, as reliance on familiar practices may lead decision-makers to underestimate risks and resist fintech adoption [27], [39]. Given this discussion, the following hypothesis is proposed: H6. Hedonic motivation moderates the relationship between overconfidence and digital adoption amongst Indonesian MSMEs.

2.3.7 Loss aversion, digital adoption, and hedonic motivation

The positive experience associated with technology use, hedonic motivation, promotes digital adoption by reinforcing both willingness to engage and continued usage, with evidence linking it to stronger uptake of digital financial services and other emerging technologies [25], [26], [44], [45]. In contrast, loss aversion, the tendency to weigh potential losses as more impactful than equivalent gains, drives decision-making towards risk avoidance [38]. In digital settings, perceived financial risk from adopting digital financial services is viewed as a key barrier despite possible operational benefits [40], [41]. However, this same bias may also promote adoption when digitalisation is interpreted as a means of preventing future losses [42]. As hedonic motivation positively predicts the openness toward technology use [46], it is expected to operate as a conditional mechanism on whether loss aversion discourages or facilitates digital adoption outcomes. Based on this discussion, the following hypothesis is proposed: H7. Hedonic motivation moderates the relationship between loss aversion and digital adoption amongst Indonesian MSMEs.

2.3.8 Financial literacy, digital adoption, and hedonic motivation

The enjoyment associated with technology use, hedonic motivation, is known to encourage

digital acceptance by strengthening users' willingness to engage with new systems, with evidence linking it to higher intention to adopt digital financial services and broader technology uptake [25], [26], [44], [45]. Financial literacy, defined as a foundational understanding of economics and finance for personal decision-making [32], is similarly associated with MSME digital adoption because it improves judgement and reduces hesitation towards innovation. Studies indicate that financial literacy mitigates cognitive biases, lowers resistance to new technologies, and reduces barriers such as distrust and risk aversion in digital financial contexts [27], [41], [43]. Given that hedonic motivation positively predicts openness to technology use, [46] it is expected to moderate the relationship between financial literacy and digital adoption among Indonesian MSMEs. Accordingly, the following hypothesis is proposed: H8. Hedonic motivation moderates the relationship between financial literacy and digital adoption amongst Indonesian MSMEs.

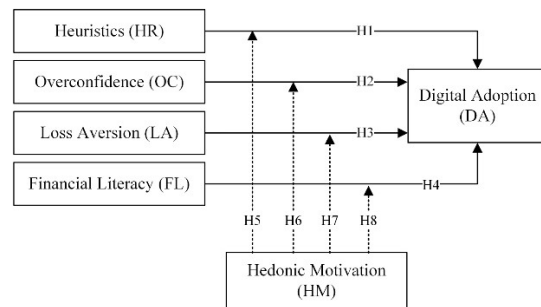


Figure 3: Conceptual Research Model and Hypothesis Development.

3 METHODOLOGY

3.1 Research Approach and Sampling Technique

This study adopts a quantitative explanatory approach to understand how behavioural biases, financial literacy, and digital adoption are related among Micro, Small, and Medium Enterprises (MSMEs). A quantitative design is chosen because the study seeks to test hypothesised relationships between latent constructs and to observe how strong and in which direction these relationships operate within a structured model. In line with previous studies in financial behaviour and technology adoption, quantitative methods are widely recognised as appropriate for capturing measurable

behavioural patterns and technology usage intentions [33], [47].

More specifically, this study is an explanatory study, which aims to explain the causal relationship between variables. This study not only describes the level of digitalisation among MSMEs but also explains how and why behavioural factors such as overconfidence, loss aversion, heuristics, and financial literacy influence digital adoption decisions. In addition, hedonic motivation is included as a moderating variable, considering that the pleasure and comfort of using technology can influence how SME actors respond to these behavioural factors. Therefore, explanatory designs are commonly used in technology adoption studies when the main focus of the study is to identify causal relationships, rather than simply describing existing conditions [33].

To test the research model, this study uses Partial Least Squares Structural Equation Modelling (PLS-SEM). This method was chosen because it is capable of analysing complex relationships between latent variables, including moderating effects. In addition, PLS-SEM is suitable for prediction-oriented research and can be used effectively on moderate sample sizes. Previous research in the fields of SMEs, financial behaviour, and technology adoption also shows that PLS-SEM is effective in estimating both direct and interactive effects between variables [11]. In terms of sampling, this study used non-probability sampling, specifically purposive sampling. The research respondents were owners or managers of MSMEs located in urban areas, particularly Jakarta and its surrounding areas, who were directly involved in business decision-making. This criterion was important because not all MSME players have an active role in digitalisation decisions. Purposive sampling was chosen due to the limited availability of a complete SME sample frame and to ensure that respondents had relevant experience with digital business practices. This approach is also widely used in SME and financial behaviour research to obtain data that is relevant to the research objectives [11].

Data collection was conducted through an online questionnaire distributed using social media

platforms. This method allowed researchers to reach MSME actors more efficiently in various locations. In addition, the research respondents were generally familiar with the use of digital technology, making this method appropriate for the research context. Previous studies have also shown that social media-based surveys are effective in technology adoption studies, especially for reaching digitally active respondents [47].

3.2 Sample Size, Variables, and Data Collection

The sample includes 180 valid responses obtained from MSME owners and managers operating in Indonesia. When working with MSME actors, reaching respondents is not always straightforward. Participation often depends on time, willingness, and personal circumstances. Even so, this sample size is considered adequate for PLS-SEM analysis, as the method is known to perform well with moderate samples and research models that involve multiple constructs and moderating variables. Previous studies in MSME performance and technology adoption have reported reliable results using similar sample sizes, which further supports the robustness of PLS-SEM for prediction-oriented and exploratory analysis [11].

The research model consists of six latent variables, each representing different elements of MSME decision-making behaviour. Overconfidence (X1), Loss Aversion (X2), Heuristics (X3), and Financial Literacy (X4) are specified as exogenous variables, as they capture internal behavioural and cognitive factors that influence how MSME actors approach digital related decisions.

All constructs are operationalised using reflective indicators, resulting in a total of 54 measurement items. A reflective specification is applied because the indicators are treated as manifestations of their respective latent constructs. As the underlying constructs change, the observed measures are expected to move in the same direction. This assumption is commonly adopted in behavioural and technology adoption research and is considered appropriate for the present study.

Table 1: Measurement Items and Descriptive Statistics.

Mean	Standard deviation	Outer Loadings	Indicators		Adapted From
3.844	1.079	0.872	OC1	I have the ability to take right investment decision	[48]
3.789	1.110	0.849	OC2	I am confident of my ability to do better than others in investment decision	[48]
3.561	1.179	0.883	OC3	I have the ability to control the results according to investment objectives.	[48]
3.739	1.107	0.866	OC4	My past investment successes were due to my specific skills.	[48]
3.567	1.075	0.885	OC5	I have complete knowledge of the financial market.	[48]
3.761	1.087	0.905	OC6	I am confident in my ability to manage my business.	[49]
3.317	1.138	0.878	OC7	I am confident in my ability to recognize and take advantage of business opportunities.	[49]
3.706	1.228	0.809	OC8	I am confident in my ability to repay debts and interest obligations.	[49]
3.756	1.205	0.880	OC9	I am confident in my ability to increase business sales.	[49]
3.767	1.179	0.866	OC10	I am confident in my ability to increase business profits.	[49]
3.706	1.186	0.856	LA1	I avoid innovative business opportunities if they involve high risk.	[50]
3.678	1.104	0.779	LA2	I feel the impact of financial losses more strongly than the impact of financial gains.	[51]
3.900	1.150	0.758	LA3	I feel uncomfortable making decisions that involve the possibility of loss.	[52]
3.811	1.129	0.801	LA4	I prioritise short-term safety over potential long-term gains.	[50]
4.039	1.190	0.795	LA5	The possibility of experiencing a loss makes a decision less attractive to me.	[52]
3.744	1.116	0.839	LA6	I am only willing to accept a decision involving potential loss if the expected return is very high.	[52]
3.739	1.102	0.757	LA7	The presence of potential loss leads me to set stricter limits when making decisions.	[52]
3.833	1.276	0.719	LA8	Avoiding loss is more important to me than achieving additional gains.	[52]
3.761	1.066	0.838	LA9	I favour safer decisions to prevent possible losses.	[52]
3.850	1.142	0.795	LA10	I hesitate to choose options that carry a noticeable risk of loss.	[52]

3.678	1.134	0.900	HR1	I make decisions without considering the initial likelihood of an outcome.	[53]
3.472	1.176	0.892	HR2	I draw conclusions based on a small number of experiences or examples I have observed.	[53]
3.306	1.091	0.901	HR3	I believe that patterns observed in the past will repeat in the future.	[53]
3.611	1.097	0.879	HR4	I rely more on information that is easy to recall than on information that I encounter less frequently.	[53]
3.689	1.146	0.896	HR5	I use past experiences as my main reference when predicting future outcomes.	[53]
3.617	1.166	0.901	HR6	I use initial information or values as the primary reference when making decisions.	[53]
3.344	1.151	0.867	HR7	I believe that extremely good or extremely poor outcomes will continue over time.	[53]
3.550	1.198	0.842	HR8	I tend to associate two things simply because I frequently see or hear about them together.	[53]
3.489	1.147	0.910	HR9	I feel that a few examples are sufficient to represent a general situation.	[53]
4.061	1.101	0.881	FL1	I understand the importance of preparing financial reports	[13]
4.044	1.110	0.871	FL2	I understand how to prepare financial statements	[13]
3.639	1.099	0.823	FL3	I understand how to calculate the rate of return on capital	[13]
3.889	1.085	0.886	FL4	I understand how to calculate return on sales	[13]
4.083	1.032	0.866	FL5	I understand how to calculate the rate of return on assets	[13]
3.861	1.149	0.835	FL6	I understand how to calculate the rate of return on investment	[13]
4.089	1.082	0.878	FL7	I have constructed a long-term financial plan	[54]
4.317	1.088	0.913	FL8	I take my time in making financial decisions	[54]
4.050	1.117	0.819	FL9	I consider my financial condition before making major purchases or investments.	[12]
4.200	1.284	0.825	DA1	I use digital technologies to support my business activities.	[55]
4.444	1.207	0.843	DA2	I use digital systems in preparing and managing my financial reports.	[2]
4.511	1.108	0.892	DA3	I use digital systems to complete accounting tasks more quickly.	[2]
4.417	1.125	0.860	DA4	I use digital platforms such as e-commerce, social media, or digital logistics systems.	[55]

4.456	1.112	0.890	DA5	I am open to changes brought by digital innovation in my business.	[55]
4.250	1.095	0.888	DA6	I feel that using digital platforms helps my business remain competitive.	[17]
4.461	1.194	0.832	DA7	I feel that digital tools help me make better business decisions.	[2]
4.378	1.116	0.884	DA8	I believe that adopting digital technology is important for my business survival	[2]
4.344	1.235	0.869	DA9	I feel that digital systems make accounting information more useful for my business.	[2]
4.261	1.217	0.867	DA10	My business is ready to adopt more advanced digital technologies.	[55]
3.828	1.048	0.879	HM1	I feel that using digital technology for my business is enjoyable.	[33]
3.656	1.092	0.912	HM2	I experience enjoyment when using digital technology for business purposes.	[33]
3.956	1.163	0.902	HM3	I feel that using digital technology makes my business activities more interesting.	[21]
3.939	1.155	0.892	HM4	Using digital technology in my business stimulates my curiosity.	[21]
3.872	1.174	0.899	HM5	I feel that using digital technology brings positive effects to my business.	[33]
3.728	1.163	0.901	HM6	I feel that using digital technology gives me a sense of reassurance in running my business.	[33]

4 DISCUSSION AND RESULTS

4.1 Demographic Analysis

The demographic profile presented in table 2 shows that most of the respondents fall within 29-35 year age, followed by those ages 45-55 years old and above 55 years old, while the younger and middle age categories are represented in smaller proportions. This shows that the sample includes respondents from both early and later stages of working life. Accordingly, the sample for this study reflects a range of experience levels and maturity among the respondents, thereby providing a broader picture of how MSME operators make decisions regarding digitalisation. The age composition of the respondents also indicates that the majority belong to a group that is fairly familiar with the digital environment, making them suitable for analysing behaviour related to digital adoption [56].

The majority of respondents had completed upper secondary education (48.9%) and a bachelor's degree (38.3%). This indicates that the majority of respondents had a sufficiently good educational background to understand each statement in the questionnaire and provide relevant answers. This is important because in PLS-SEM-based research, respondents are expected to be able to assess indicators related to perceptions and behaviour, particularly to explain latent constructs that cannot be measured directly [57].

Based on the IFC (International Finance Corporation) criteria, the sample is dominated by micro enterprises (66.7%), followed by small enterprises (29.4%). This in line with this study and supporting the applicability of PLS-SEM, which has been widely applied in heterogeneous and resource constrained research contexts such as MSMEs [57].

Moreover, A strong concentration of respondents is found in the retail trade sector (79.4%) and in urban areas, particularly Jakarta and

its surrounding regions. This reflects a service-oriented environment with higher exposure to digital technologies, thereby strengthening the contextual relevance of the study for examining digital adoption behaviour among MSMEs [56].

Table 2: Demographic Profile of Respondents.

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	79	43,9
	Female	101	56,1
Age	< 20 years	12	6,7
	21 - 28 years	3	1,7
	29 - 35 years	63	35
	36 - 44 years	30	16,7
	45 - 54 years	36	20
	> 55 years	36	20
	Education	Middle School	4
High School		88	48,9
Associate degree		10	5,6
Undergraduate		69	38,3
Graduate		9	5
Enterprise Size	Micro	120	66,7
	Small	53	29,4
	Medium	7	3,9
Sector	Manufacturing	7	3,9
	Health / Social Services	1	0,6
	Arts / Entertainment / Recreation	6	3,3
	Finance / Insurance	3	1,7
	Construction	3	1,7

	Education	2	1,1
	Transportation / Warehousing	1	0,6
	Retail Trade	143	79,4
	Other Services	14	7,8
Location	Bekasi	6	3,3
	Bogor	4	2,2
	Depok	11	6,1
	Jakarta	71	39,4
	Tangerang	19	38,3
	Other	69	10,6

4.2 Descriptive Statistics of Constructs

Descriptive statistics were used to provide an initial picture of how respondents evaluated each construct in the study. As reported in table 3, the mean values range from 3.528 to 4.372, indicating an overall positive tendency across the constructs. Digital Adoption records the highest mean value (4.372), followed by Financial Literacy (4.004) and Hedonic Motivation (3.830). This shows respondents express favourable perceptions toward digitalisation, particularly in terms of adoption behaviour and their perceived financial capabilities. In contrast, heuristics show the lowest mean value (3.528). This reflects more varied behavioural tendencies, as heuristics-based decision making may often depends on situational factors and individual judgement rather than consistent evaluation. In other words, respondents may differ in how strongly they rely on mental shortcuts when making decisions.

The standard deviation values range between 1.096 to 1.169, this indicating a moderate level of dispersion and a reasonable consistency in responses. This Supports the use of PLS-SEM as the method is robust to non-normal data distributions and is commonly applied in behavioural and managerial research contexts [56], [58].

Table 3: Descriptive Statistics of the Study Constructs.

Variable	Mean	Standard Deviation
OC	3,681	1,139
LA	3,806	1,146
HR	3,528	1,145
FL	4,004	1,096
DA	4,372	1,169
HM	3,830	1,133

4.3 Reliability and Convergent Validity

Reliability and convergent were evaluated using Cronbach’s alpha and Average Variance Extracted (AVE), as presented in table 4. The result indicates a high level of internal consistency across all constructs. Cronbach’s alpha values range from 0.936 to 0.966, which are well above the commonly recommended threshold 0.70. This suggests that the measurement items that consistently capture the same underlying constructs.

Convergent validity is also well supported. All AVE values fall between 0.632 to 0.806, exceeding the minimum criterion of 0.50. This indicates that each of the constructs explains more than half of the variance in its indicators. As the result, the indicators can be considered sufficiently representative of their intended latent constructs. These findings confirm that the measurement model meets the required standards for reliability and convergent validity and therefore suitable for further PLS-SEM analysis [56], [59].

Table 4: Construct Reliability and Convergent Validity.

Variable	Cronbach's alpha	Average variance extracted (AVE)
OC	0.964	0.756
LA	0.936	0.632
HR	0.966	0.788
FL	0.957	0.747
DA	0.963	0.749

HM	0.952	0.806
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4.4 Latent Variable Correlations

Table 5 presents the latent variable correlation matrix generated using SmartPLS, offering an initial overview of how this study constructs relate to one another at the latent level. The results show that Digital Adoption is positively correlated with Financial Literacy ($r = 0.718$) and hedonic motivation ($r = 0.678$). This indicates that MSME actors with stronger financial knowledge and higher enjoyment in using digital tools tend to report higher enjoyment in using digital tools tend to report higher levels of digital adoption.

In contrast, digital adoption exhibits negative correlations with behavioural bias constructs, namely heuristics ($r = -0.622$), Overconfidence ($r = -0.615$), and Loss Aversion ($r = -0.195$). This pattern indicates that the higher the cognitive bias among SME operators, the lower the rate of digital adoption tends to be. This situation may arise because decisions that are more heavily influenced by heuristics, overconfidence and loss aversion make business operators less open to the use of digital technology. Previous research has also shown that behavioural biases can undermine rational evaluation processes and ultimately slow down the acceptance of technological change. Furthermore, the correlation coefficients between constructs in this study remain below the general threshold of 0.90, indicating that each construct remains clearly distinguishable and does not lead to issues of multicollinearity. Thus, the latent correlation results from SmartPLS provide initial support for the proposed relationships between variables and indicate that the data from this study are suitable for structural model analysis and further hypothesis testing [56], [58].

Table 5: Latent Variable Correlation

Variable	DA	FL	HM	HR	LA	OC	HM x HR	HM x OC	HM x LA	HM x FL
DA	1.000	0.718	0.678	-0.622	-0.195	-0.615	-0.121	0.018	-0.269	0.256
FL	0.718	1.000	0.446	-0.433	-0.107	-0.393	-0.220	-0.156	-0.270	0.036
HM	0.678	0.446	1.000	-0.231	-0.382	-0.510	-0.316	0.055	-0.118	0.281
HR	-0.622	-0.433	-0.231	1.000	0.031	0.298	0.016	0.226	0.313	-0.221
LA	-0.195	-0.107	-0.382	0.031	1.000	-0.013	0.307	0.261	-0.077	-0.265
OC	-0.615	-0.393	-0.510	0.298	-0.013	1.000	0.232	-0.119	0.273	-0.161
HM x HR	-0.121	-0.220	-0.316	0.016	0.307	0.232	1.000	0.235	-0.083	-0.353
HM x OC	0.018	-0.156	0.055	0.226	0.261	-0.119	0.235	1.000	-0.016	-0.272
HM x LA	-0.269	-0.270	-0.118	0.313	-0.077	0.273	-0.083	-0.016	1.000	0.009
HM x FL	0.256	0.036	0.281	-0.221	-0.265	-0.161	-0.353	-0.272	0.009	1.000

4.5 Discriminant Validity of Constructs

The Fornell Larcker criterion was applied to assess discriminant validity. As shown by the results, the square root of the Average Variance Extracted (AVE) for each construct is higher than its correlations with the other constructs in the model.

This study indicates that each construct captures a distinct concept rather than overlapping with others, thereby confirming that the discriminant validity requirement is satisfied [22], [45]. These results further suggest that digital adoption, financial literacy, hedonic motivation, and behavioural bias dimensions represent empirically separate constructs within the proposed model.

Table 6: Discriminant Validity Assessment Using the Fornell–Larcker Criterion.

Variable	DA	FL	HM	HR	LA	OC
DA	0.865					
FL	0.718	0.864				
HM	0.678	0.446	0.898			
HR	-0.622	-0.433	-0.231	0.888		
LA	-0.195	-0.107	-0.382	0.031	0.795	
OC	-0.615	-0.393	-0.510	0.298	-0.013	0.870

Further discriminant validity was assessed using the heterotrait monotrait ratio (HTMT) with a conservative threshold of 0.85. The results show that all HTMT values remain below the recommended criterion, with the highest value observed between Digital Adoption and Financial Literacy (0.747). This indicates that all of the constructs are empirically distinct and represent separate

conceptual domains. Importantly, the interaction constructs also exhibit relatively low HTMT values when compared with the main constructs. Importantly, the interaction constructs also exhibit relatively low HTMT values when compared with the main constructs. This suggests that the moderation terms do not show any problematic overlap or redundancy within the measurement

model. These findings confirm that discriminant validity is satisfactorily established for the measurement model [55], [59].

Table 7: Discriminant Validity Assessment Using the heterotrait monotrait ratio (HTMT)

Variable	DA	FL	HM	HR	LA	OC	HM x HR	HM x OC	HM x LA	HM x FL
DA										
FL	0.747									
HM	0.707	0.465								
HR	0.643	0.449	0.239							
LA	0.193	0.114	0.399	0.058						
OC	0.636	0.406	0.530	0.308	0.056					
HM x HR	0.123	0.224	0.323	0.025	0.318	0.236				
HM x OC	0.033	0.159	0.058	0.230	0.265	0.121	0.235			
HM x LA	0.274	0.275	0.122	0.318	0.097	0.278	0.083	0.016		
HM x FL	0.261	0.043	0.288	0.224	0.269	0.163	0.353	0.272	0.009	

4.6 Coefficient of Determination

The coefficient of determination (R^2) explains how much of the variation in an endogenous variable can be explained by its predictor variables. In PLS-SEM, R^2 is mainly used to show how strong the structural model is in explaining the relationships between variables [56]. As shown in Table 8, Digital Adoption (DA) has an R^2 value of 0.851, which means that 85.1% of the variation in digital adoption can be explained by the exogenous variables in the model. Based on recent PLS-SEM guidelines, R^2 values above 0.75 indicate strong explanatory power, suggesting that the model explains the endogenous construct well [58]. This strong explanatory power also indicates that digital adoption among MSMEs is not shaped by a single factor alone, but rather by the combined role of behavioural biases, financial literacy, and hedonic motivation. In this case, the result supports prior literature which suggests that MSME digitalisation is influenced by multiple behavioural, financial, and technological factors operating simultaneously [2], [9], [14], [17], [18], [27].

The adjusted R^2 value (0.843) is slightly lower than the R^2 , which is expected. Adjusted R^2 provides a more conservative estimate because it accounts for the number of predictors included in the model. The relatively small difference between R^2 and adjusted R^2 suggests that the model is appropriately specified, indicating that the included predictors are relevant in explaining digital adoption and that the model does not appear to be unnecessarily complex [56], [58]. This finding further strengthens the model, as it shows that the explanatory power not only increases due to the number of predictors, but also reflects a meaningful contribution from the selected variables. Overall, the R^2 and adjusted R^2 values indicate that the integrated model used in this study provides a substantial explanation of MSME digital adoption, which is consistent with the literature emphasizing that digitalization decisions are shaped by rational capabilities and behavioral tendencies [21], [23], [24], [27].

Table 8: Coefficient of Determination (R^2) of the Endogenous Construct

Endogenous Variable	R^2	Adjusted R^2
Digital Adoption (DA)	0.851	0.843

4.7 Structural Path Coefficients and Hypothesis Testing Results

This section presents the results of the structural model analysis, with a focus on the direction and statistical significance of the hypothesis relationships. Path significance was evaluated using a bootstrapping procedure, and hypothesis testing was based on the path coefficient (β), t-value, and p-value.

As shown in Table 9, Financial Literacy exhibits a positive and significant effect on Digital Adoption ($\beta = 0.417$, $t = 11.159$, $p < 0.001$). This finding suggests that MSMEs with stronger financial knowledge are more likely to adopt digital technologies. This result is in line with previous studies which indicate that financial literacy improves individuals ability to understand digital systems, evaluate risks, and make more informed financial and technological decisions [14], [27], [32], [41], [43].

The finding also supports earlier evidence that greater financial literacy reduces hesitation toward digital financial services and lowers barriers such as distrust and risk aversion [27], [41], [43]. It means, the result reinforces the argument that financially literate MSME actors are better positioned to assess the potential value of digital tools and therefore become more open to digital adoption.

In contrast, Heuristics ($\beta = -0.326$, $t = 7.982$, $p < 0.001$) and Overconfidence ($\beta = -0.224$, $t = 5.838$, $p < 0.001$) show significant negative effects on digital adoption. Therefore, greater reliance on cognitive shortcuts and excessive self-confidence appear to reduce openness toward digital technologies. These findings are consistent with previous literature suggesting that heuristic based thinking may lead decision makers to rely on past experiences or simplified judgements rather than conducting a thorough evaluation of new technologies [4], while previous study argue that mental shortcuts may result in less optimal decisions and weaker openness to innovation [28], [31]. Likewise, the negative effect of overconfidence supports prior studies which argue that inflated self

assessment may suppress openness to innovation because decision makers become overly reliant on their own judgement and underestimate the need for new digital solutions [27], [39]. This indicates that when MSME actors feel too certain about existing ways of operating their businesses, they may perceive less urgency to adopt digital systems, even when such systems offer long term advantages.

Loss Aversion also demonstrates a negative relationship with digital adoption, although the effect size is relatively weaker ($\beta = -0.081$, $t = 2.343$, $p = 0.019$). This result is also in line with previous studies showing that fear of loss and perceived financial risk can discourage individuals from adopting digital financial services and other new technologies [27], [29], [40], [41]. At the same time, the weaker coefficient suggests that the influence of loss aversion, while significant, is less dominant than heuristics and overconfidence in explaining digital adoption in this study. This is similar to what several previous literatures have suggested that loss aversion can also drive adoption when digitalization is interpreted as a way to prevent future losses. [42]. However, the present finding shows that within the context of Indonesian MSMEs, loss aversion is more likely to function as a barrier rather than a trigger for digital adoption, indicating that concerns over potential risks still outweigh perceived future benefits.

With regard to the moderating effects, Hedonic Motivation significantly moderates the relationships between FL and DA ($\beta = 0.134$, $t = 3.848$, $p < 0.001$), HR and DA ($\beta = 0.174$, $t = 5.069$, $p < 0.001$), and OC and DA ($\beta = 0.141$, $t = 3.975$, $p < 0.001$). These findings indicate that enjoyment and positive experiences in using digital technologies can strengthen the influence of financial literacy and certain behavioural biases on digital adoption. This result is consistent with earlier studies that use UTAUT based frameworks which show that hedonic motivation increases individuals willingness to engage with digital systems and strengthens continued technology use [25], [26], [33], [44], [45]. More specifically, the significant moderation on the relationship between financial literacy and digital adoption suggests that financially literate MSME actors may be even more likely to adopt digital technology when the technology is perceived as enjoyable, user friendly, and comfortable to use. This support previous evidence by showing that the effect of financial capability is not purely cognitive, but can be strengthened by motivational and experiential aspects of technology use [25], [26], [44], [45].

The significant moderating effect of hedonic motivation on the relationship between heuristics and digital adoption also supports the view that positive user experiences may reduce resistance created by simplified or habit based decision-making [33], [44], [45]. In other words, even when MSME actors rely on mental shortcuts, they may still become more open to digital adoption if the technology feels pleasant and easy to engage with. Similarly, the moderating effect on overconfidence suggests that enjoyment in technology use may soften the negative effect of excessive self confidence. This finding is in line with the literature indicating that hedonic motivation serves as a strong behavioural driver of digital acceptance and may encourage users to engage with technology even when other psychological barriers are present [25], [26], [44], [45]. Therefore, hypotheses H5, H6, and H7 are supported.

However, the moderating effect of hedonic motivation on the relationship between Loss

Aversion and Digital Adoption is not statistically significant ($\beta = 0.054$, $t = 1.825$, $p = 0.068$). This result suggests that feelings of enjoyment or pleasure from using technology are not sufficient to remove the cautious behaviour associated with loss aversion. Therefore, hypothesis H8 is not supported [60], [61]. This finding is particularly important because, although prior studies have generally suggested that hedonic motivation encourages digital technology acceptance [25], [26], [44], [45], the present study shows that such motivational benefits may not be strong enough to offset a deeper concern related to potential losses. This result is also broadly consistent with literature emphasizing that perceived financial risk remains a major barrier in digital financial contexts [40], [41]. In addition, while some studies suggest that loss aversion can sometimes promote adoption when technology is seen as a means of preventing future losses [42], such a pattern does not appear in the present study. This implies that for Indonesian MSMEs, the fear of immediate or potential loss remains a stronger psychological force than the enjoyment derived from technology use.

Table 9: Results of Hypothesis Testing.

Hypothesis	Path	β (Original Sample)	t-value	p-value	Result
H1	FL \rightarrow DA	0.417	11.159	<0.001	Supported
H2	HR \rightarrow DA	-0.326	7.982	<0.001	Supported
H3	OC \rightarrow DA	-0.224	5.838	<0.001	Supported
H4	LA \rightarrow DA	-0.081	2.343	0.019	Supported
H5	HM \times FL \rightarrow DA	0.134	3.848	<0.001	Supported
H6	HM \times HR \rightarrow DA	0.174	5.069	<0.001	Supported
H7	HM \times OC \rightarrow DA	0.141	3.975	<0.001	Supported
H8	HM \times LA \rightarrow DA	0.054	1.825	0.068	Not supported

The results in this section were obtained through Partial Least Squares Structural Equation Modelling (PLS-SEM) analysis using SmartPLS. The analysis was conducted by estimating the structural model using the PLS algorithm to determine the standardised path coefficients and the proportion of variance explained by the endogenous constructs. Subsequently, the analysis was followed by bootstrapping with 5,000 resamples to assess the stability of the hypothesised relationships. This step yielded standard errors, t-values, and p-values, thereby enabling a more robust statistical significance test.

Figure 4 shows the SmartPLS structural model used in this study to test the relationships between constructs. In this model, Digital Adoption (DA) acts as the endogenous variable, whereas Financial Literacy, Heuristics, Overconfidence, Loss Aversion, and the interaction term involving Hedonic Motivation act as exogenous variables influencing the level of digital adoption.

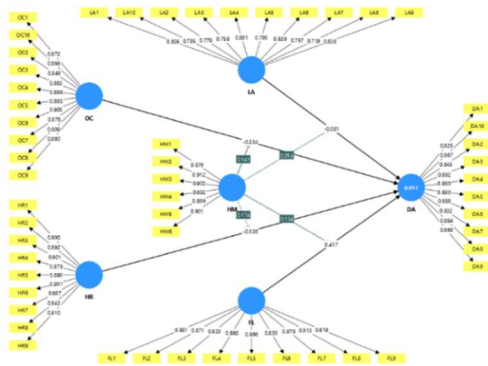


Figure 4: PLS-SEM Structural Model Results.

5 CONCLUSION

Based on the results of the study, behavioural bias, level, literacy and motivational factors greatly influence MSMEs in making digital adoption decisions. The results show that financial literacy has a positive influence on digital adoption. This means that SME actors with better financial knowledge are able to understand digital systems, assess potential risks, and make more informed and appropriate adoption decisions [14], [27], [32]. In contrast to financial literacy, heuristics and overconfidence have been shown to have a negative influence on digital adoption. This indicates that SME actors become less open to the use of digital technology because they rely too much on experience or old habits and overestimate their abilities. This condition can cause them to underestimate the complexity of digital systems or fail to see the added value offered by this technology [4], [27], [28]. Similar to heuristics and overconfidence, loss aversion also has a negative impact on digital adoption, although its influence is relatively less than other behavioural biases. This shows that concerns about potential financial losses remain an obstacle for MSMEs in adopting digital technology, although its role is not as strong as heuristics and overconfidence in shaping the digital behaviour of MSMEs [40], [42]. These findings directly address the research gap in this study, as previous research has generally addressed behavioural biases, financial literacy and motivational factors separately. By combining these variables within a single research framework, this study demonstrates that digital adoption among SMEs is influenced not only by a single factor, but also by the interplay between cognitive biases, financial literacy and individual motivation. These results provide a more comprehensive understanding of why digital adoption among SMEs remains inconsistent, despite the continuous advancement of

digital technology and the increasing availability of various digital platforms.

The results of the study also show that the presence of hedonic motivation strengthens the positive relationship between financial literacy and digital adoption and weakens the negative influence of heuristics and overconfidence on digital adoption. In other words, when MSME actors view digital technology as something that is fun and convenient to use, they become more willing to adopt it, even though they are still influenced by certain cognitive biases [25], [26], [44], [45]. However, unlike loss aversion, hedonic motivation does not significantly moderate the relationship between loss aversion and digital adoption. This is because fear of potential loss is a stronger barrier that cannot be easily reduced simply through pleasure or positive experiences in using technology. This finding extends prior behavioural research by showing that the effects of certain cognitive biases are not only present, but can also be conditionally reduced through hedonic motivation. In this regard, the study contributes by providing a mechanism-based explanation of digital adoption, where positive user experience and enjoyment can partially mitigate the negative effects of heuristics and overconfidence, although they are not sufficient to reduce loss aversion. These findings also show that not all behavioural barriers can be addressed in the same way, thereby providing a deeper understanding of how MSME actors make decisions in digital contexts. Each bias has different characteristics and effects, so the approach used to address it also needs to be adjusted.

In addition, this study provides empirical evidence from MSMEs in Indonesia, where digital adoption continues to develop but has not yet taken place evenly among business actors. This is important because integrated evidence from MSME contexts in developing countries is still relatively limited, even though such conditions are often characterised by resource constraints, behavioural barriers, and uneven digital readiness. Therefore, this study not only makes a theoretical contribution, but also strengthens the contextual relevance of digital adoption studies in emerging economies.

6 LIMITATIONS AND FURTHER RESEARCH

This study has several limitations that should be considered when interpreting the findings. The use of a cross-sectional design limits the ability to establish causal relationships between financial

literacy, behavioural biases, hedonic motivation, and digital adoption. In addition, the data was sourced through self-reported surveys, which results in responses that are based on the perceptions and opinions of the MSME actors rather than direct observations or objective records. This may introduce response bias, particularly in measuring psychological constructs such as heuristics, overconfidence, and loss aversion. Moreover, the variables studied are latent constructs measure indirectly through survey items, assuming that respondents can accurately assess their own cognitive tendencies. This condition may result in inaccurate representation of actual decision-making behaviour. Furthermore, the study focuses only on the variables discussed, which may not fully capture the complexity of digital adoption among MSMEs. Therefore, future research is encouraged to employ longitudinal or experimental approaches to better understand causal relationships and reduce reliance on self-reported data, as well as to explore factors influencing cognitive biases, such as differences in age or generation, given that variations in digital familiarity, risk tolerance, and decision-making styles may shape digital adoption decisions.

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REFERENCES

- [1] C. E. Widjayanti, W. R. Adawiyah, and Sudarto, "Financial literacy innovation is mediated by financial attitudes and lifestyles on financial behavior in MSME players," *J. Innov. Entrep.*, vol. 14, no. 1, 2025, doi: 10.1186/s13731-025-00525-5.
- [2] D. W. Sari, I. Triyuwono, N. Adib, and Y. W. Prihatiningtias, "Barriers to Digital Accounting Adoption Among Micro-Enterprises in Indonesia: An Ethnomethodological Study," *Journal of System and Management Sciences*, vol. 14, no. 9, pp. 376–389, 2024, doi: 10.33168/jsms.2024.0924.
- [3] A. E. Ahmed, D. Ucbasaran, G. Cacciotti, and T. A. Williams, "Integrating Psychological Resilience, Stress, and Coping in Entrepreneurship: A Critical Review and Research Agenda," *Entrepreneurship: Theory and Practice*, vol. 46, no. 3, pp. 497–538, 2022, doi: 10.1177/10422587211046542.
- [4] V. Berthet, "The Impact of Cognitive Biases on Professionals' Decision-Making: A Review of Four Occupational Areas," *Front. Psychol.*, vol. 12, no. January, 2022, doi: 10.3389/fpsyg.2021.802439.
- [5] van der L. L, P. L, and O. R, "Investigating the effect of cognitive bias influences on sustainable decision-making in complex systems," *Sustainable Futures*, vol. 10, 2025, doi: 10.1016/j.sfr.2025.101227.
- [6] R. K. Marjerison, H. Dong, and J. M. Kim, "Generational Investment Behavior: The Influence of Risk Tolerance and Technology Adoption in an Evolving Financial Landscape," *Sage Open*, vol. 15, no. 3, pp. 1–20, 2025, doi: 10.1177/21582440251352342.
- [7] P. S. Kraft, C. Günther, N. H. Kammerlander, and J. Lampe, "Overconfidence and entrepreneurship: A meta-analysis of different types of overconfidence in the entrepreneurial process," *J. Bus. Ventur.*, vol. 37, no. 4, p. 106207, 2022, doi: 10.1016/j.jbusvent.2022.106207.
- [8] A. Rafinda, A. Suroso, P. Purwaningtyas, and A. C. Mubaroq, "Bias in Sme Investment Decisions: a Cross-Country Study," *Polish Journal of Management Studies*, vol. 30, no. 1, pp. 289–303, 2024, doi: 10.17512/pjms.2024.30.1.17.
- [9] M. Setini, P. N. S. Yasa, and N. W. Sitiari, "MSME digitalization: How are social capital factors in encouraging the use of digital applications?," *International Journal of Data and Network Science*, vol. 9, no. 1, pp. 47–56, 2025, doi: 10.5267/j.ijdns.2024.10.007.
- [10] A. Aggarwal and A. K. Dwivedi, "A systematic literature review on key performance indicators for growth in small and medium enterprises," *International Journal of Business Excellence*, vol. 35, no. 3, pp. 329–352, 2025, doi: 10.1504/IJBEX.2025.144981.
- [11] Asmawati, A. R. Laba, A. R. S. Dewi, and N. Alamzah, "The Influence of Dynamic Capabilities, Financial Literacy, and Financial Inclusion on Sustainability of MSMEs in East Kalimantan, Indonesia: The Mediating Role of Financial Performance," *Global Business and*

- Finance Review*, vol. 30, no. 10, pp. 216–234, 2025, doi: 10.17549/gbfr.2025.30.10.216.
- [12] M. Hasan *et al.*, “Understanding the role of financial literacy, entrepreneurial literacy, and digital economic literacy on entrepreneurial creativity and MSMEs success: a knowledge-based view perspective,” *Cogent Business and Management*, vol. 11, no. 1, p., 2024, doi: 10.1080/23311975.2024.2433708.
- [13] M. Miran, L. Evinita, and P. J. Pesak, “Financial literacy as mediating factors affecting the financial performance of MSMEs in digital cities and special economic zones in 3T regions,” *Edelweiss Applied Science and Technology*, vol. 9, no. 3, 2025, doi: 10.55214/25768484.v9i3.5320.
- [14] A. Zaimovic, A. Omanovic, L. Dedovic, and T. Zaimovic, “The effect of business experience on fintech behavioral adoption among MSME managers: The mediating role of digital financial literacy and its components,” *Future Business Journal*, vol. 11, no. 1, 2025, doi: 10.1186/s43093-025-00432-x.
- [15] V. I. Dewi, E. Febrian, N. Effendi, and M. Anwar, “Financial literacy among the millennial generation: Relationships between knowledge, skills, attitude, and behavior,” *Australasian Accounting, Business and Finance Journal*, vol. 14, no. 4, pp. 24–37, 2020, doi: 10.14453/aabfj.v14i4.3.
- [16] L. Anatan and Nur, “Micro, Small, and Medium Enterprises’ Readiness for Digital Transformation in Indonesia,” *Economies*, vol. 11, no. 6, 2023, doi: 10.3390/economies11060156.
- [17] K. W. Chung, W. Chiu, G. Chen, and K. P. Liu, “Digital Transformation Driving SME Business Model Innovation: A Dynamic Capabilities Perspective,” *Journal of Global Information Management*, vol. 32, no. 1, 2024, doi: 10.4018/JGIM.350191.
- [18] R. N. Rosyidiana and I. M. Narsa, “Micro, small, and medium-sized enterprises (MSMEs) during the post-pandemic economic recovery period: digitalization, literation, innovation, and its impact on financial performance,” *Cogent Business and Management*, vol. 11, no. 1, p., 2024, doi: 10.1080/23311975.2024.2342488.
- [19] A. Amaya, J. Campoverde, and M. L. Granda, “The effect of dynamic capabilities on msme digitalization: Exploring the moderating role of firm age,” *Journal of Technology Management and Innovation*, vol. 19, no. 1, pp. 40–51, 2024, doi: 10.4067/S0718-27242024000100040.
- [20] D. Sastararuji, D. Hoonsopon, P. Pitchayadol, and P. Chiwamit, “Cloud accounting adoption in Thai SMEs amid the COVID-19 pandemic: an explanatory case study,” *J. Innov. Entrep.*, vol. 11, no. 1, 2022, doi: 10.1186/s13731-022-00234-3.
- [21] M. B. Amnas, M. Selvam, M. Raja, S. Santhoshkumar, and S. Parayitam, “Understanding the Determinants of FinTech Adoption: Integrating UTAUT2 with Trust Theoretic Model,” *Journal of Risk and Financial Management*, vol. 16, no. 505, 2023, doi: 10.3390/jrfm16120505.
- [22] L. D. Anggraini, A. R. Santoso, and A. V. Reyes, “The Role of Fintech Adoption in Enhancing Financial Literacy and Financial Well-Being in Emerging Markets,” *Journal of Economics and Management*, vol. 3, no. 3, 2025.
- [23] E. D. Purnamasari, L. D. Anggraini, and Faradillah, “Influence of FinTech Paylater, Financial Well Being, Behavioral Finance, and Digital Financial Literacy on MSME Sustainability in South Sumatera,” *Journal of Risk and Financial Management*, vol. 18, no. 12, 2025, doi: 10.3390/jrfm18120682.
- [24] F. S. Rahayu, A. Risman, I. Firdaus, and L. Haningsih, “The Behavioral Finance of MSME in Indonesia: Financial Literacy, Financial Technology (Fintech), and Financial Attitudes,” *International Journal of Digital Entrepreneurship and Business (IDEB)*, vol. 4, no. 2, 2023, doi: 10.52238/ideb.v4i2.127.
- [25] M. Maghrour Zefreh, B. Edries, and D. Esztergár-Kiss, “Understanding the antecedents of hedonic motivation in autonomous vehicle technology acceptance domain: A cross-country analysis,” *Technol. Soc.*, vol. 74, 2023, doi: 10.1016/j.techsoc.2023.102314.
- [26] O. Tyrväinen, H. Karjaluoto, and H. Saarijärvi, “Personalization and hedonic motivation in creating customer experiences and loyalty in omnichannel retail,” *Journal of Retailing and Consumer Services*, vol. 57, 2020, doi: 10.1016/j.jretconser.2020.102233.
- [27] R. Aftab, A. Fazal, and R. Andleeb, “Behavioral biases and Fintech adoption: Investigating the role of financial literacy,” *Acta Psychol. (Amst)*, vol. 257, 2025, doi: 10.1016/j.actpsy.2025.105065.
- [28] J. Jain, N. Walia, H. Singla, S. Singh, S. Kiran, and S. Grima, “Heuristic biases as mental shortcuts to investment decision-making,” *Risks*, vol. 11, no. 4, 2023, doi: 10.3390/risks11040072.
- [29] D. Dolder and J. Vanderschuren, “Behavioral risk profiling: Measuring loss aversion of individual investors,” *J. Bank. Financ.*, vol.

- 168, 2024, doi: 10.1016/j.jbankfin.2024.107293.
- [30] S. K. Rahayu, I. Budiarti, D. W. Firdaus, and V. Onegina, "Digitalization and Informal MSME: Digital Financial Inclusion for MSME Development in the Formal Economy," *Journal of Eastern European and Central Asian Research*, vol. 10, no. 1, 2023.
- [31] A. Kariza, S. H. Chuah, and D. Arli, "Applying insights from behavioural economics to foster entrepreneurship: a systematic literature review," *Management Review Quarterly*, 2025, doi: 10.1007/s11301-025-00556-y.
- [32] A. Lo Prete, "Digital and financial literacy as determinants of digital payments and personal finance," *Econ. Lett.*, vol. 213, 2022.
- [33] A. Sharma, A. Mohan, A. Johri, and M. Asif, "Determinants of financial technology (FinTech) adoption by the farmers in agrarian economy," *Social Sciences & Humanities Open*, vol. 11, 2025, doi: 10.1016/j.ssaho.2025.101370.
- [34] M. M. Hasan, F. Karim, and Md. B. B. Ripon, "Behavioral economics and consumer decision-making: An integrative review," *Business and Social Sciences*, vol. 3, no. 1, 2025, doi: 10.25163/business.3110228.
- [35] G. J. Wei, R. Ab-Rahim, A. H. H. Mohamad, and Mohd. S. Ibrahim, "The Current State of Behavioural Economics Studies: A Bibliometric Analysis," *International Journal of Economics and Financial Issues*, vol. 15, no. 4, 2025, doi: 10.32479/ijefi.18799.
- [36] J. Zhang, J. Chen, and K. Wang, "The effects of cognitive closure need and time pressure on individual risk decision making," *Acta Psychol. (Amst.)*, vol. 258, 2025, doi: 10.1016/j.actpsy.2025.105240.
- [37] S. Md. S. Ali, "Cognitive Biases in Digital Decision Making: How Consumers Navigate Information Overload (Consumer Behavior)," *Advances in Consumer Research*, vol. 2, no. 1, 2025.
- [38] S. Meier and I. Ju, "Framing Effects on AI Adoption in Organizations: The Moderating Roles of Loss Aversion and Involvement," *Communication Reports*, 2025, doi: 10.1080/08934215.2025.2576724.
- [39] M. Leković, "Cognitive Biases as an Integral Part of Behavioral Finance," *Economic Themes*, vol. 58, no. 1, 2020, doi: 10.2478/ethemes-2020-0005.
- [40] M. A. Al Mamun, T. Tanchangya, M. A. Rahman, Md. M. Hasan, N. Islam, and B. Yeamin, "Measuring the influence of FinTech innovation towards consumers' attitude: Moderating role of perceived usefulness," *Sustainable Futures*, vol. 10, 2025, doi: 10.1016/j.sftr.2025.100885.
- [41] J. A. Addae, S. Ahmed, K. S. Ofori, A. Abubakari, and A. Sharma, "Understanding users' continuance adoption of FinTechs through the lens of the behavioural reasoning theory: insights from PLS-SEM and fs-QCA," *Behaviour & Information Technology*, 2025, doi: 10.1080/0144929X.2025.2558199.
- [42] A. R. Pratama and F. M. Firmansyah, "Until you have something to lose! Loss aversion and two-factor authentication adoption," *Applied Computing and Informatics*, vol. 21, no. 1/2, 2025, doi: 10.1108/ACI-12-2020-0156.
- [43] J. Yang, Y. Wu, and B. Huang, "Digital finance and financial literacy: Evidence from Chinese households," *J. Bank. Financ.*, vol. 156, 2023, doi: 10.1016/j.jbankfin.2023.107005.
- [44] C. F.-Y. Chen, T. J. Chan, and N. H. Hashim, "Factor Influencing Continuation Intention of Using Fintech from the Users' Perspectives: Testing of Unified Theory of Acceptance and Use of Technology (UTAUT2)," *International Journal of Technology*, vol. 14, no. 6, 2023, doi: 10.14716/ijtech.v14i6.6636.
- [45] M. O. Saeed, A. A. Abdulmuhsin, and D. M. Dajani, "From novelty to necessity: Understanding CRM-driven service robot adoption in Iraqi restaurants through UTAUT3," *Journal of Innovation & Knowledge*, vol. 13, 2026, doi: 10.1016/j.jik.2025.100916.
- [46] X. Lin, K. Suanpong, A. Ruangkanjanases, Y.-T. Lim, and S.-C. Chen, "Improving the Sustainable Usage Intention of Mobile Payments: Extended Unified Theory of Acceptance and Use of Technology Model Combined With the Information System Success Model and Initial Trust Model," *Front. Psychol.*, vol. 13, 2022, doi: 10.3389/fpsyg.2021.634911.
- [47] V. Sharma and B. Priya, "Bridging the gap: AI-powered FinTech and its impact on financial inclusion and financial well-being," *Discover Artificial Intelligence*, vol. 5, 2025, doi: 10.1007/s44163-025-00465-9.
- [48] M. Adil, Y. Singh, and Mohd. S. Ansari, "How Financial Literacy Moderate the Association Between Behaviour Biases and Investment Decision?," *Asian Journal of Accounting Research*, vol. 7, no. 1, 2022, doi: 10.1108/AJAR-09-2020-0086.
- [49] G. A. S. Oktaryani, N. L. P. Wiagustini, L. G. S. Artini, and I. R. Candraningrat, "Local Cultural Values, Managerial Overconfidence, and SME Performance: The Mediating Role of Debt Financing," *Mercados y Negocios*, vol. 57, 2026, doi: 10.32870/myn.vi57.7918.

- [50] J. R. Saura and R. Bužinskienė, “Behavioral economics, artificial intelligence and entrepreneurship: an updated framework for management,” *International Entrepreneurship and Management Journal*, vol. 21, 2025, doi: 10.1007/s11365-025-01076-7.
- [51] A. M. A. Jayawardena and N. S. Nanayakkara, “How Does Loss Aversion Mediate the Relationship Between Personality Traits and Efficiency of Skills in Investment Decision-Making?,” *International Review of Management and Marketing*, vol. 15, no. 1, 2025.
- [52] K. Nagaya, “Why and Under What Conditions Does Loss Aversion Emerge?,” *Japanese Psychological Research*, vol. 65, no. 4, 2023.
- [53] W. J. W. Botzen, L. D. Thepaut, and S. Banerjee, “Kahneman’s Insights for Climate Risks: Lessons from Bounded Rationality, Heuristics and Biases,” *Environ. Resour. Econ. (Dordr.)*, vol. 88, 2025, doi: 10.1007/s10640-025-00980-4.
- [54] V. Ventre, R. Martino, and M. J. Muñoz Torrecillas, “Relationship between an inconsistent degree of financial literacy and inconsistent decision-making in intertemporal choices,” *Heliyon*, vol. 10, 2024, doi: 10.1016/j.heliyon.2024.e27253.
- [55] Y. Nurfaizal, A. A. Kurniawan, H. Hermawan, D. I. S. Saputra, S. N. Amalina, and L. N. Hafshah, “Digital Platform Utilization and ICT Literacy on Global Market Access among MSMEs: The Mediating Role of Digital Business Readiness and the Moderating Effect of Government Support,” *Journal of Applied Data Sciences*, vol. 6, no. 4, pp. 2391–2406, 2025, doi: 10.47738/jads.v6i4.893.
- [56] J. Hair and A. Alamer, “Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example,” *Research Methods in Applied Linguistics*, vol. 1, 2022, doi: 10.1016/j.rmal.2022.100027.
- [57] P. Guenther, M. Guenther, C. M. Ringle, G. Zaefarian, and S. Cartwright, “Improving PLS-SEM use for business marketing research,” *Industrial Marketing Management*, vol. 111, 2023, doi: 10.1016/j.indmarman.2023.03.010.
- [58] M. Sarstedt, J. F. Hair, M. Pick, B. D. Lienggaard, L. Radomir, and C. M. Ringle, “Progress in partial least squares structural equation modeling use in marketing research in the last decade,” *Psychol. Mark.*, vol. 39, 2022, doi: 10.1002/mar.21640.
- [59] G. W. Cheung, H. D. Cooper-Thomas, R. S. Lau, and L. C. Wang, “Reporting reliability, convergent and discriminant validity with structural equation modeling: A review and best-practice recommendations,” *Asia Pacific Journal of Management*, vol. 41, 2024, doi: 10.1007/s10490-023-09871-y.
- [60] M. B. Amnas, M. Selvam, and S. Parayitam, “FinTech and Financial Inclusion: Exploring the Mediating Role of Digital Financial Literacy and the Moderating Influence of Perceived Regulatory Support,” *Journal of Risk and Financial Management*, vol. 17, 2024.
- [61] F. Herzallah, A. J. Abosamaha, Y. Abu-Siam, M. Amer, U. Sajjad, and K. Hamid, “Determinants of mobile wallet usage among Gen Z: Extending the UTAUT2 model with moderating effects of personal innovativeness and gender,” *International Journal of Information Management Data Insights*, vol. 5, 2025.