DIGITAL LITERACY PARADOX: MODERATING EFFECTS ON E-COMMERCE ADOPTION AND FINANCIAL PLANNING AMONG MSMEs

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ABSTRACT

Background: Micro, Small, and Medium Enterprises (MSMEs) in West Kalimantan face substantial financial management challenges amid accelerating digital transformation. As a border province geographically distant from Indonesia's primary economic centers, Pontianak's entrepreneurial ecosystem is characterized by informal financial practices, uneven digital infrastructure and limited access to formal financial services. These structural conditions create disparities in financial capability and digital readiness among MSME actors.
Purpose: This study examines the effects of financial behavior, fintech development, online shopping platforms, and present bias on MSMEs' financial planning, with digital literacy as a moderating variable within an integrated behavioral–technological framework.
Methods: A quantitative causal research design was employed using structured online questionnaires distributed to 262 MSME owners selected through purposive sampling. Six validated constructs were measured using a five-point Likert scale and analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0 to assess both direct and moderating effects.
Results: Financial behavior was the strongest predictor of financial planning, followed by online shopping platform utilization and fintech development. The present bias did not have a significant direct effect. Digital literacy showed no direct influence on financial planning; however, it negatively moderated the relationship between online shopping platforms and financial planning, indicating diminishing marginal returns of e-commerce utilization among MSMEs with higher digital capabilities.
Conclusion: Behavioral financial discipline remains the cornerstone of MSME financial planning, regardless of technological sophistication. Digital tools contribute to financial planning when they are integrated with structured managerial practices rather than functioning as standalone solutions.
Originality/value: This study extends behavioral finance and technology adoption theories within the urban entrepreneurial ecosystem of Pontianak. The identification of a negative moderating effect of digital literacy reveals non-linear and context-dependent dynamics between digital capability and financial planning outcomes, offering policy-relevant insights into inclusive digital transformation strategies in developing urban economies.

Keywords: digital literacy, e-commerce, financial behavior, financial planning, fintech

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INTRODUCTION

Micro and Small Enterprises (MSEs) occupy a highly strategic position within the structure of the modern economy and are internationally recognized as one of the primary drivers of economic growth. Their contribution is not limited to job creation; it also includes stimulating innovation, enhancing competitiveness, and strengthening economic resilience in both developed and developing countries. In Indonesia, MSMEs dominate the national business landscape and are the backbone of economic activity at multiple levels. According to Nursini (2020), approximately 98.68% of MSMEs fall into the micro-enterprise category and account for 89.04% of total employment in the sector. These figures clearly demonstrate that MSMEs play a decisive role in sustaining economic growth, reducing poverty, and supporting national financial stability.

Within the Indonesian context, MSMEs also function as stabilizing agents during periods of economic crises and global uncertainty. Data from the Ministry of Cooperatives and SMEs indicate that MSMEs consistently contribute significantly to the national GDP and remain the largest source of employment absorption. This highlights the importance of strengthening MSME resilience to maintain economic continuity. At the regional level, particularly in West Kalimantan Province, MSMEs are the backbone of local economic development. Pontianak City, as the provincial capital, has experienced continuous growth in MSME activity, especially in the trade and service sectors, where entrepreneurial capability and resource optimization are essential for sustaining business expansion (Fajarika et al. 2024). However, despite this growth, MSMEs face managerial and financial challenges that threaten their long-term sustainability.

One of the most pressing challenges faced by MSMEs is the need to adapt to rapid digital transformation processes. The expansion of digital platforms, FinTech services, and online marketplaces has reshaped competitive dynamics and altered traditional business processes. While digitalization offers opportunities for efficiency and broader market access, it also demands stronger managerial capability and structured financial planning. Many MSME actors still rely on informal financial practices and intuitive decision-making, which may not be sufficient in a digitally competitive environment. Therefore, examining the determinants of financial planning among MSMEs is increasingly urgent to ensure business sustainability amid digital transformation.

Digital transformation has fundamentally altered the operational dynamics. The emergence of financial technology and e-commerce platforms provides enterprises with tools to enhance transaction efficiency, improve liquidity management, and expand market reach (Gomber et al. 2017). Through fintech services, business owners can access digital payments, working capital financing, and real-time financial monitoring systems. Similarly, e-commerce platforms enable MSMEs to access broader regional and international markets without geographical constraints. However, the effective utilization of these digital technologies depends on managerial capability and digital readiness, and in Indonesia, uneven digital literacy remains a major obstacle to optimal adoption (Sunarso et al. 2025).

From a conceptual perspective, digital transformation is not merely the adoption of new technologies but represents a comprehensive shift in organizational processes, decision-making structures and value creation mechanisms (Verhoef et al. 2021). In this context, financial behavior has been widely recognized as a key determinant of effective financial planning (Xiao & Porto, 2017). Disciplined budgeting, systematic monitoring, and rational resource allocation significantly contribute to sustainable financial results. Additionally, psychological dimensions, such as present bias, influence financial decision-making by encouraging short-term orientation over long-term strategic planning (Strömbäck et al. 2017).. These behavioral and psychological factors demonstrate that financial sustainability depends not only on technology adoption but also on managerial discipline.

Furthermore, digital literacy represents a multidimensional competence encompassing the technical, cognitive, and strategic skills required to navigate complex technological environments (Laar et al. 2017). Technology adoption theory also explains that perceived usefulness, ease of use, and facilitating conditions shape behavioral intentions toward digital systems (Venkatesh et al. 2012). Although previous studies have examined financial behavior, fintech utilization, e-commerce adoption, and digital literacy independently, most studies treat these determinants as separate explanatory factors. Limited empirical studies have integrated behavioral, technological, and

psychological dimensions into a unified analytical framework to explain MSME financial planning, particularly in emerging urban ecosystems such as Pontianak. Therefore, this study contributes to the literature by positioning digital literacy as a moderating variable within an integrated model to examine how these determinants interact in shaping financial planning outcomes.

To address the identified research gap, this study develops a comprehensive conceptual framework that integrates financial behavior, fintech development, online shopping platform utilization, and present bias as determinants of financial planning behavior. Digital literacy is positioned as a moderating variable that may strengthen or condition the relationships between these variables. By combining perspectives from behavioral finance, capability theory, and technology adoption models, this study provides a holistic analytical approach to understanding MSME financial management practices. This integrated framework allows for the simultaneous examination of both direct and moderating effects among latent constructs. This approach aims to clarify how managerial discipline and digital capability interact within a digitally evolving business environment.

The empirical analysis employs a quantitative research design using Partial Least Squares Structural Equation Modeling (PLS-SEM). This method is appropriate for testing complex structural relationships and examining moderating effects within the predictive models. Data were collected from MSME owners in Pontianak City to ensure contextual relevance and robustness. The use of PLS-SEM enables the evaluation of measurement reliability and structural relationships in a single analysis. Consequently, this methodological approach strengthens the explanatory power of the integrated model proposed in this study.

Based on the background and identified research gap, this study aims to examine the determinants of financial planning among MSMEs in Pontianak. Specifically, it analyzes the influence of financial behavior, fintech development, online shopping platform utilization, and present bias on financial planning. In addition, this study evaluates the moderating role of digital literacy in shaping the relationships between these determinants and financial planning. By integrating the behavioral, technological, and psychological dimensions within a unified analytical framework, this study seeks to provide a comprehensive explanation of MSME financial sustainability. Ultimately, the findings are expected to contribute to the advancement of MSME financial management literature and support evidence-based digital transformation strategies in emerging urban economies.

METHODS

This study applied a quantitative causal research design to examine the relationships among financial behavior, financial technology utilization, online shopping platforms, present bias, and financial planning, with digital literacy serving as a moderating variable. The research was conducted in Pontianak City, West Kalimantan, Indonesia, targeting MSME owners who had operated their businesses for at least one year.

Two types of data were used in this study: Primary data were collected through a structured questionnaire distributed online using Google Forms to 262 valid respondents. The questionnaire was designed based on validated instruments adapted from prior empirical studies and modified to suit the MSME context in Pontianak, Indonesia. Secondary data obtained from official publications of the Pontianak City Bureau of Statistics (BPS) and reports from the Ministry of Cooperatives and SMEs were used to provide a contextual background regarding MSME demographics and digital ecosystem conditions.

All variables were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The constructs included financial behavior, FinTech development, e-commerce platforms, present bias, digital literacy, and financial planning. Each construct was operationalized using previously validated instruments (Deursen et al. 2015; Yeo et al. 2024) to ensure content and construct validity.

The study employed a purposive sampling technique, selecting MSME owners who (1) actively managed their own business finances, (2) used at least one digital platform (fintech or e-commerce), and (3) had been in operation for a minimum of one year. The questionnaires were distributed online via professional networks, MSME associations, and local entrepreneurship communities in Pontianak. Respondents were briefed on the research purpose, confidentiality of responses, and voluntary participation in accordance with ethical

research standards. The questionnaire consisted of six sections representing key constructs, with each section containing items corresponding to the measurement indicators. The responses were screened for completeness, consistency, and the presence of outliers. Data cleaning was performed by checking for missing values, ensuring uniformity of responses, and validating response authenticity (e.g., duplicate IP detection). This process ensured that the 262 valid responses were appropriate for statistical analysis.

Data were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique through SmartPLS 4.0 software. PLS-SEM was chosen because of its robustness in handling complex models, small-to-medium sample sizes, and non-normal data distributions. The analytical procedure consisted of two main stages.

1. Measurement Model Evaluation, including the following: Reliability testing was performed using Cronbach's alpha and composite reliability (threshold > 0.7). Convergent validity testing via average variance extracted (AVE > 0.5) and outer loadings (> 0.7). Discriminant validity testing using the Fornell–Larcker criterion.

2. Structural Model Evaluation, involving: Path coefficient estimation and significance testing via bootstrapping (5000 subsamples). Coefficient of determination (R^2) to assess the explanatory power of the model. Effect size (f^2) and predictive relevance (Q^2) to evaluate model fit and predictive accuracy. Moderation analysis was used to examine the conditional effect of digital literacy on the relationships among the main constructs.

Hypotheses were accepted or rejected based on t-statistics (>1.96) and p-values (<0.05). The analytical results were interpreted using theoretical and empirical justifications from behavioral finance and digital entrepreneurship literature. Based on the literature review, this study proposed eight hypotheses:

H1: Financial behavior positively and significantly influences MSMEs' financial planning. Rationale: Rational and disciplined financial behavior improves budgeting, saving, and investment, leading to better financial planning (Susan, 2020).

H2: Fintech development positively and significantly affects financial planning. Rationale: Digital financial services enhance financing access and enable efficient cash flow management (Li et al. 2023).

H3: Online shopping platforms positively and significantly affect financial planning. Rationale: E-commerce utilization improves revenue predictability and facilitates transparent financial tracking (Amornkitvikai et al. 2022).

H4: Present bias negatively affects financial planning. Rationale: Temporal preference for immediate gratification undermines long-term financial decision-making (Wang & Sloan, 2018).

H5–H8: Digital literacy moderates the relationships between financial behavior, fintech development, e-commerce use, and present bias on financial planning. Rationale: Digital capability conditions the effectiveness of behavioral and technological factors in shaping financial decisions (Angeles, 2022).

The research model is depicted in Figure 1, which illustrates the hypothesized relationships among the study variables. Financial behavior, fintech development, e-commerce platforms, and present bias are exogenous variables that affect financial planning, whereas digital literacy is a moderating variable.

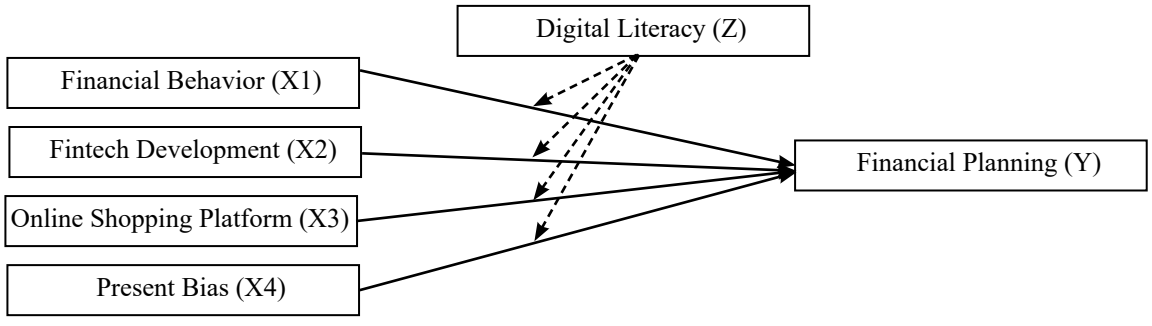

Figure 1. Conceptual framework of the effects of financial behavior, fintech development, online shopping platform, and present bias on financial planning with digital literacy as a moderating variable among MSMEs in Pontianak City

RESULTS

The quantitative component of this study investigates factors that enhance financial planning among SMEs, including financial behavior, the use of fintech, e-commerce platforms, present bias, and the moderating role of digital literacy. Data were collected through an online questionnaire distributed via Google Forms to 262 valid respondents from August to September 2025. As presented in Table 1, which summarizes the sociodemographic characteristics of MSME owners in Pontianak City, the sample is dominated by male respondents (51.53%). The majority hold a Diploma or Bachelor's degree (51.53%) and operate businesses in the service sector (32.82%). Most businesses have been operating for 1–5 years (36.64% of the sample). In terms of financial capacity, 39.69% of the respondents reported a monthly turnover of less than IDR 10 million. Additionally, most respondents employed between one and five workers (58.02%).

The primary purpose of validity testing is to ensure that the constructs under investigation are accurately measured in accordance with the conceptual framework being assessed. According to Dzin and Lay (2021), an indicator is considered valid if it meets several criteria, including an outer loading value exceeding 0.70, a communality value above 0.50, and an average variance extracted (AVE) greater than 0.50. In this study, instrument reliability was assessed to determine internal consistency among indicators. Within the Partial Least Squares (PLS) approach, reliability testing is conducted using two key measures, Cronbach's alpha and composite reliability, which evaluate the extent to which indicators within a construct exhibit stable consistency (Kamis et al. 2020). Hair et al. (2017) further note that although a reliability value of 0.60 may still be acceptable, the widely adopted ideal threshold for Cronbach's alpha and composite reliability is above 0.70.

Based on the reliability and validity tests conducted using SmartPLS, all variables demonstrated Cronbach's alpha and composite reliability values exceeding 0.7, indicating that the instruments were reliable and internally consistent. Accordingly, it can be concluded that all latent variables—Financial Planning, Financial Behavior, Fintech Development, Online Shopping Platforms, Present Bias, and Digital Literacy–exhibit a high level of reliability. In addition, the measurement model evaluation results are presented in Table 2, which reports the outer loadings, Cronbach's alpha, composite reliability, and AVE values for Financial Behavior, Fintech Development, Online Shopping Platform, Present Bias, Digital Literacy, and Financial Planning. The results show that all constructs met the required criteria for reliability and convergent validity, as their respective AVE values surpassed the threshold of 0.5.

Table 1. Sociodemographic Characteristics of Respondents

Demographic characteristics	Frequency	Percentage
Gender		
Male	135	51.53
Female	127	48.47
Last Education		
Elementary School	2	0.76
Junior High School or Equivalent	10	3.82
High School or Equivalent	108	41.22
Diploma / Bachelor's Degree	135	51.53
Master's Degree	7	2.67
Type of Business		
Service Sector	86	32.82
Trade	64	24.43
Culinary	48	18.32
Small Manufacturing	37	14.12
Transportation	22	8.40
Urban Agriculture	5	1.91
Length of Business		
< 1 year	4	1.53
1-5 years	96	36.64
6-10 years	62	23.66
11-15 years	54	20.61
16-20 years	24	9.16
21-25 years	17	6.49
> 25 years	5	1.91
Turnover per Month		
<10.000.000.-	104	39.69
10.000.000 - < 50.000.000	72	27.48
50.000.000 - <100.000.000	71	27.10
>500.000.000	15	5.73
Number of Employees		
1-5 employees	152	58.02
6-10 employees	53	20.23
11-20 employees	40	15.27
21-50 employees	17	6.49

Table 2. Measurement model analysis

Variable	Item	Outer loading	Cronbach's Alpha	Composite Reliability	AVE
Financial Behavior	FB1	0.794	0.875	0.903	0.573
	FB2	0.756			
	FB3	0.763			
	FB4	0.787			
	FB5	0.685			
	FB6	0.797			
	FB7	0.707			
Development of Financial Technology	DFT1	0.794	0.902	0.923	0.632
	DFT2	0.822			
	DFT3	0.829			
	DFT4	0.848			
	DFT5	0.817			
	DFT6	0.74			
	DFT7	0.704			
Online Shopping Platform	OSP1	0.748	0.882	0.911	0.63
	OSP2	0.834			
	OSP3	0.833			
	OSP4	0.819			
	OSP5	0.765			
	OSP6	0.759			
Present Bias	PB1	0.793	0.92	0.936	0.676
	PB2	0.831			
	PB3	0.823			
	PB4	0.78			
	PB5	0.851			
	PB6	0.821			
	PB7	0.852			
Digital Literacy	DL1	0.818	0.877	0.91	0.67
	DL2	0.845			
	DL3	0.823			
	DL4	0.801			
	DL5	0.805			
Financial Planning	FP1	0.69	0.894	0.917	0.613
	FP2	0.827			
	FP3	0.794			
	FP4	0.756			
	FP5	0.841			
	FP6	0.842			
	FP7	0.718			

Based on the results of the internal consistency reliability assessment, as presented in Table 2, the reliability and construct validity tests indicate that all the latent variables in the model exhibit a high level of internal consistency. The Cronbach's alpha values for all constructs exceeded the recommended threshold of 0.70, demonstrating satisfactory reliability. Specifically, the highest Cronbach's alpha value was observed for the Present Bias construct (0.920), followed by Financial Technology Development (0.902) and Financial Planning (0.894). Meanwhile, the constructs Financial Behavior (0.875), Online Shopping Platforms (0.882), and Digital Literacy (0.877) also showed strong reliability.

The Composite Reliability (CR) values for all constructs also exceeded the threshold of 0.70, ranging from 0.903 to 0.936, thereby confirming a high level of internal consistency across the model. In addition, the Average Variance Extracted (AVE) values for all constructs were above 0.50, indicating that each construct explained more than 50% of the variance in its respective indicators. The highest AVE value was recorded for the Present Bias construct (0.676), while the lowest value, Financial Behavior (0.573), still met the minimum acceptable criterion.

Convergent validity is established when an indicator's outer loading exceeds 0.70, indicating that the indicator has a strong ability to accurately represent the underlying construct (Ghozali & Latan, 2015). Nonetheless, indicators with outer loadings between 0.50 and 0.60 may still be retained if they possess strong theoretical relevance. Conversely, indicators with outer loadings below 0.50 should be removed, as their contribution to the latent variable is weak and statistically insignificant (Ramayah et al. 2018). The results of the validity assessment for all indicators are presented in Table 2, which provides an overview of the level of convergent validity achieved in the measurement model of this study.

Based on Table 2, the results of the outer loading assessment indicate that all indicators exhibit adequate loading values ranging from 0.685 to 0.852. These findings suggest that each measurement item consistently reflects its corresponding latent construct. For the Financial Behavior construct (FB1–FB7), the loading values ranged from 0.685 to 0.797, with FB6 demonstrating the highest loading (0.797), indicating the strongest contribution to the construct. Although FB5 recorded the lowest loading value (0.685), it remained acceptable for exploratory research. The Financial Planning construct (FP1–FP7) shows loading values between 0.704 and 0.848, with FP4 achieving the highest loading (0.848), which reflects excellent construct representation. Meanwhile, for the Online Shopping Platform construct (OSP1–OSP6), the loading values fell between 0.748 and 0.834, with OSP2 (0.834) and OSP3 (0.833) serving as the dominant indicators in explaining the construct. The Financial Technology Development construct (DFT1–DFT7) exhibited relatively high loading values, ranging from 0.780 to 0.852, with DFT7 (0.852) and DFT5 (0.851) emerging as the most representative indicators. Furthermore, the Digital Literacy construct (DL1–DL5) demonstrated loadings between 0.801 and 0.845, all of which exceeded the 0.70 threshold, indicating strong consistency and reliability among its indicators. Finally, the Present Bias construct (PB1–PB7) reported loading values between 0.690 and 0.842, with PB6 contributing the most to the construct (0.842). Although PB1 showed the lowest loading (0.690), it remained within the acceptable range.

Hypothesis test results

As shown in Table 3, which presents the coefficient of determination (R^2 and adjusted R^2) of Financial Planning in the structural model, the R-squared value is 0.678, and the adjusted R^2 is 0.662, indicating that the independent variables explain a substantial proportion of the variance in Financial Planning. This indicates that the variables included in the model account for 66.2% of the variance in Financial Planning, while the remaining 33.8% is explained by external factors not captured in this study. Thus, only 66.2% of the variability in Financial Planning can be attributed to the variables examined, whereas the remaining 33.8% must be explained by other factors beyond the scope of this research.

The *t*-statistic values between the independent and dependent variables were used to assess the significance level of the predictive model within the structural model evaluation. Based on the SmartPLS results, the *t*-statistics reported in the path coefficient table indicate the extent to which the relationships between the independent and dependent variables contribute to determining the predictive strength of the structural model. The detailed structural model results, including path coefficients, t-statistics, and p-values for each hypothesized relationship, are shown in Table 4.

Table 3. Coefficient of determination of financial planning explained by financial behavior, fintech development, online shopping platform, present bias, and digital literacy

	R Square	R Square Adjusted
Financial Planning	0.678	0.662

Table 4. Path coefficients and hypothesis testing results of financial behavior, fintech development, online shopping platform, present bias, and moderating effects of digital literacy on financial planning

Variabel	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Latent Variable 1 → Latent Variable 6	0.524	0.507	0.076	6.930	0.000
Latent Variable 2 → Latent Variable 6	0.114	0.124	0.057	2.005	0.045
Latent Variable 3 → Latent Variable 6	0.182	0.175	0.070	2.604	0.009
Latent Variable 4 → Latent Variable 6	0.068	0.086	0.067	1.002	0.317
Latent Variable 5 → Latent Variable 6	0.056	0.058	0.049	1.145	0.253
Moderating Effect 1 → Latent Variable 6	0.057	0.051	0.063	0.908	0.364
Moderating Effect 2 → Latent Variable 6	0.049	0.045	0.070	0.709	0.479
Moderating Effect 3 → Latent Variable 6	-0.167	-0.157	0.059	2.844	0.005
Moderating Effect 4 → Latent Variable 6	0.076	0.070	0.069	1.106	0.269

Research Model

The structural model obtained from the PLS-SEM bootstrapping procedure is illustrated in Figure 2, which depicts the direct and moderating relationships between the study variables. The results indicate that four of the nine hypothesized relationships were statistically significant. Among the direct effects, Financial Behavior exhibited the strongest influence on Financial Planning, with a positive path coefficient of 0.524. The corresponding p-value of 0.000 indicates a highly significant and robust positive relationship between the two variables. These findings suggest that Financial Behavior is the most critical predictor in the model, accounting for approximately 52.4% of the explained variance in the financial planning of MSME actors. This implies that financial decision-making patterns, including planning, control, management, and evaluation behaviors, play a dominant role in determining the quality of comprehensive financial planning among MSMEs.

The Online Shopping Platform also exhibited a significant positive effect on Financial Planning, with a path coefficient of 0.182. The corresponding p-value of 0.009 indicates moderate predictive strength. These findings suggest that the intensity and usage patterns of e-commerce platforms, including platform diversification and integration with business systems, contribute to enhancing the quality of financial planning among MSMEs. The more intensively MSME actors utilize online shopping platforms, the better their capacity to manage cash flow, investments, taxation, risk, and business continuity.

Similarly, FinTech Development exhibited a statistically significant impact on Financial Planning, albeit weaker, with a path coefficient of 0.114 and a p-value of 0.045. These findings confirm that the adoption and utilization of financial technology innovations such as payment systems, digital lending, crowdfunding, and crypto assets positively contribute to the financial planning capabilities of MSME actors, although the magnitude of this effect is more moderate than that of other variables.

Conversely, the hypothesized relationship between Present Bias and Financial Planning, with a path coefficient of 0.068 and a p-value of 0.317, is not supported by the data. The non-significant coefficient indicates that MSME actors' tendency to prioritize immediate gratification over future benefits does not exert a direct, meaningful influence on financial planning within the context of this study. This finding suggests that cognitive biases related to time preference and self-control may operate through more complex mechanisms or require mediating variables to effectively impact financial planning.

Furthermore, the direct effect of Digital Literacy on Financial Planning was not statistically significant, as indicated by a coefficient of 0.056 and a p-value of 0.253. Although the ability of MSME actors to use, understand, and leverage digital technologies effectively is an important skill in the digital era, these findings suggest that digital literacy does not directly influence the quality of financial planning skills. This implies that digital literacy may function more as a moderating or mediating variable within the model rather than as a direct predictor.

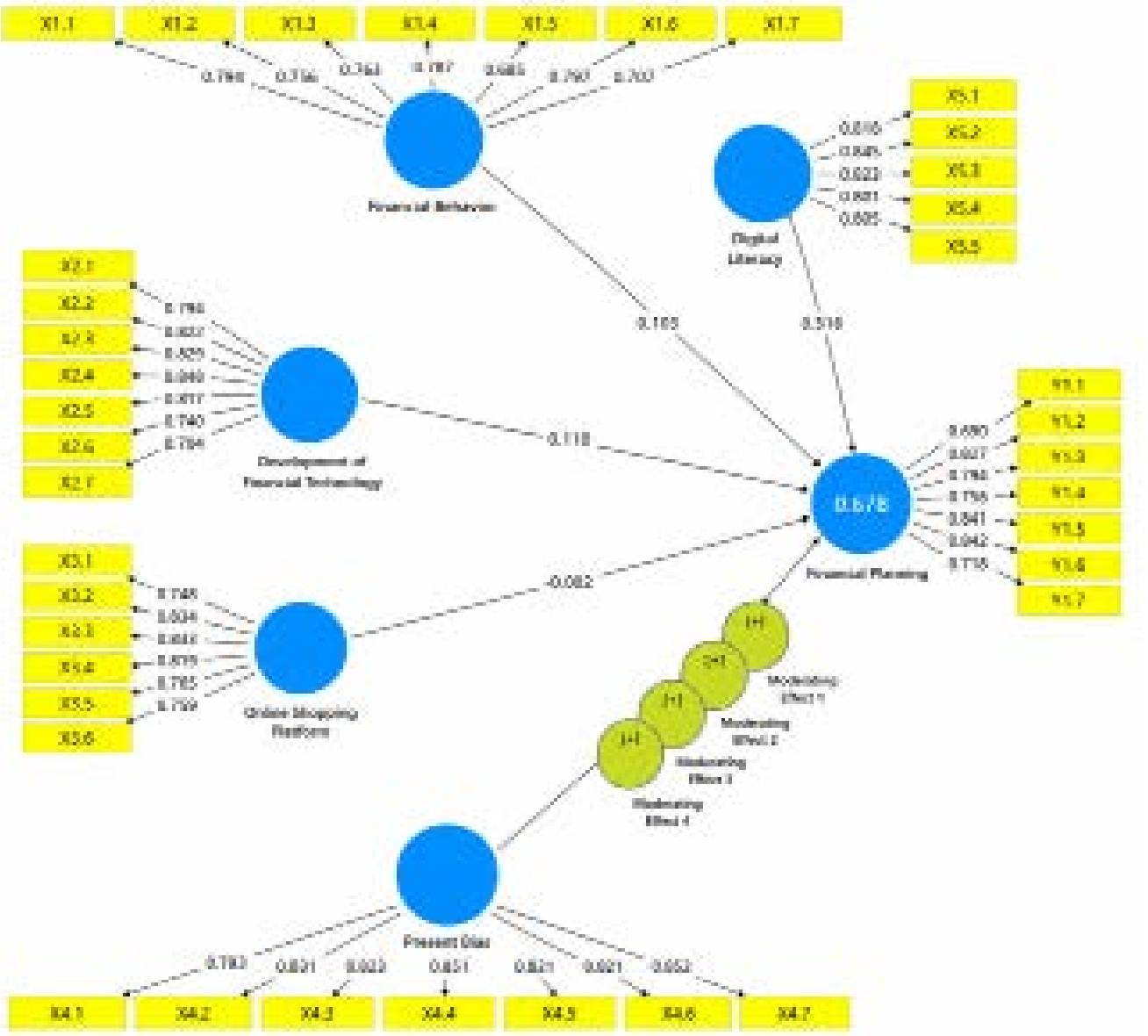

Figure 2. Structural model bootstrapping results of the effects of financial behavior, fintech development, online shopping platform, present bias, and the moderating role of digital literacy on financial planning among MSMEs in Pontianak City

Moderating Effects of Digital Literacy

Regarding the moderation effects, only one of the four hypothesized moderations received empirical support. Digital Literacy negatively moderated the relationship between Online Shopping Platforms and Financial Planning, with a coefficient of -0.167 and a p-value of 0.005. This negative moderation indicates that at higher levels of digital literacy, the positive impact of online shopping platforms on financial planning diminishes. This can be explained by the fact that MSME actors with high digital literacy may already possess inherently strong financial planning skills, such that additional use of online shopping platforms does not provide a significant incremental benefit to their financial performance. Conversely, for MSME actors with low digital literacy, utilizing online shopping platforms offers a more substantial advantage in enhancing financial planning capabilities.

Conversely, Digital Literacy did not moderate the relationship between Financial Behavior and Financial Planning, as indicated by a coefficient of 0.057 and a p-value of 0.364. This finding suggests that the strength of the relationship between financial behavior and financial planning remains consistent, regardless of

the level of digital literacy among MSME actors. In other words, the positive influence of sound financial behavior on financial planning is universal, applying equally to MSME actors with both high and low levels of digital literacy.

Similarly, the moderating effect of Digital Literacy on the relationship between Financial Technology (FinTech) Development and Financial Planning was not statistically significant, as indicated by a coefficient of 0.049 and a p-value of 0.479. This suggests that the benefits of adopting financial technology for financial planning do not depend on the digital literacy level of MSME actors. This finding may indicate that modern financial technologies are designed with user-friendly interfaces, enabling MSMEs to use them effectively across varying levels of digital literacy.

Finally, digital literacy did not moderate the relationship between present bias and financial planning, as indicated by a coefficient of 0.076 and p-value of 0.269. Considering that the direct effect of present bias on financial planning was also non-significant, this finding is consistent and suggests that time-preference-related cognitive biases do not play a substantial role in the financial planning processes of MSMEs, either directly or through their interaction with digital literacy.

Overall, the hypothesis testing results provide partial support for the proposed model's validity. The significant direct effects of Financial Behavior, Financial Technology Development, and Online Shopping Platforms underscore the importance of these variables as key antecedents of financial planning among SMEs. Moreover, the identification of a negative moderating effect of Digital Literacy on the relationship between Online Shopping Platforms and Financial Planning further enriches the understanding of the conditional nature of these relationships, highlighting that the benefits of digital technology in financial planning depend on the specific context and characteristics of SME actors.

Managerial Implication

The findings of this study highlight that financial behavior is the most critical determinant of financial planning among MSMEs. As the strongest predictor in the structural model, disciplined financial practice forms the foundation of sustainable business management. Therefore, MSME owners should prioritize structured budgeting, a clear separation between personal and business finances, and systematic cash flow monitoring as core managerial routines. Strengthening these behavioral competencies reduces financial uncertainty and enhances the capacity for long-term planning. Consequently, improving financial discipline should be the primary intervention before introducing more advanced digital solutions.

The significant effects of fintech development and online shopping platforms indicate that digital tools can contribute meaningfully to financial planning when they are integrated into operational processes. Fintech services facilitate transaction recording, digital payments, and access to financing, whereas e-commerce platforms generate valuable sales and customer data. When properly utilized, these digital traces can support revenue forecasting, liquidity management and performance evaluation. However, digital platforms should not be treated merely as transactional instruments but as financial information systems that support strategic decision making. Thus, MSME managers are encouraged to embed digital adoption within broader financial planning frameworks, rather than viewing it as an isolated technological upgrade.

The moderating role of digital literacy provides more nuanced managerial insights. Although digital literacy is commonly perceived as universally beneficial, the findings suggest that its effect is conditional and does not automatically improve financial planning outcomes. In particular, higher digital competence does not always amplify the impact of e-commerce adoption, indicating the presence of contextual or diminishing returns effects. This implies that digital empowerment initiatives should be differentiated according to the capability levels of MSMEs. Therefore, policy interventions and training programs must align digital skill development with practical financial management applications to ensure that technological capabilities translate into measurable planning improvements.

Overall, the results suggest that technology adoption alone is insufficient to guarantee enhanced financial resilience. Financial sustainability in MSMEs depends on the alignment of behavioral discipline, strategic use of digital tools, and contextual capability development. Overemphasizing digital literacy without strengthening financial behavior may limit the effectiveness of digital transformation policies. Accordingly, an integrated approach that prioritizes behavioral financial discipline

while strategically supporting digital adoption is more likely to enhance MSME financial resilience in emerging urban economies.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study was designed to analyze how financial behavior, financial technology development, online shopping platforms (Platform Belanja Online), and present bias affect the financial planning of MSMEs in Pontianak City, with digital literacy serving as a moderating variable. The findings directly address the research objectives by revealing that financial behavior is the most dominant and consistent determinant of sound financial planning. MSME owners who apply disciplined budgeting, a clear separation between business and personal finances, and regular financial evaluation demonstrate stronger financial planning capacity and resilience.

The utilization of *Platform Belanja Online* and the development of financial technology also significantly improved financial planning, although with moderate effect sizes compared to behavioral factors. These results indicate that integrating digital tools, such as e-commerce and fintech, enhances financial control and strategic planning when guided by prudent behavioral foundations. Conversely, present bias and digital literacy show no direct influence on financial planning, implying that both psychological and capability factors may exert effects only through mediating constructs, such as self-control or confidence. A noteworthy finding is the negative moderation of digital literacy on the relationship between *Platform Belanja Online* and financial planning, signifying that MSMEs with lower digital literacy levels derive greater benefits from e-commerce adoption in improving financial management, while those with higher literacy experience diminishing returns.

These findings are generally consistent with previous studies that emphasize the importance of financial behavior in improving financial planning outcomes, where disciplined financial practices play a central role in shaping better financial decisions among MSMEs. The positive effects of fintech development and the use of online shopping platforms also support earlier findings, indicating that digital platforms can assist MSMEs in managing their finances effectively. However, this study also reveals differences from prior research, particularly regarding the role of digital literacy, which does not have a significant direct effect on financial planning. In addition, the negative moderating effect of digital literacy on the relationship between online shopping platforms and financial planning contrasts with the commonly expected positive role of digital capabilities. These findings suggest that the role of digital literacy is more context-dependent and does not always generate increasing benefits, especially when higher levels of digital literacy reduce the additional contribution of digital platform usage to financial planning in MSMEs.

Recommendations

Based on these conclusions, several practical and academic implications arise. MSME actors should prioritize strengthening their financial behavior through consistent budgeting, meticulous cash flow monitoring, and disciplined financial evaluation as the behavioral core of their sustainable business planning. Local governments and MSME support agencies are encouraged to design tiered digital literacy programs that match entrepreneurs' digital readiness levels, focusing on hands-on mentoring for those with lower literacy who benefit the most from *Platform Belanja Online* utilization. Fintech developers and e-commerce providers should simplify user interfaces, provide integrated financial education, and encourage responsible technology use to enhance financial inclusion. Academically, future research should adopt longitudinal designs to capture behavioral change over time, extend the geographic coverage beyond Pontianak to test contextual generalizability, and incorporate mediating constructs such as financial self-efficacy, trust in technology, or social norms to uncover indirect pathways shaping MSME financial planning in the digital economy.

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