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EDITORIAL ADDRESS

BJ Building Lv. III, Faculty of Economics and Business, Udayana University

Jl. PB Sudirman, Denpasar

Tel. 0361-224133, Fax. 0361-241929

e-mail: matrik.fe@unud.ac.id

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Impact of Fintech on Financial Performance of MSMES in Bali with Financial Literacy as Moderator

Ica Rika Candraningrat [1)], Vera Intanie Dewi [2)]
Putu Ayu Kezia Dewi [3)]
[1,3] Faculty of Economics and Business, Udayana University
[2] Faculty of Economics, Parahyangan Catholic University
Email: candraningrat@unud.ac.id

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ABSTRACT

This study examines the impact of fintech on the financial performance of micro, small, and medium enterprises (MSMEs) in Bali, with financial literacy as a moderating variable. A quantitative approach was employed, utilizing primary data collected through questionnaire distribution. The sampling method used was purposive sampling, with a total of 150 respondents. The findings indicate that fintech has a positive and significant effect on financial performance. Furthermore, financial literacy positively moderates this relationship, strengthening the impact of fintech on financial performance. These results align with the Theory of Planned Behavior and the Theory of Financial Innovation. The higher the financial literacy of MSME owners, the more effectively they utilize fintech to enhance financial performance.

Keyword: Fintech; Financial Performance; Financial Literacy; MSMEs

INTRODUCTION

Financial performance reflects the effectiveness and efficiency of management in utilizing available resources to contribute to the national economy (Kamukama et al., 2017). In the context of micro, small, and medium enterprises (MSMEs), financial performance is a critical area of study due to its implications for fiscal health and business resilience (Orobia et al., 2020). MSMEs serve as the backbone of Indonesia's economy, contributing 61.97 percent of the Gross Domestic Product (GDP), equivalent to IDR 8,500 trillion, and employing 97 percent of the workforce (BKPM, 2020). However, economic challenges, particularly in the digital era and the Industry 4.0 revolution, continue to test MSME resilience. To maintain competitiveness, MSMEs require strong competencies in data literacy, technological literacy, and financial literacy (Widyakto et al., 2022).

The Covid-19 pandemic has demonstrated the remarkable resilience of MSMEs, despite widespread revenue declines, operational disruptions, and financial difficulties. These challenges highlight the urgent need for enhanced support in human resource management, marketing strategies, financial management, and technology adoption. Strengthening these areas is essential to ensure that MSMEs can sustain their operations and adapt to an increasingly digital economic landscape.

Innovation in the financial sector, particularly financial technology (fintech), plays a crucial role in the development of MSMEs. Fintech enhances financial inclusion and improves efficiency by providing access to various services such as peer-to-peer (P2P) lending, e-wallets, crowdfunding, and personal finance management (Suryanto et al., 2020). According to Financial Innovation Theory (Silber, 1983), fintech adoption can enhance business competitiveness and operational efficiency. Several studies have shown that fintech positively contributes to MSME financial performance by expanding access to financing and improving transaction efficiency (Abbasi et al., 2021; Leong & Sung, 2018). However, without adequate financial knowledge, fintech adoption may increase financial risks, potentially reducing business performance (Almulla & Aljughaiman, 2021; Sudaryanti et al., 2018).

Financial literacy plays a crucial role in strengthening the relationship between fintech adoption and MSME financial performance. This capability enables business owners to manage their finances wisely, mitigate financial risks, and optimize fintech benefits. Financial literacy comprises three key aspects: financial knowledge, financial behavior, and financial attitude, which collectively contribute to the effectiveness of MSME financial management (Sanistasya et al., 2019). According to the Theory of Planned Behavior (Ajzen, 1985), financial decision-making is influenced by attitudes, subjective norms, and perceived behavioral control. Empirical studies indicate that financial literacy not only enhances the effectiveness of MSME financial management but also facilitates fintech adoption and minimizes the potential negative impacts of financial technology (Mogaji & Nguyen, 2022; Octavina & Rita, 2021).

As a moderating variable, financial literacy strengthens the relationship between fintech adoption and MSME financial performance. A strong understanding of financial concepts enables business owners to utilize fintech features optimally, thereby enhancing financial management efficiency and reducing financial risks. Research by Lema et al. (2021) suggests that financial literacy expands access to fintech services and accelerates the adoption of technological innovations among MSMEs. Thus, financial literacy serves as a key factor in optimizing fintech benefits to improve MSME financial performance.

Bali, as a center of Indonesia's creative economy and tourism industry, has a diverse and dynamic MSME ecosystem. However, many MSMEs in Bali continue to face challenges in accessing financing and adopting financial technology. Therefore, this study examines the impact of fintech adoption on the financial performance of MSMEs in Bali, with financial literacy as a moderating variable. The findings are expected to provide both theoretical and practical contributions, supporting MSME development and assisting the government and other stakeholders in formulating more effective policies.

METHODS

This study investigates the impact of fintech adoption on financial performance, with financial literacy as a moderating variable. The research was conducted in Bali Province, involving 150 MSMEs selected through purposive sampling. A quantitative approach was employed, utilizing primary data collected via structured questionnaires. Partial Least Squares-Structural Equation Modeling (PLS-SEM) was applied for hypothesis testing and data analysis.

The research framework comprises fintech adoption as the independent variable, financial performance as the dependent variable, and financial literacy as the moderating variable. It is hypothesized that financial literacy strengthens the relationship between fintech adoption and financial performance, implying that MSMEs with higher financial literacy can leverage fintech services more effectively to enhance their financial outcomes.

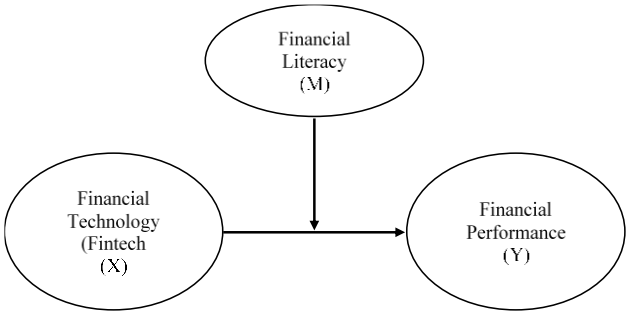

Figure 1. Research Conceptual Framework

The sample selection was based on the following criteria: MSMEs that have been operating in Bali for at least two years, actively using fintech services such as P2P lending, e-wallets, or crowdfunding, and maintaining financial records to assess performance. The indicators used to measure each variable are detailed in Table 1.

Table 1. Research Variable Indicators

Variable	Indicator	Source
Financial performance	Achievements in product sales; Increase in profit or profit; Achievement of revenue targets	Oktavina & Rita (2021)
Fintech	Easy to operate; platform view; Information access; Cost efficiency; Time efficiency; Effectiveness; user experience; Good idea; Perception of individual needs; important person; Influential person; Can be trusted; Personal information; Compensation; Fraud and piracy	Safira et al. (2020)
Financial Literacy	Knowledge of the time value of money; Knowledge of risks about and benefits of investments; Understanding the definition of inflation; Understand the concept of diversification; Active saving; Considering a purchase; Supervise financial affairs; Planning long term goals; Choose a product before making a transaction; and Considering the needs of tomorrow	Safira et al. (2020)

Source: processed data, 2022

RESULT AND DISCUSSION

Table 2 presents the distribution of the research sample, showing that 107 respondents belong to micro businesses, 39 to small businesses, and 4 to medium businesses. The majority of respondents are micro-business owners, accounting for 71 percent of the sample, followed by small businesses at 26 percent and medium businesses at 3 percent.

Table 2. Data Analysis

Intervals	Frequency	Percentage
0 - 2 Billion (Micro)	107	71
> 2 Billion - 15 Billion (Small)	39	26
> 15 Billion - 50 Billion (Medium)	4	3
Amount	60	100

Source: processed data, 2022

Table 3 displays the results of the validity test. All indicators demonstrate their ability to represent the corresponding latent variables, as evidenced by factor loadings exceeding 0.50. These results confirm that all measurement indicators meet the validity requirements.

Table 3. Convergent Validity Test Results

Variable	Indicator	Loading Factor
Fintech (X)	X1	0.672
	X2	0.793
	X3	0.832
	X4	0.640
	X5	0.788
	X6	0.774
	X7	0.859
	X8	0.806
	X9	0.761
	X10	0.712
	X11	0.771
	X12	0.770
	X13	0.658
	X14	0.644
	X15	0.706
Financial Performance (Y)	Y1	0.943
	Y2	0.936
	Y3	0.898
Financial Literacy M)	M1	0.862
	M2	0.776
	M3	0.881
	M4	0.814
	M5	0.826
	M6	0.856
	M7	0.830
	M8	0.869
	M9	0.880
	M10	0.863

Source: processed data, 2022

Table 4 presents a valid model, as indicated by the Average Variance Extracted (AVE) values for each variable exceeding 0.50. The reliability test results in Table 5 confirm that

all variables are reliable, as demonstrated by composite reliability and Cronbach's alpha values exceeding 0.50. The composite reliability value for the fintech variable is 0.955, with a Cronbach's alpha of 0.945. The financial performance variable has a composite reliability value of 0.958 and a Cronbach's alpha of 0.916. Meanwhile, the financial literacy variable records a composite reliability of 0.965 and a Cronbach's alpha of 0.876.

Table 4. Average Variance Extracted (AVE) Value

Research variable	AVE
Fintech (X)	0.655
Financial Performance (Y)	0.831
Financial Literacy (M)	0.712

Source: processed data, 2022

Table 5. Reliability Test Results

Variable	Composite Reliability	Cronbach's Alpha
Fintech (X)	0.955	0.945
Financial Performance (Y)	0.958	0.916
Financial Literacy (M)	0.965	0.876

Source: processed data, 2022

Table 6 shows that financial technology positively influences financial performance, with a coefficient of 0.784, a t-statistic of 10.342, and a p-value of 0.000. The p-value, which is below 0.05, confirms the statistical significance of this relationship.

Table 6. Path Coefficients Test Results

Direct Effects	Original Sample (O)	Direct Effects	Original Sample (O)	Direct Effects	Original Sample (O)
Fintech -> Financial Performance	0.784	0.796	0.077	10.342	0.000
Fintech_Financial Literacy -> Financial Performance	0.122	0.107	0.061	2.075	0.038

Source: processed data, 2022

The research findings confirm that fintech positively influences financial performance, supporting the proposed hypothesis. This suggests that SMEs that effectively understand and utilize fintech experience improved financial outcomes. These results align with financial innovation theory, which posits that innovation enhances a company's competitive advantage by improving revenue generation and financial efficiency. This principle applies to SMEs in Bali that have successfully integrated fintech into their business operations. The majority of respondents in this study reported increased income and greater transaction convenience after adopting fintech solutions. Previous studies by (Wulan, 2017), (Leong & Sung, 2018), (Luckandi, 2019), and (Hamidah et al., 2020) also indicate that financial technology contributes positively to SMEs' financial performance. Additionally, access to fintech-based financing enables SMEs to expand their market reach and address funding constraints (Suryanto et al., 2020).

Beyond its direct effect, fintech enhances financial performance through financial literacy as a moderating variable. The analysis results indicate a positive moderation effect,

with a coefficient of 0.122, a t-statistic of 2.075, and a p-value of 0.038, confirming that financial literacy strengthens the relationship between fintech adoption and financial performance. This finding supports the hypothesis that financial literacy enhances the positive impact of fintech on financial outcomes. SMEs with higher financial literacy levels can optimize fintech use, mitigate financial risks, and improve financial decision-making, ultimately leading to stronger financial performance.

From the perspective of the Theory of Planned Behavior, financial literacy consists of three key components: attitude, subjective norms, and behavioral control. A positive attitude towards financial management, supportive social norms, and strong behavioral control contribute to SMEs' ability to leverage fintech effectively. SMEs with higher financial literacy levels are better equipped to recognize and adapt to financial changes facilitated by fintech adoption. The ability to utilize fintech optimally depends on SME owners' awareness, knowledge, and skills in financial management. This finding is consistent with (Widyaningsih et al., 2021), who emphasize that financial literacy plays a crucial role in maximizing the benefits of fintech innovations. Furthermore, studies by (Anisah & Crisnata, 2021) and (Octavina & Rita, 2021) reinforce this conclusion, demonstrating that financial literacy amplifies the positive effects of fintech on SMEs' financial performance.

CONCLUSIONS

The findings of this study confirm that fintech adoption positively influences the financial performance of MSMEs, with financial literacy playing a crucial moderating role. MSMEs with higher financial literacy are better able to utilize fintech services effectively, leading to improved financial management, increased revenue, and enhanced business sustainability. These results highlight the importance of financial literacy in maximizing the benefits of fintech adoption among MSMEs.

This research contributes to Financial Innovation Theory by demonstrating that fintech adoption enhances financial performance through increased financial accessibility, efficiency, and competitiveness. The study also supports Planned Behavior Theory, as financial literacy influences MSME owners' attitudes, subjective norms, and behavioral control, leading to more informed financial decision-making and effective fintech utilization. The interaction between fintech and financial literacy strengthens their impact on financial performance, reinforcing the notion that financial knowledge is essential in leveraging technological advancements.

The practical implications of this study emphasize the need to enhance financial literacy among MSMEs to ensure the effective adoption of fintech solutions. MSME owners with strong financial literacy can better manage their finances, mitigate financial risks, and optimize fintech services to improve business performance. Policymakers, financial institutions, and fintech providers should collaborate to implement targeted financial education programs, develop accessible fintech solutions, and facilitate greater financial inclusion for MSMEs. Strengthening financial literacy will enable MSMEs to maximize fintech adoption, contributing to broader economic growth and business resilience.

This study is limited to examining fintech adoption and financial literacy as determinants of financial performance. Future research should consider additional factors such as education level, industry type, innovation capability, business size, ownership

structure, and government policies that may also impact MSME financial performance. Expanding the research scope to different regions or industries and incorporating qualitative insights could provide a more comprehensive understanding of the dynamics influencing MSME financial success in the digital era.

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Frugal Innovation: a Bibliometric Study of the Conceptual Foundations and Future Research Directions

Renita Kawuryan[1)], Prapdopo[2)], Andi Nurhasanah[3)], Kristin Wulansari[4)]
[1,2,3] Politeknik Negeri Samarinda
Email: renitakawuryan@polnes.ac.id

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ABSTRACT

Frugal innovation is gaining traction in resource-limited settings, emphasizing sustainability. This paper uses bibliometric analysis to explore trends and gaps in frugal innovation research. Further publications were identified from the Scopus database using the Publish or Perish tool for the period 2014-2024. Data is processed using RStudio and VOSviewer to reveal key themes, influential scholars, research institutions, and network maps. It highlights the growing scholarly interest in frugal innovation and its alignment with sustainability goals, stressing the need for further exploration of its principles and impacts. The study aims to advance understanding and to guide future research. Additionally, integrating sustainability and environmental considerations in product development, alongside frugal innovation, can drive economic and social sustainable development. Organizational capabilities like Big Data are vital for achieving sustainability outcomes, and frugal innovation positively impacts a firm's financial and environmental performance. Strengthening organizational capabilities is key to leveraging frugal innovation for sustainability.

Keyword: frugal innovation; sustainability; organizational capabilities

INTRODUCTION

Frugal innovation has drawn increasing attention as an effective strategy, especially in resource-limited environments, with an emphasis on sustainability (Pineda-Escobar, 2023). Although the concept itself is not entirely new, with historical examples of necessity-driven innovations, it has become more prominent in the early 21st century. This shift reflects a move towards more resource-efficient solutions in innovation paradigms (Le Bas, 2023c). The interplay between frugality and sustainability is a major area of interest, calling for a clearer definition of frugal innovation, a global research perspective, and an evaluation of its impact throughout the product life cycle (Le Bas, 2023b). Frugal innovation is marked by significant cost reductions, simplified core functionalities, and enhanced performance levels, pointing to a new direction in technological change that prioritizes inclusivity and environmental efficiency (Khan, 2023).

The bibliometric analysis of frugal innovation reveals several pivotal findings. First, it underscores the escalating international interest and scientific output in the domain, highlighting a discernible trend towards examining business sustainability and consumer

behavior within the framework of frugal innovation (Dima et al., 2022). Second, the analysis identifies frugal innovation as a promising approach for fostering sustainable development from economic and social perspectives, despite the presence of both positive and negative impacts across economic, social, and ecological dimensions (STÖBER et al., 2022a). Furthermore, the study emphasizes the critical role of collaboration in achieving sustainability outcomes through frugal innovation, noting that the types of actors involved and their motivations significantly influence the potential impact on economic, environmental, and social sustainability (De Marchi et al., 2022).

Recent bibliometric analyses highlight the increasing scholarly attention toward frugal innovation, emphasizing its potential alignment with sustainability goals (Mbabil Dok-Yen et al., 2023). Frugal innovation is recognized as a promising approach to addressing sustainability challenges, particularly in resource-constrained environments (STÖBER et al., 2022a). The concept of frugal innovation is evolving, with a focus on the economic, social, and ecological dimensions of sustainability (Le Bas, 2023c). Scholars emphasize the need for a clear definition of frugal innovation, a global research perspective, and an assessment of its impact throughout the product life cycle to enhance its sustainability characteristics (Le Bas, 2023a). Moreover, the relationship between frugality and sustainability is being explored, positioning frugal innovation as an emerging technological paradigm with the potential to significantly contribute to environmental sustainability. However, these analyses also identify potential gaps in the literature. Given the nascent stage of the field, there is a need for further exploration of its fundamental principles and long-term impacts. Additionally, integrating insights from other disciplines that address frugality and simplicity could enhance the understanding of frugal innovation.

This research utilizing bibliometric analysis can address these gaps by mapping the landscape of existing studies, identifying key themes, influential scholars, and prominent research institutions. It can also unveil emerging trends by exploring new directions and underexplored aspects of frugal innovation research and identifying potential research gaps where further investigation is required to deepen our understanding of frugal innovation. By employing bibliometric analysis, this research has the potential to significantly advance our comprehension of frugal innovation and guide future research endeavors in this critical field.

METHODS

This research employs a bibliometric approach to analyze the landscape of frugal innovation research. Scopus, a comprehensive citation database for peer-reviewed literature (Shestakova et al., 2023), will be utilized using the Publish or Perish (PoP) software (Moosa, 2018). The search strategy involves developing a search string that combines terms related to "frugal innovation". To focus on recent and impactful research, PoP filters within the Scopus database will limit the publication date to 2014-2024 and include document types such as articles and reviews, or specific subject areas such as engineering, business, and economics. Data organized in a research information system (RIS) format was collected and imported into Mendeley. From the Scopus database, 200 valid data entries were retrieved for further analysis. After applying multiple selection criteria, including scope, keywords, and alignment, 191 suitable articles were identified to achieve the study's objectives.

Data analysis will be conducted using RStudio, beginning with data cleaning and preprocessing to remove irrelevant information, standardize text formats, and correct errors (Aria & Cuccurullo, 2017). Using R packages such as bibliometric analyses will be performed, including co-citation analysis to explore thematic connections, author co-occurrence analysis to identify potential research collaborations, and keyword analysis to pinpoint key research areas. Network visualization with VOSviewer will create network maps where nodes represent articles, keywords, or authors, and edges represent their relationships, with node size and color indicating factors like publication frequency or centrality within the network ("Network Visualization," 2023a).

RESULT AND DISCUSSION

This section explains how the searched publications were distributed according to annual scientific production, most relevant sources, total citation per year. This section also presents a comprehensive bibliographic analysis, which includes network visualization, overlay visualization, and density visualization. All the results presented in this section were obtained from the Scopus by using PoP filtered analysis options, that were applied on the entire document corpus extracted using the search string mentioned in the previous section.

An analysis of the keyword "frugal innovation" was conducted, examining publication trends across 200 research articles from 2014 to 2024. The annual distribution of publications is as follows: 2014 (11 articles), 2015 (3 articles), 2016 (18 articles), 2017 (18articles), 2018 (29 articles), 2019 (12 articles), 2020 (29 articles), 2021 (31 articles), 2022 (32 articles), 2023 (14 articles), and 2024 (3 articles). Figure 1 illustrates the publication trend over this ten-year period.

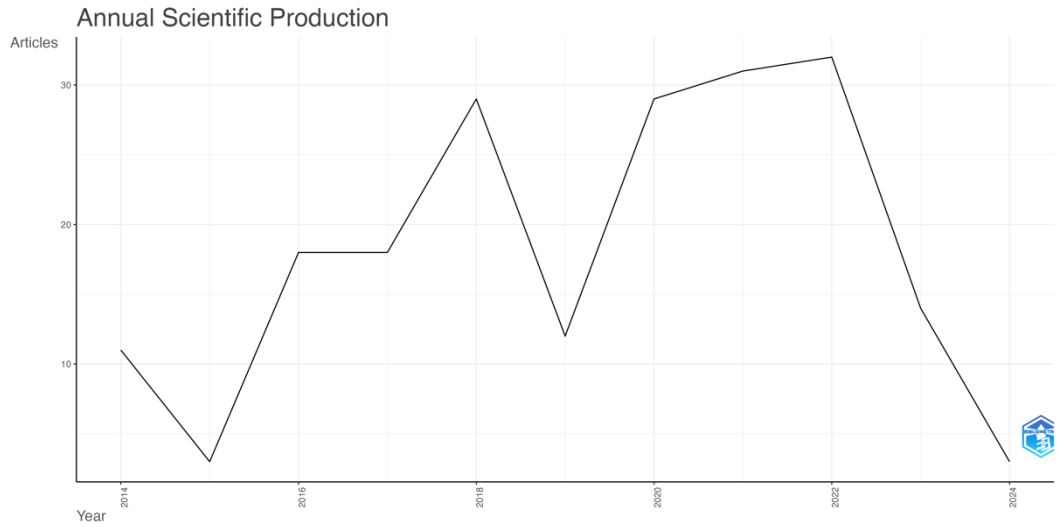

Figure 1. Annual Scientific Production
Source: Results of data analysis using Biblioshiny, R Studio

Figure 2 depicts the cumulative occurrences of publications from different sources related to the field of study from 2014 to 2024. The y-axis represents the cumulative

occurrences (or the number of publications), while the x-axis represents the years. Each line on the graph corresponds to a different source, identified by different colors and labeled at the bottom of the graph. The European Journal of Development Research (Red) saw a rapid increase in publications starting around 2017, reaching a plateau from 2019 to 2020, and then again in 2021, with a slight increase afterward. In contrast, IEEE Transactions on Engineering Management (Blue) demonstrated steady growth from around 2015, with a noticeable increase in publications around 2017, continuing to rise consistently until plateauing in 2022. The International Journal of Technology Management (Green) exhibited a gradual increase in publications starting around 2016, with a more significant rise around 2019, continuing to grow steadily afterward. Similarly, the Journal of Cleaner Production (Purple) had a gradual increase starting around 2015, with a more significant rise around 2018, then showing a consistent upward trend until plateauing in 2022. Sustainability (Switzerland) (Pink) showed a steady increase starting around 2017, with a noticeable rise around 2019, continuing to grow steadily through to 2022, and then maintaining a steady pace. Technology in Society (Brown) showed a gradual increase starting around 2018, with a significant rise around 2020, followed by a steady growth trend. Finally, Technovation (Yellow) showed a steady increase starting around 2017, with a significant rise around 2019, continuing to grow steadily afterward.

The graph illustrates how different sources have contributed to the body of literature over time, with most sources showing an upward trend in publications, particularly around the mid to late 2010s and continuing into the early 2020s. This indicates a growing interest and increasing research output in the field covered by these sources.

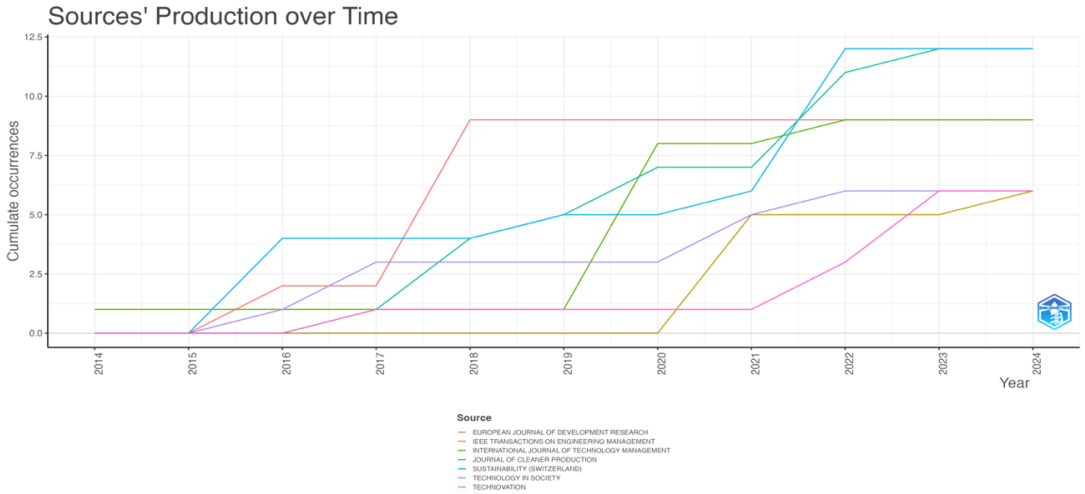

Figure 2. Sources' Production over Time
Source: Results of data analysis using Biblioshiny, R Studio

Figure 3 displays the top-cited documents based on the number of global citations. Each document is represented by a dot on the horizontal axis, which corresponds to the total number of citations received. The document by M.B. Zeschky (2014) is the most cited in "Res. Technol. Manag". It has the highest number of citations at 218, indicating its significant

influence or relevance in its field. Journals such as "J. Clean. Prod." appear multiple times with 198 citations, suggesting that this journal is a key source for highly cited documents in the dataset. The range of citations (from 17 to 218) indicates a varied impact among the listed documents. This chart is useful for identifying influential documents and understanding the impact of various research works within a specific academic context.

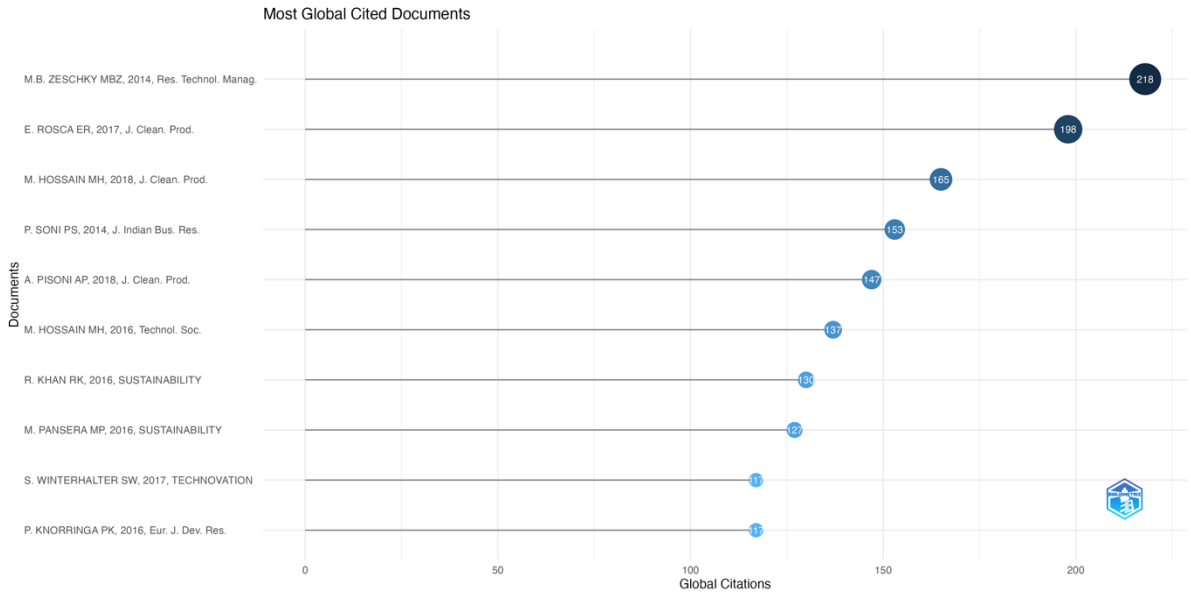

Figure 3. Most Global Cited Documents
Source: Results of data analysis using Biblioshiny, R Studio

The Network Visualization generate three cluster. The blue cluster on the left likely represents terms related to "sustainable development," including "sustainable development goal" and "pyramid." The red cluster in the center focuses on terms such as "product," "process," and "sustainability," indicating a theme around sustainable products and processes. The green cluster on the right includes terms like "firm," "role," and "capability," suggesting a focus on organizational aspects and the roles and capabilities of firms. For example, "sustainable development goal" (blue cluster) is connected to terms like "sustainable development" and "pyramid," indicating a thematic grouping around sustainable development goals. "Product" (red cluster) has many connections to terms like "process," "sustainability," and "use," showing its centrality in discussions about sustainable products. "Role" (green cluster) is linked to terms like "capability," "data," and "effect," pointing to discussions around the roles and capabilities in firms. The network provides an overview of the main themes and the relationships between them within the dataset. It allows researchers to see how different concepts are interconnected and to identify major areas of focus and significant terms within the field. In summary, this visualization helps to map out the intellectual structure of the research domain, showing the prominent themes (clusters) and how various terms (nodes) are interrelated through their co-occurrences (links).

The idea of sustainable development involves various concepts, such as the "sustainable development goal" and "pyramid," which are essential for comprehending and advancing sustainability. The United Nations Sustainable Development Goals (SDGs) significantly influence global sustainability efforts (Lim, 2022). Additionally, the sustainability pyramid presents a hierarchical approach to sustainable consumption and production, prioritizing economic, social, and environmental sustainability to inspire behavioral changes among mainstream consumers (Andersen & Esbjerg, 2020). Grasping these concepts and frameworks is vital for organizations, including multinational corporations, to create strategies that support sustainable development goals and tackle sustainability challenges, particularly in base-of-the-pyramid markets (Lotan Marcus, 2018).

Sustainable product design, process innovation, and the creation of sustainable business models are vital in the current business environment. Integrating sustainability into product development is crucial, with tools like the Sustainable Design Evaluation helping to assess ecological, economic, and social criteria throughout a product's lifecycle (Restu Millaningtyas et al., 2023). Design Thinking is instrumental in developing and innovating sustainable business models, utilizing methods such as workshops, brainstorming, co-creation, and prototyping (Havemo, 2023). Additionally, frameworks that connect Design Thinking with Sustainable Business Models emphasize circular economy models, product-service systems, and user-oriented innovation, underscoring the importance of stakeholder needs analysis and prototyping for sustainable business success (Reichard & Martin, 2023). Incorporating sustainability and environmental considerations into product development processes is also essential, focusing on remanufacturing, recyclability, end-of-life design, and Extended Producer Responsibility to meet sustainable objectives (Kurek et al., 2023).

Furthermore, Frugal innovation emphasizes core functionalities, cost reduction, and sustainable engagement, is recognized as an effective strategy for promoting economic and social sustainable development (STÖBER et al., 2022b). The success of frugal innovation in driving sustainability outcomes depends significantly on the types of actors involved—whether large firms, small firms, or non-firm entities—their motivations, and their collaborations (Dost et al., 2022). Additionally, frugal innovation positively impacts a firm's financial and environmental performance, with proactive orientation further enhancing its environmental benefits (Rossetto et al., 2023). Strengthening these organizational capabilities and roles within firms is essential to leverage frugal innovation for achieving positive sustainability outcomes.

Organizational capabilities like Big Data capability (BDC) (Wang et al., 2023), big data analytics capabilities (Alyahya et al., 2023), and Information Technology capability (ITC) (Awan et al., 2023) are pivotal in influencing sustainability outcomes within firms. These capabilities are associated with enhanced performance in sustainability-oriented innovation (SIP) (Liang et al., 2022), sustainable performance (Lee et al., 2023), and business sustainability through ambidextrous innovation. In summary, harnessing these organizational

capabilities and nurturing a culture driven by data are crucial for firms to attain sustainable outcomes and adeptly respond to market dynamics.

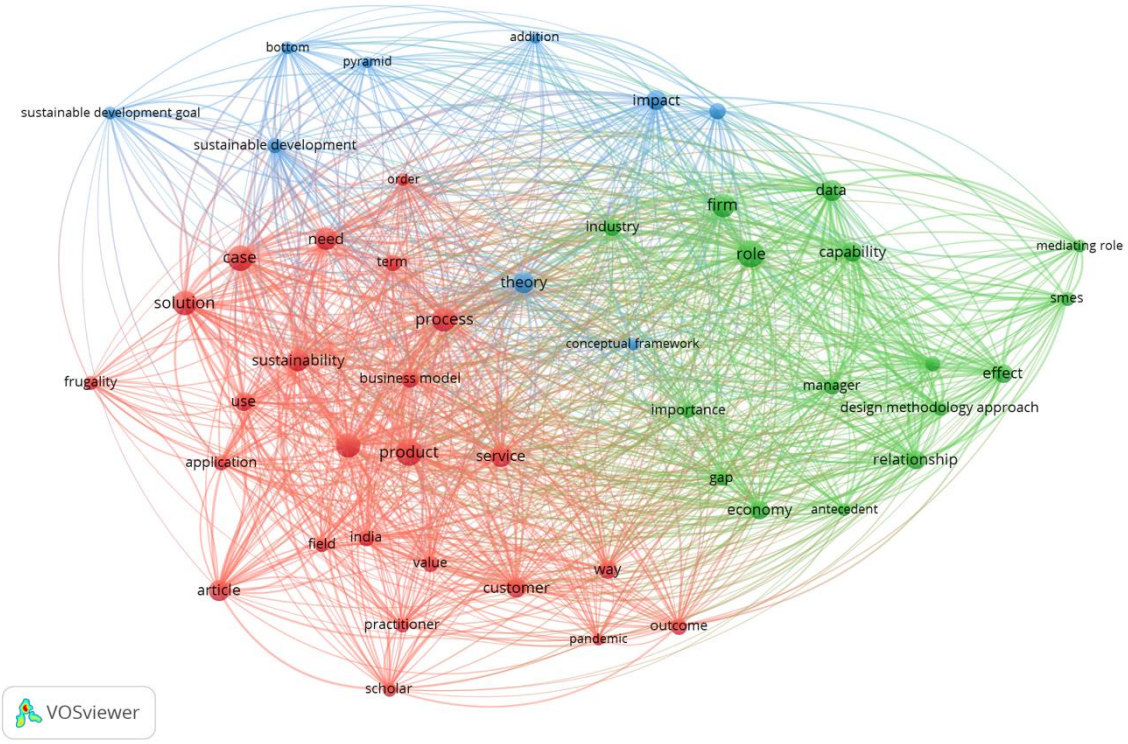

Figure 4. Network Visualization
Source: Results of data analysis using Vos Viewer

The network visualization effectively maps the thematic landscape of sustainable development research, highlighting the temporal evolution of key concepts and illustrating how different areas of study are interconnected ("Network Visualization," 2023b). The color coding offers a valuable perspective on how research focus has shifted over time, with newer topics like "pandemic" and "impact" emerging recently, reflecting contemporary issues and challenges. The color gradient in the visualization provides insights into how recent or old the research on specific terms is. Dark Blue Terms, discussed since 2019, represent foundational concepts like "process" and "product." Green Terms, prominent around 2020, reflect the growing emphasis on "capability" and "data." Yellow Terms, emerging around 2021, capture

newer concerns and focuses, such as the impact on "SMEs" and the effects of the "pandemic."

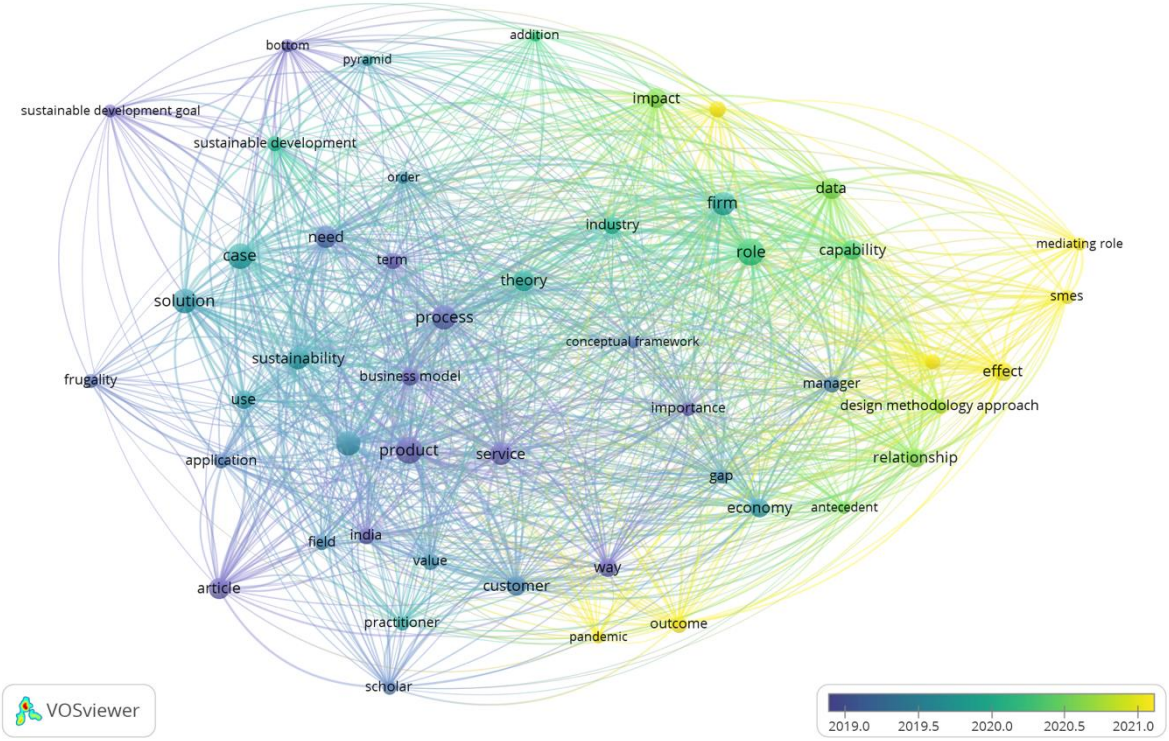

Figure 5. Overlay Visualization
Source: Results of data analysis using Vos Viewer

Network visualization, presented as a heat map, uses VOSviewer to show the density and distribution of terms based on their co-occurrence within a dataset, which is likely drawn from academic publications or articles (“Network Visualization,” 2023b). The heat map highlights areas of high and low term density, providing insights into the focus and intensity of research in different thematic areas. Specifically, the map identifies key research areas: Sustainable Development and Goals (Top Left), Sustainable Products and Processes (Center), Organizational Capabilities and Roles (Top Right), Relationships and Methodologies (Right), and Impact and Outcomes (Center to Right). The heat map visualization provides a clear representation of the density and focus areas within the field of sustainability research, highlighting where the most intense research activities are concentrated and offering insights into how different themes and topics are interconnected. The temporal aspect, though less emphasized in this map, can be inferred by the density and the prominence of terms reflecting ongoing or emerging research trends.

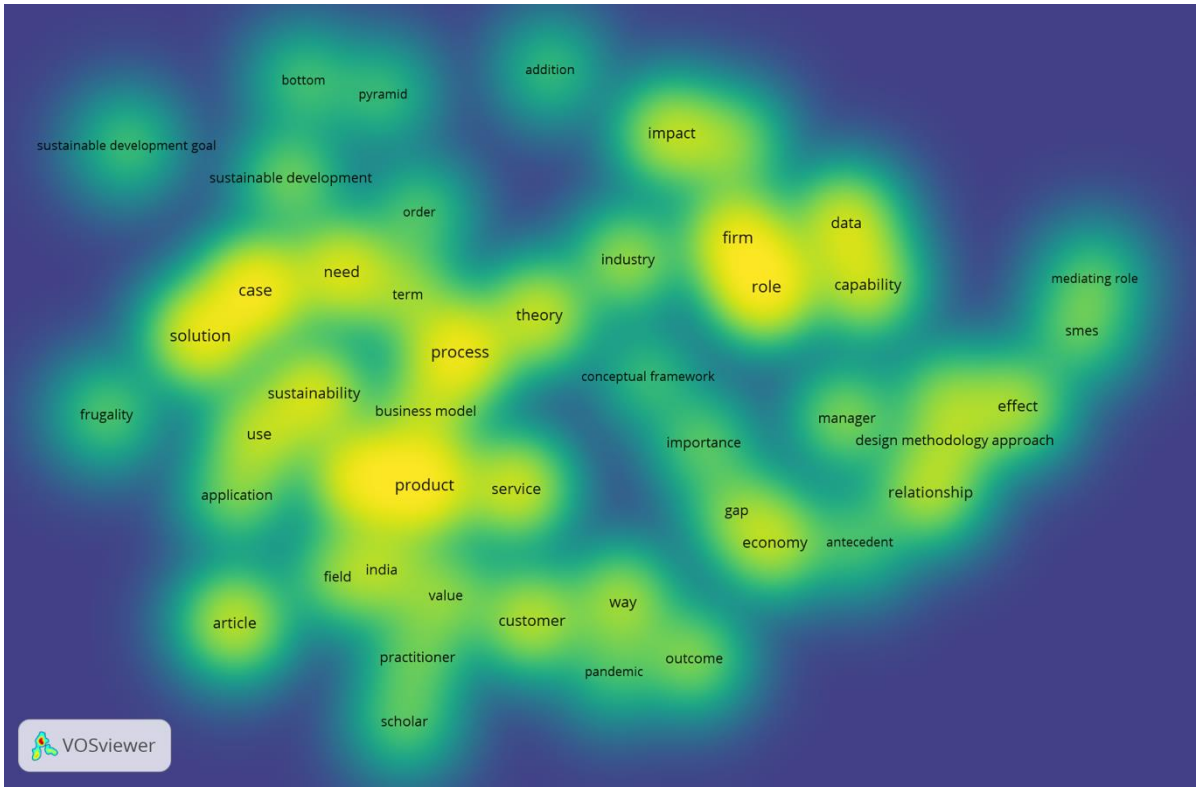

Figure 5. Density Visualization
Source: Results of data analysis using Vos Viewer

CONCLUSIONS

The integration of sustainability and environmental considerations in product development processes, alongside frugal innovation, is shown to be a key driver of economic and social sustainable development. Organizational capabilities, particularly in areas like Big Data and Information Technology, are highlighted as critical for achieving sustainability outcomes. Network and density visualizations provide valuable insights into the thematic landscape and research focus within sustainable development. Frugal innovation is demonstrated to have a positive impact on both a firm's financial performance and its environmental sustainability. The importance of strengthening organizational capabilities and roles is underscored as essential for effectively leveraging frugal innovation for sustainability outcomes. Overall, this article contributes to the understanding of frugal innovation as a growing trend in resource-limited environments, particularly in the context of promoting sustainability. Through bibliometric analysis, it identifies increasing scholarly interest in frugal innovation and its alignment with sustainability goals, emphasizing the need for further exploration of its fundamental principles and long-term impacts. This research serves to guide future studies in the field of frugal innovation, aiming to enhance its application and effectiveness in driving sustainable development.

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Gacha Addiction and In-App Purchases: A Study on Genshin Impact Players in Indonesia

Cokki [1)], Haris Maupa [2)], Wanstum [3)], Syarifuddin Sulaiman [4)]
[1,2] Postgraduate Program, Universitas Tarumanagara
[1,3] Faculty of Economics and Business, Universitas Tarumanagara
[3] Faculty of Economics and Business, Universitas Muhammadiyah Makassar
Email: cokki@fe.untar.ac.id

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ABSTRACT

The purpose of this study was to examine the impact of gacha addiction and good price on the intention to purchase in-app items, with mobile game loyalty as a mediating variable. The research employed a quantitative approach using Partial Least Squares-Structural Equation Modeling (PLS-SEM) to analyze survey data collected from 208 Genshin Impact players in Indonesia through random sampling and online questionnaires. The results indicate that gacha addiction significantly influences the intention to purchase in-app items, while good price has a moderate effect. Additionally, mobile game loyalty serves as a partial mediator in the relationship between gacha addiction and purchase intention.

Keyword: Gacha Addiction; Genshin Impact; Good price; In-App Purchase Intention; Indonesia; Mobile game loyalty; PLS-SEM.

INTRODUCTION

Addictive behaviors have often been correlated with substance abuse, alcohol, gambling, gaming, and more. Companies can exploit their consumers' addictions to certain goods or activities to quickly gather profits without concern for their consumers' health or financial situation. This exploitation is why such activities are often regulated or restricted for consumer health and longevity. This study aims to discuss an addictive feature that has been regulated yet popularized as a monetization tool within the gaming industry: the gacha feature. The gacha feature allows players to obtain certain goods randomly within fixed odds; some players may need to spend extra money to acquire specific items, while others may spend less. Gacha is a new addictive in-app feature because it incorporates gambling aspects.

The gacha feature began to be widely used in the early 2010s, especially in Japan. Nearly all of Japan's highest-grossing mobile games use the gacha feature, making it an integral part of Japanese mobile gaming culture. Mobile game developers praise the gacha feature as a monetization strategy for free-to-play apps, aiming to maximize the game's monetization potential. The first gacha feature was implemented on December 3, 2003, in the game Maple Story (Katsuta, 2007), intending to create a free-to-play mobile game that anyone could play, with an option to buy in-app features using real currency to acquire virtual goods

randomly. The mobile game industry grew rapidly between 2008-2011 due to the popularization of gacha features (Ernkvist, 2016). However, the feature became problematic in 2012 as it caused consumers to become very addicted and spend money uncontrollably, even in free-to-play games. This issue led the Japanese Online Game Association and the Computer Entertainment Supplier's Association (CESA) to issue regulations on the feature in 2016, providing players with a guarantee system to acquire desired in-app features within a fixed number of pulls (Koeder et al., 2018; Ma & He, 2025).

In-app purchases require long-term momentum to motivate players to engage. The more involvement and attachment players have with the game, the greater their intention to purchase (Drell, 2013; Catalán et al., 2019; Hwang et al., 2025). Gacha, as an in-app feature, has elements similar to gambling, using in-app currency to obtain virtual items randomly. This may lead to an addictive mindset, such as "I might get what I want if I try again," increasing the tendency for players to spend money to obtain what they desire. Long-term addictive behaviors may heighten the intention to purchase in-app items (Balakrishnan & Griffiths, 2018; Kubat Dokumacı, 2024). Addictive behaviors can enhance player loyalty, aligning with previous research by Balakrishnan & Griffiths (2018). Affordable prices of goods can be a determining factor for purchasing goods in mobile games (Cheng et al., 2008). Although previous studies have discussed addiction in online games (Cole & Griffiths, 2007; Kuss & Griffiths, 2012; Widodo & Balqiah, 2020), internet addiction (Lu & Wang, 2008; Barnes & Pressey, 2014), and mobile phone addiction (Kim & Shin, 2016; Makki et al., 2025), there has been limited discussion on addiction within the context of gacha in-app features influencing players' in-app purchase intentions. This study aims to fill this research gap by determining whether gacha addiction influences players' in-app purchase intentions as much as or more than the affordability of in-app goods.

The growth of the gaming industry has spread extensively, particularly in Indonesia, which ranks third globally in the number of gamers, constituting 94.45% of the population aged 16-64 years (Dihni, 2022). Studies on gacha addiction in Indonesia have focused on the psychological aspects, showing that gacha fosters a sense of attachment, leading players to feel a connection with the game and potentially perpetuating continuous purchases (Pradhipta, 2021). Gacha is also considered an indirect form of gambling, fueling consumptive behavior among its users (Ardiansyah & Wahyu, 2024). However, most research on gacha addiction relies on qualitative methods through literature reviews, lacking empirical testing of its statistical impact. Therefore, this study aims to address this gap by empirically examining the influence of mobile gaming, particularly gacha features, which exhibit gambling-like tendencies.

This study enhances the theoretical comprehension of gacha mechanics in mobile games by presenting gacha addiction as a prominent catalyst for in-app purchases. This study expands upon current research on digital consumption and gambling-like behaviors in virtual settings by incorporating ideas from addiction theory and consumer behavior. The study presents a thorough behavioral model that investigates the effects of gacha addiction on purchase intentions. Additionally, it studies how perceived value (good pricing) moderates this effect and how mobile game loyalty mediates it. This comprehensive approach enhances comprehension of the intricate relationships among various variables.

This research concentrates explicitly on gacha addiction as the main catalyst, distinguishing itself from other studies that have explored different aspects affecting in-app purchases. This original study examines a developing trend in mobile gaming, offering fresh

perspectives on its psychological foundations and commercial consequences. Introducing perceived value as a moderating variable and mobile game loyalty as a mediating variable brings a unique combination to the analysis. This comprehensive method enhances the comprehension of gacha addiction and clarifies the intricate interaction among various motivational elements. The study focuses on Genshin Impact players in Indonesia, providing unique insights that emphasize the distinct characteristics of mobile gaming in the Southeast Asian industry.

This study examines the relationship between gacha addiction, in-game item pricing, mobile game loyalty, and in-app purchase intentions. To achieve this goal, a thorough review of the relevant literature on addiction was conducted, exploring its relevance to gacha behavior in in-app purchases. Data was collected from players of Genshin Impact, a popular game incorporating gacha elements, to measure their levels of gacha addiction, their opinions on in-game prices, their loyalty to the game, and their purchase intentions for gacha. The collected data was then analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM) to investigate the roles played by gacha addiction and opinions on in-game prices in shaping purchase intentions. By employing this approach, we aimed to gain insights into the factors that influence players' gacha addiction and how these factors impact their in-app purchase intentions.

METHODS

Table 1. Factors Analysis and Reliability Tests

Variable	Dimensions	Factor loadings	α
Gacha Addiction (GA)	Salience	0,659	
	Tolerance	0,614	
	Mood Modification	0,648	
	Relapse	0,653	0,707
	Withdrawal Symptoms	0,603	
	Conflict	0,621	
	Problems	0,713	
Good Price (GP)	GP1	0,794	
	GP2	0,800	
	GP3	0,766	0,832
	GP4	0,790	
	GP5	0,740	
Mobile Game Loyalty (L)	L1	0,643	
	L2	0,670	
	L3	0,668	0,730
	L4	0,610	
	L5	0,609	
In-App Purchase Intention (PI)	PI1	0,612	
	PI2	0,636	
	PI3	0,676	0,716
	PI4	0,684	
	PI5	0,619	

Source: Data processed by the authors (2024).

A quantitative method was employed in this study, utilizing data collected via questionnaires distributed through Google Forms. The study employed a random sampling technique to gather responses from Indonesian players of multiple gacha-based games, including Genshin Impact, Arknights, and Fate/Grand Order. By expanding the sample beyond a single game, the study aimed to provide a more comprehensive understanding of whether the observed behaviors are unique to Genshin Impact or reflective of broader gaming trends. This approach enhances the generalizability of the findings and strengthens the study's contribution to research on gacha addiction and in-app purchasing behaviors. To facilitate respondent participation, the researcher organized two "Blessing of the Welkin Moon" prize distribution events. "Blessing of the Welkin Moon" is an in-app feature that players can subscribe to monthly, offering higher value compared to other in-game purchases. The study collected data from 208 Indonesian Genshin Impact players. An initial pilot test assessed the questionnaire's validity. After evaluating the outcomes of the pilot test conducted on these participants, the questionnaires were subsequently disseminated to a selected set of target samples. Confirmatory factor analysis was employed to establish the questionnaire's construct validity, and the results confirmed its validity. This study employs Cronbach's Alpha coefficient to assess the questionnaire's reliability. Table 1 displays the confirmatory factor analysis findings and the variables' reliability.

Gacha addiction was assessed based on seven dimensions with 19 indicators, referring to studies by Balakrishnan & Griffiths (2018), Xu et al. (2012), and Lee et al. (2021). The first dimension, salience, measured the level of addiction and spending habits in gacha. The second dimension, tolerance, evaluated an individual’s inability to control addictive behavior, increased spending, and difficulty in stopping. The third dimension, mood modification, assessed the extent to which gacha was used to relieve stress, enhance pleasure, and distract from problems. The fourth dimension, withdrawal symptoms, reflected challenges in reducing spending, resistance to advice from others, and personal difficulties in controlling expenditures. The fifth dimension, relapse, measured feelings of discomfort, anger, and stress when attempting to stop. The sixth dimension, conflict, included disputes arising from spending habits, dishonesty regarding expenditures, and neglect of others. Finally, the problems dimension assessed the impact of addiction on important responsibilities and financial strain due to excessive spending.

In addition, mobile game loyalty was evaluated using five indicators: the desire to continue playing, preference for the game over others, positive word-of-mouth, inclination to recommend it to others, and inviting others to play. These indicators were based on the research of Balakrishnan & Griffiths (2018), Hsiao & Chen (2016), and Huang & Hsieh (2011).

Furthermore, perceived value in gacha transactions was assessed using five indicators: reasonable pricing, cost-effectiveness, benefits matching the price, meeting expectations, and affordability. These indicators were derived from studies by Hsiao & Chen (2016), Purnami & Agus (2020), and Hamari et al. (2020).

Meanwhile, purchase intentions were measured using five indicators: interest in buying, predicting future purchases, recommending purchases to others, perceived usefulness of purchases, and intention to make repeat purchases. This measurement was based on the research of Balakrishnan & Griffiths (2018), Hsiao & Chen (2016), and Hsu & Lin (2016). All variables in this study were measured using a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

RESULT AND DISCUSSION

The respondents consisted of 173 (83.7%) male and 34 (16.3%) female participants, reflecting a predominantly male sample. The majority (83.2%) were between 18 and 25 years old, indicating that the study primarily captured insights from young adults. In terms of financial status, 84 respondents (40.4%) reported having no income, suggesting that a substantial proportion of participants rely on external sources, such as allowances or financial support from family, to fund their gaming expenses. The most common spending group among respondents was the "dolphin" category, which included 124 respondents (59.6%). Dolphins are players who tend to invest in high-value subscription-based features and make moderate in-app purchases, with monthly expenditures ranging between IDR 79,000 and IDR 329,000. This finding highlights that a significant portion of Genshin Impact players in this study, despite not having their own income, are still willing to spend money on in-game items, suggesting strong engagement with the game's monetization system. The prevalence of dolphin spenders also underscores the effectiveness of subscription models and microtransactions in sustaining revenue from a dedicated player base.

All variables met the requirements for convergent validity, as each achieved an Average Variance Extracted (AVE) score above 0.50, indicating that more than half of the variance in their observed indicators is explained by the underlying construct (Hair et al., 2011).

Table 2. Convergent Validity Test Results

Variable/Dimensions	AVE
Gacha Addiction	0,558
Salience	0,677
Tolerance	0,659
Mood Modification	0,717
Relapse	0,725
Withdrawal Symptoms	0,772
Conflict	0,628
Problems	0,733
Mobile Game Loyalty	0,653
Good Price	0,707
In-App Purchase Intention	0,633

Source: Data processed by the authors (2024).

The discriminant validity analysis confirmed that all variables passed the test, as evidenced by their Heterotrait-Monotrait Ratio (HTMT) values being below the recommended threshold of 0.9 (Henseler et al., 2015). This indicates that each construct is sufficiently distinct from others, ensuring that the measurement model does not suffer from excessive overlap between variables.

Table 3. Discriminant Validity Test Results

Variable	GP	GA	L
GA	0,266		
L	0,282	0,194	
PI	0,553	0,649	0,399

Source: Data processed by the authors (2024).
GA: Gacha addiction; L: Mobile game loyalty; GP: Good price; PI: In-app purchase intention.

Table 4. Indicator Reliability Test Results

Variable	Dimensions	Factor Loading
Gacha Addiction (GA)	Salience – GA1	0,817
	Salience – GA2	0,829
	Tolerance – GA3	0,819
	Tolerance – GA4	0,847
	Tolerance – GA5	0,767
	Mood Modification – GA6	0,838
	Mood Modification – GA7	0,823
	Mood Modification – GA8	0,878
	Relapse – GA9	0,824
	Relapse – GA10	0,820
	Relapse – GA11	0,908
	Withdrawal Symptoms – GA12	0,833
	Withdrawal Symptoms – GA13	0,894
	Withdrawal Symptoms – GA14	0,907
	Conflict – GA15	0,845
	Conflict – GA16	0,724
	Conflict – GA17	0,804
	Problems – GA18	0,849
	Problems – GA19	0,862
Good Price (GP)	GP1	0,848
	GP2	0,835
	GP3	0,835
	GP4	0,891
	GP5	0,792
Mobile Game Loyalty (L)	L1	0,702
	L2	0,742
	L3	0,845
	L4	0,885
	L5	0,850
In-App Purchase Intention (PI)	PI1	0,849
	PI2	0,803
	PI3	0,644
	PI4	0,808
	PI5	0,855

Source: Data processed by the authors (2024).

The indicator reliability analysis demonstrated that each indicator successfully met the required threshold, as all factor loadings exceeded the recommended value of 0.6 (Table 4). This result indicates that each measurement item consistently represents its corresponding construct, thereby confirming the reliability of the variables used in this study (Hair et al., 2011).

The internal consistency reliability analysis further demonstrated that all variables were reliable, as each variable had a composite reliability value between 0.7 and 0.95 (Hair et al., 2019; Table 5).

Table 5. Internal Consistency Reliability Test Results

Variable/Dimensions	Composite Reliability
Gacha Addiction	0.925
Salience	0.807
Tolerance	0.852
Mood Modification	0.884
Relapse	0.888
Withdrawal Symptoms	0.910
Conflict	0.835
Problems	0.846
Mobile Game Loyalty	0.903
Good Price	0.923
In-App Purchase Intention	0.895

Source: Data processed by the authors (2024).

Additionally, the multicollinearity test results, based on the variance inflation factor (VIF), indicated that no multicollinearity was present, as all values were below 5 (Hair et al., 2019; Table 6).

Table 6. Multicollinearity Test Results

Variable	VIF	Explanation
PI = f (GA, L, GP)		
GA	1.070	No Multicollinearity
L	1.085	No Multicollinearity
GP	1.120	No Multicollinearity

Source: Data processed by the authors (2024).
GA: Gacha addiction; L: Mobile game loyalty; GP: Good price;
PI: In-app purchase intention

The coefficient of determination test results suggest that the model has a moderate ability to explain in-app purchase intention, with values between 0.5 and 0.75, and a very low ability to explain mobile game loyalty, as the value was below 0.25 (Hair et al., 2019; Table 6). Furthermore, the prediction relevance test results (Table 7) confirmed the model's suitability for measuring the conceptual framework, as indicated by a Q^2 value greater than 0 (Hair et al., 2011).

Table 7. Coefficient of Determination and Predictive Relevance Test Results

Variable	R^2	Q^2
In-App Purchase Intention	0,502	0,302
Mobile Game Loyalty	0,025	0,013

Source: Data processed by the authors (2024).

The hypothesis testing results (Table 8) shows that all hypotheses are supported because they met the requirements, namely the p-value is below 0.5 which means that the H_1, H_2, H_3, H_4 hypothesis were supported. In the mediation test, H_5 acts as a partial mediation because gacha addiction can affect the intention to buy in-app goods with or without the mediation.

Table 8. Hypothesis Test Results

	Hypothesis	β	p-value	f^2
H_1	Gacha Addiction → Mobile Game Loyalty	0,157	0,004	0,025
H_2	Gacha Addiction → In-App Purchase Intention	0,461	0,000	0,398
H_3	Mobile Game Loyalty → In-App Purchase Intention	0,198	0,000	0,072
H_4	Good Price → In-App Purchase Intention	0,337	0,000	0,204
H_5	Gacha Addiction → Mobile Game Loyalty → In-App Purchase Intention	0,031	0,018	-

Source: Data processed by the authors (2024).

Based on the first hypothesis test (H_1), gacha addiction shows a statistically significant positive effect, albeit with a small impact, on mobile game loyalty. This aligns with previous research showing that prolonged engagement in addictive gaming activities can contribute to loyalty (Balakrishnan & Griffiths, 2018; Lu & Wang, 2008; Kim & Shin, 2016). In this study, the small impact of gacha addiction on loyalty may be due to varying levels of player satisfaction, influenced by the unpredictable nature of gacha rewards.

According to the second hypothesis test (H_2), gacha addiction demonstrates a statistically significant positive effect, with a substantial impact, on in-app purchase intention. This finding is consistent with prior studies, which suggest that deeper engagement in online games increases the likelihood of purchasing in-app features (Balakrishnan & Griffiths, 2018; Barnes & Pressey, 2014; Widodo & Balqiah, 2020). Gacha addiction stems from players' desire to obtain rare in-game items, which functions similarly to gambling mechanics and fosters compulsive purchasing behavior. This result underscores gacha addiction as a major revenue driver, particularly in Genshin Impact.

Based on the third hypothesis test (H_3), mobile game loyalty shows a statistically significant positive effect, albeit with a minor impact, on in-app purchase intention. This aligns with previous research suggesting that loyalty influences consumer purchase decisions (Oliver, 1999; Balakrishnan & Griffiths, 2018; Purnami & Agus, 2020; Widodo & Balqiah, 2020). In this study, although Genshin Impact players exhibit loyalty to the game, this loyalty has only a small impact on their purchasing behavior. Many Indonesian players perceive in-app purchases as unnecessary expenses, which may explain the weak correlation.

Based on the fourth hypothesis test (H_4), the perceived value of in-app purchases exhibits a statistically significant positive effect, with a moderate impact, on in-app purchase intention. This finding supports previous studies indicating that pricing affects players' willingness to make in-game purchases (Hamari et al., 2017; Cheng et al., 2008; Purnami & Agus, 2020; Widodo & Balqiah, 2020; Hsiao & Chen, 2016). Although Genshin Impact's in-

app pricing is generally viewed as reasonable, many players feel dissatisfied with the value they receive, leading them to discourage others from making purchases. However, despite these reservations, some players remain open to future spending.

Finally, according to the fifth hypothesis test (H_5), gacha addiction exhibits a statistically significant positive effect on in-app purchase intention through the mediating role of mobile game loyalty. Mediation analysis shows that mobile game loyalty partially mediates the relationship between gacha addiction and in-app purchase intention. This suggests that even when players do not yet feel loyal to the game, gacha addiction strongly influences their propensity to purchase in-app items.

This study provides new insights into how gacha addiction influences in-app purchase intentions among Indonesian gamers. It specifically examines gacha mechanics—a form of randomized rewards in games like Genshin Impact—and their impact on player spending behavior. By quantitatively analyzing the relationships between gacha addiction, mobile game loyalty, and purchase intention, this research fills a important gap in understanding consumer behavior in the gaming industry.

Given Indonesia's growing mobile gaming market, these findings highlight the importance of ethical game monetization strategies. The results suggest that gacha addiction not only directly influences in-game spending but also indirectly affects spending through its impact on player loyalty. This dual effect underscores the need for developers to balance profitability with ethical considerations in game design.

From a practical perspective, this study offers valuable insights for game developers, policymakers, and researchers interested in regulating addictive features in digital entertainment. It also provides actionable recommendations for game creators and marketers aiming to optimize their monetization strategies. Understanding the impact of gacha addiction and the perceived value of in-app purchases can help design more engaging and sustainable in-game economies. Furthermore, recognizing the mediating role of game loyalty suggests that fostering long-term player engagement is a key factor in maintaining financial success in the gaming industry.

In essence, this research enhances our understanding of addictive behaviors in gaming, particularly in the context of gacha mechanics, and provides practical implications for stakeholders seeking to manage and regulate consumer spending in online gaming environments. The findings offer valuable insights for game developers and marketers looking to optimize their monetization strategies. Understanding the significant role of gacha addiction and perceived value in driving purchases can help shape more engaging and profitable in-app purchasing systems. Furthermore, recognizing the mediating role of game loyalty highlights the importance of fostering long-term player engagement.

CONCLUSIONS

Based on this study, gacha addiction has a positive effect on mobile game loyalty and in-app purchase intention, mobile game loyalty has a positive effect towards in-app purchase intention, good price has a positive effect towards in-app purchase intention, and gacha addiction has a positive effect on in-app purchase intention through mobile game loyalty. This research shows that even if gacha players have yet to feel loyal towards the mobile game, gacha addiction is already a strong enough factor that can influence players to buy in-app items.

The limitations of this study lie in the variables used to examine in-app purchase intention and mobile game loyalty. This research specifically focuses on the role of addiction in relation to these two variables within the context of the gacha feature and pricing. Future research is encouraged to incorporate additional variables such as perceived playfulness, player satisfaction, perceived connectedness to virtual features, and perceived rewards to further explore their impact on mobile game loyalty and in-app purchase intention. This is necessary because in-app purchase intention is influenced by multiple factors, as each in-app item holds different value, and players' perceptions of these items vary significantly.

Future studies may also focus on the characteristics of respondents, particularly by selecting participants aged 25 and above to examine the relationship between impulsivity and gacha addiction. This would allow researchers to assess whether these characteristics support the theories proposed by Gavin et al. (2009) and Steinberg et al. (2008). Additionally, expenditure groups could be analyzed, particularly those classified as "whales" and "leviathans," to better understand their level of gacha addiction and their motivations for spending money on in-app purchases. The whale expenditure group consists of players who spend between IDR 330,000 and IDR 10,000,000 per month, while leviathan spenders exceed IDR 10,000,000 per month.

For mobile game developers, it is suggested to use the gacha feature responsibly. While the addictive nature of gacha mechanics can generate substantial revenue, potentially even more than maintaining reasonable pricing, it should be implemented ethically. Exploiting players' addiction can have long-term negative consequences for both the players and the developers. For instance, introducing essential items exclusively through gacha may initially drive high spending, but over time, excessive monetization can lead to player dissatisfaction, reduced engagement, and ultimately, the game's discontinuation.

A relevant example is Brave Frontier, a mobile game developed by Alim, which ceased operations on April 27, 2022, after nine years of service (Toffee, 2022). Originally released in Japan in July 2013 and globally in December 2013, Brave Frontier was notorious for releasing overpowered gacha characters, making it nearly impossible to complete certain content without acquiring specific units. This created a high barrier to entry for new players while also leading to stagnation among veteran players. As the active player base steadily declined, overall revenue decreased, ultimately resulting in the game's shutdown.

Finally, players are advised to exercise caution and avoid excessive spending on gacha mechanics. Uncontrolled in-app purchases can have negative financial and personal consequences. Several extreme cases have been reported, such as a Singaporean child accumulating S$20,000 SGD in gacha-related charges on their parents' mobile bill and an undergraduate student depleting their bank account on gacha pulls, forcing them to borrow money from their boyfriend just to afford food (Yeoh & Yip, 2022). Players should take heed of concerns raised by family and friends if their spending on gacha games exceeds reasonable limits. Additionally, they should practice self-restraint when making in-game purchases, as missed promotions or rare items will likely return in future events.

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Social Proof as a Leveraging Variable for Purchasing Decisions

Endang Sulistiyani[1)]
[1]Business Administration Department, Politeknik Negeri Semarang, Indonesia
Email: endangsulis15@polines.ac.id

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ABSTRACT

This study aims to analyze the influence of affiliate marketing and online customer reviews on social proof and purchasing decisions on TikTok. Data collection method by distributing questionnaires to TikTok users in Central Java. The data collection technique uses quota sampling and purposive sampling method. The data analysis method uses structural Equation Modelling, with the AMOS 25 program. The results of the analysis show that the direct and indirect influence between affiliate marketing, online customer reviews on social proof and purchase decisions shows positive and significant results. Social proof is able to strengthen the relationship of the indirect influence of affiliate marketing and online customer reviews on purchasing decisions. This research combines Social Influence Theory and Theory of Planned Behaviour as a bridge to digital strategies in making purchasing decisions. TikTok needs to increase partnerships with affiliate marketers who have a good reputation and great influence in the target market.

Keyword: affiliate marketing; online customer reviews; purchase decisions; social influence theory; theory of planned behaviour

INTRODUCTION

The development of technology and the advancement of the digital era have opened up great opportunities for the development of online buying and selling businesses in Indonesia. Online businesses are transforming to support business activities and have great opportunities after the COVID-19 pandemic. This condition is supported by the high number of internet users in Indonesia. According to survey data conducted by the Internet Service Providers Association (APJII) in 2023, the internet penetration rate in Indonesia from 2022 which originally amounted to 77.02% rose to 78.19%. The high number of internet users and the increasing penetration rate are widely used by some Indonesians to support economic activities through social media.

Social media or often called social networks is one of the simple communication tools whose users can interact remotely and also online channels as a medium of hobby and creativity (Nurjannah & Surianto, 2022); (Sulistiyani, Rustono, et al., 2024).Various social media are developing in Indonesia such as Instagram, Facebook, Twitter, Youtube, WhatsApp, TikTok and many more. These various social media are competing to improve performance by developing the latest features in accordance with changing patterns of people's lives. TikTok is one of the most popular social media in Indonesia. According to information from katadata.com TikTok is one of the fastest growing social media platforms in Indonesia. By 2024, the number

of TikTok users in Indonesia will reach 157.6 million, making it the largest market in the world for the platform. TikTok Shop, as TikTok's e-commerce feature, has become a key tool for direct purchases through video content, providing an integrated and entertaining shopping experience. TikTok users in Indonesia spend an average of 2,495 minutes per month on the app, higher than other social media platforms such as Instagram or Facebook. TikTok Shop has seen rapid growth since its launch in Indonesia in 2021, with most of its users coming from millennials and Gen Z, the dominant groups in online shopping. The number of Tik Tok users in Indonesia has begun to surpass the number of other social media users, such as Instagram, Youtube, and Twitter, making this platform a great place to share information, communicate, and promote. A marketing strategy that can be done on Tik Tok is the use of hashtags (#) with certain topics presented in the video so that people can easily search and find the video in question. TikTok was originally an application for various videos, but along with the changing patterns of people's lives since the Coivd 19 pandemic, TikTok officially launched an online shopping feature called TikTok Shop. TikTok Shop makes the TikTok application a social-commerce application. This is also what underlies TikTok launching the TikTok Affiliate program as a collaboration program for TikTok content creators and sellers on TikTok Shop.

This affiliates program on TikTok is the same as what other e-commerce companies like Shopee do. Content creators will create short videos about the products listed in the "yellow basket" which is an icon that will later link directly to the link of products sold on TikTok Shop. Content creators who successfully sell products in the "yellow basket" will earn a commission according to the number of products they successfully sell. Affiliate marketing programs on TikTok can significantly increase the number of sales and help sellers to use social media as marketing(Kwan, 2023).

In addition to the affiliate program that helps potential customers get reviews and information about the products they will buy from content creators on TikTok. TikTok Shop adds a feature that helps potential customers based on direct reviews from previous consumers called online customer reviews. Online customer reviews are a simple solution so that potential buyers are wiser and convince themselves to choose items from several online store options on TikTok Shop. TikTok Shop provides a review feature, namely online customer review so that consumers who have made transactions provide their experience about the quality and condition of the products purchased.

Siregar et al. (2023) state that customers will consider several decisions related to non-purchase behavior. Repeatedly the choice of not to buy can influence the purchase decision. The decision is based on good and bad information and reviews about the goods that potential customers will buy. With the TikTok Shop online customer review feature, potential customers will get this convenience. In the opinion suggests that the experience provided by others can be used as information or input before consumers make purchase decisions. Through the Zhai et al. (2024) online customer review feature on TikTok Shop, consumers will get this and are expected to influence the purchase decision of products sold on TikTok Shop.

Several studies have been conducted on affiliate marketing and online customer reviews of purchasing decisions. Based on research that has been carried out by (Syrdal et al., 2023) showing that affiliate marketing variables affects purchasing decisions. Other research conducted by showing the results of (Husnayetti et al., 2023) online consumer reviews variables have a significant effect on purchasing decisions. Different studies conducted by states that (Wandira & Rahman, 2021) affiliate marketing has no influence on purchasing decisions. Other research on online customer review variables also suggests that online customer reviews do not

affect purchasing decisions. Research conducted by shows Chen et al. (2022) online customer reviews variables have no influence on purchasing decisions. This research was then conducted to get further answers regarding the results of the inconsistencies in the results of the above research and another purpose of this study was to find the influence between affiliate marketing and online customer reviews on purchase decisions on TikTok Shop.

Most previous studies have only explored the direct influence of affiliate marketing or online customer reviews on purchase decisions. This research provides a new perspective by showing how social proof strengthens these relationships through indirect influence. This research combines Social Influence Theory and Theory of Planned Behaviour (TPB) to bridge digital strategies in purchase decision making. By including social proof as a key variable, this research bridges the concepts of digital marketing and social psychology, providing new insights that have not been widely explored.

In the highly competitive digital era, companies need effective strategies to win consumers' attention. every organisation must be prepared to change as the environment evolves (Sulistiyani et al., 2023). Social proof is an important element in strengthening consumer trust in digital promotions. Social proof as a mediator helps understand how purchasing decisions are influenced by digital interactions between individuals. Social proof plays an important role in reducing uncertainty and building consumer trust in products, especially in online transactions. This research provides an innovative framework for companies to optimise the combination of affiliate marketing and online reviews in a more structured way, namely through the creation of strong social proof as a synergistic result of both strategies.

Social proof emerged from the grand theory of Social Influence Theory put forward by (kelman, 1953) explains how individuals are influenced by others in their social environment. This theory includes various concepts that explain how, why, and when people change their attitudes, beliefs, or behavior due to the influence of others. Some of the key concepts in Social Influence Theory include conformity, compliance, and Fulfillment of requests (Myers, 2002). Social Influence Theory has its roots in social psychology and has several relevant theoretical approaches, including (Kassin et al., 2011) normative influence which describes how individuals are influenced to conform to group norms to be accepted or liked, informational social influence which shows how individuals seek information from others when they are concerned about a situation or decision, and then follow others' actions because they believe that others have better knowledge or insight, and referent social influence which focuses on how people are influenced by individuals or groups they identify with or admire. In the context of marketing and consumer behavior, social proof leverages these principles by showing that many other people have chosen a product or service, which then encourages potential consumers to do the same. Social proof has become a very effective tool in marketing strategy because humans tend to trust the collective behavior of others as a valid indicator for their own decision making (Hadiyati et al., 2024).

Theory of Planned Behavior (TPB) talks about consumer behavior that is formed through attitudes, subjective norms, and perceived behavioral control (PBC) which will then shape intentions. This intention will affect how a person's attitude or behavior Theory of Planned Behavior George (2004) influence of intention or decision on online buying behaviour. This theory was developed analysis the by Icek Ajzen as a refinement of the Theory of Reasoned Action (TRA) with the addition of Perceived Behavioral Control (PBC) variables. This developed theory explains that attitudes, subjective norms, and Perceived Behavioral Control (PBC) together will shape a person's intentions, behaviors , or decisions. Attitude isa

good or bad assessment of a person's good or bad about a behavior. Subjective norms are a person's perception of certain behaviors that are influenced bytheopinions of those around him such as friends, parents, or partners. Perceived Behavioral Control (PBC) is an opinion about how easy or difficult it is to perform certain actions (Ajzen, 1991).

The Theory of Planned Behavior (TPB) can predict human behavior in all aspects. This theory is often used in the field of marketing such as buying behavior, advertising, and entrepreneurship. The Theory of Planned Behavior (TPB) is of interest arising from oneself to performcer in actions or behaviors. In this situation, a person's interests will also have an impact on the decisions that will be made Aliedan et al. (2022) in the future. The relationship between the Theory of Planned Behavior (TPB) and this study is because this theory discusses how a person or Individuals have the desire to act or perform certain behaviors such as purchasing decisions.

Purchasers must take a step called "purchase decision" before deciding what goodsorservices they will buy or use buying something, consumers will tend to go through several stages first such as problem recognition, information search, alternative evaluation, purchases decision, and post-purchase behaviour (Aprilia & Ambarwati, 2024). In these stages, there will be a repurchase decision if the consumer is satisfied. Stone et al. (2020) presenting several aspects of purchasing decisions, such as the first one is need recognition that involves information about how and when the product should be purchased, the second one is information research, when someone will look for more information when they are interested in a product, alternative evaluation is when customers use data to assess brands, the third one purchase decisions is the decision making when the buyer buys goods. Postpurchase behavior,when customers act further after purchase to their satisfaction. Based on those aspects, It can be concluded thatthepurchase decisionsis anaction from consumers to buy something after analyzing various factors when purchasing an item or service.

One marketing strategy to attract customers is withan affiliate program orcommonly known asan affiliate marketingprogram According to (Mangiò & Domenico, 2022) in explaining affiliate marketing, or also Referred to as affiliate marketing is an activity when others promote goods or services owned by someone online or offline using are venue sharing system. The person can promote goods or services through content or share an online store link. Meanwhile, according to Sihombing et al. (2023); affiliates marketing is marketing when someone assures goods or services belonging to others.

Another type of electronic word of mouth (eWOM) is on line customers reviews that can be used as a consumer medium to view reviews from other customers about products and services that Online Customer Reviews (OCR) (Bilal & Almazroi, 2023)is one of the facilities that allow consumers to freely and easily write online comments and opinions about goods and services. Online Customer Reviews can greatly in fluence a visitor's purchase decisions (Alsayat, 2023). From some of the definitions of Online Customer Reviews above, it can be concluded that Online Customer Reviews is a review that contains criticism, suggestions, or opinions from consumers or visitors honestly and what the existence of their services or goods just bought.

Social Influence Theory is a framework that explains how individual behaviour is influenced by others through normative and informational mechanisms. The theory is rooted in social psychology and suggests that social interactions can create behaviour change through various mechanisms, such as persuasion, social pressure, and imitation.This theory is relevant in consumer behaviour, and social interactions in the digital world. Social proof is often used

in marketing strategies to increase consumer trust, such as customer testimonials, number of buyers, and product ratings. The influence of influencers or viral trends on platforms such as TikTok or Instagram shows how social influence plays a role in shaping consumer preferences (Rochman et al., 2022). Consumers tend to choose products that are considered popular or have positive reviews as a form of normative and informational influence. The marketing process is one of the most crucial things in the business process. The existence of technology simplifies marketing process. For example, affiliate marketing programs on various online shopping platforms in Indonesia. This statements is supported by research conducted (Asadiyah et al., 2023) that affiliate marketing is a business model where products ares old to other businesses. So the hypothesis proposed is:

H1: Affiliate marketing influences social proof and purchasing decisions.

Normative influence is one approach to social influence theory that informs that individuals follow the behaviour, opinions, or decisions of the group to be accepted or recognised. Some individuals usually have a community and look for product-related information in the community. The informative influence approach in social influence theory conveys that reviews from other customers provide validation that the product or service offered is indeed of quality and as described.

Reviews from other customers provide validation that the product or service offered is indeed of quality and matches the description. This helps potential buyers feel more confident to follow the recommender's behavior in making a decision (Patil & Rane, 2023). According to normative influence explains that individuals tend to use information about the actions of others to determine norms and correct behavior. When they see many people doing something, they assume that the action is correct and worth following(Shah & Asghar, 2023). Valuable information from previous consumers will make valuable references and referrals to reduce the risk of buying less quality products (Yadav et al., 2023). . So the hypothesis proposed is:

H2: *Online customer reviews*influence purchasing decisions.

H3: Social proof influence on customer decisions

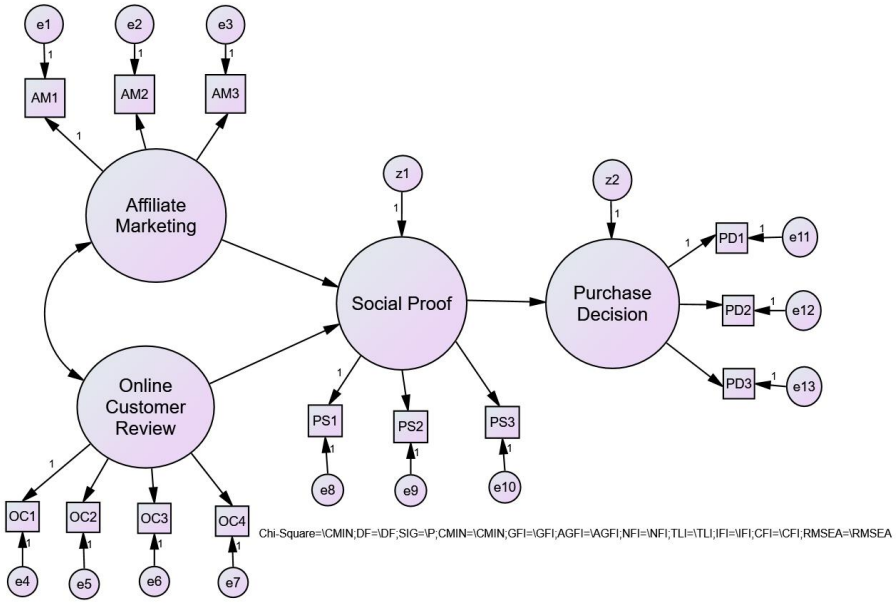

Figure 1. Research model of the relationship between variables

Source: Chen et al. (2022) developed, 2024

METHODS

This studyused descriptive type research with a quantitativeapproaches. The data sources used are primary data and secondary data. Primary data was obtained from the distributionofquestionnaires as a research instrument in the form of Google Form. The data is sourced from various previous research literature, books, surveys results, and journals. Respondents in this research are consumers or users of TikTok Shop. The sampling method is a combination of purposive sampling and quota sampling. The sample quota was set at 300 people. The required sample criteria include being 17 years of age or older, domiciled in Central Java, having made a purchase through the "Yellow Basket" feature for TikTok affiliate content creators and having provided a review of a product purchased at the TikTok Shop. Samples according to the criteria continue to be sought until the sample quota is met.

Respondents' opinions were collected through a questionnaire and distributed via a Google form link. Online customer reviews are measured through a scale of 1-10 adopted from opinions (Putri & Wandebori, 2016) with indicators of source credibility, argument quality, perceived usefulness, quantity of reviews. Affiliate marketing indicators include informativeness, perceived utility and perceived ease to locatebased on opinion (Ul Haq, 2012). Purchasing decisions are measured on a scale of 1-10 with indicators of success in buying after knowing product information, deciding to buy because it is the most preferred brand and buying because it suits your wants and needs, according to your opinion (Qazzaf, 2019). Social Proof indicators are developed from opinions Abdul Talib et al. (2017) including perceived trust, enjoying your product or service, attracting new website visitors.

The collected data were analysed using Structural Equation Modelling SEM), with the AMOS 25.0 application tool. In this study, there are two models evaluated, namely the measurement model and the structural model. The measurement model evaluates the relationship between indicators (observed variables) and latent constructs. Accepted values: ≥ 0.50 for stronger validity (J. F Hair et al., 2019). Structural model The structural model evaluates the relationship between latent constructs. Goodness of Fit Indice, used to assess the overall fit of the model. Accepted values: RMSEA (Root Mean Square Error of Approximation): ≤ 0.08; CFI (Comparative Fit Index): ≥ 0.90GFI (Goodness of Fit Index): ≥ 0.90. Hypothesis testing in SEM is done by looking at the relationship between latent constructs through the path coefficient value and significant value. The hypothesis is accepted if the p value is ≤ 0.05 (in the 95% confidence level).

RESULTS AND DISCUSSION

Data were analyzed using Structural Equation Modeling (SEM) statistical software of AMOS 25.0 for identifying the measurement model and analyzing the causal relationship and regression magnitude as well as for the goodness of fit of the model. The collected data was then analyzed using SEM statistical software AMOS 25.0. This is done to identify causal relationships and regression values between variables(Arbuckle, 2016).

Based on loading factors of the indicator of the constructs, each single variable has a cut-off value of ≥0.50, indicating the magnitude of loading factor is well mirroring the constructed variable(Hair et al., 2018). Several indicators of non-statistical measure such as GFI = 0.945; AGFI = 0.914; TLI = 0.993; IFI = 0.992; CFI = 0.995 is above the cut-off value

of ≥0.90 with the value of RMSEA = 0.035 within the cut-off value of between 0.03–0.08 (Arbuckle 2016), therefore the goodness of fit of the model is achieved.

Regression coefficient of the hypothesized path H1 = 0.964; H2 = 0.233; H3 = 0.172 and H4 = 0.471 with the critical ratio or t-value > 2.0, precisely 1.96 (Arbuckle 2016) indicating the acceptance of all hypotheses in the model.

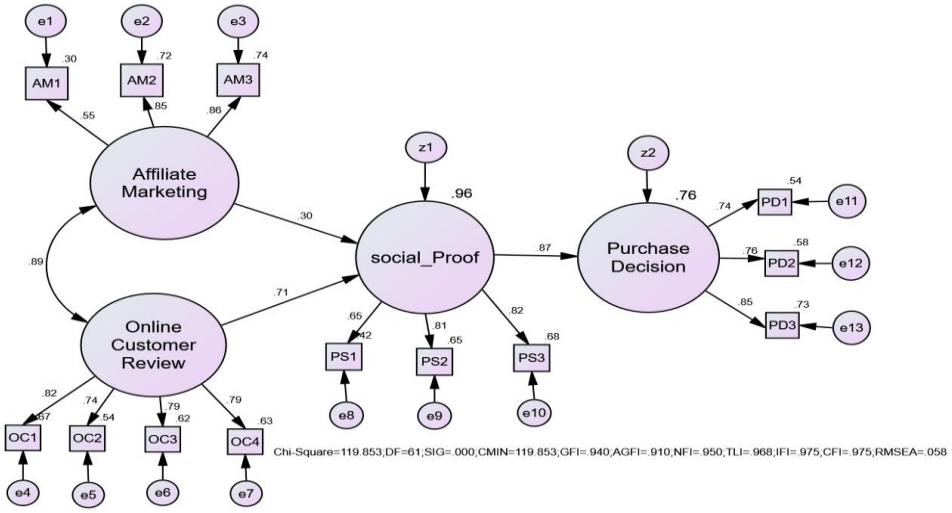

Figure 2. Full structural equation model
Source: AMOS output, 2024

Several indicators of non-statistical measure such as GFI = 0.940; AGFI = 0.910; TLI = 0.968; IFI = 0.975; CFI = 0.975 is above the cut-off value of ≥0.90 with the value of RMSEA = 0.058 within the cut-off value of between 0.03–0.08(Arbuckle, 2016), therefore the goodness of fit of the model is achieved.

Table 1. The results of the regression test

Path, Direct Effects			Estimates	S.E	P-Value	Results
Affiliate Marketing	→	Social Proof	0.339	0.136	0.013	Significant
Online Customer Review	→	Social Proof	0.560	0.105	0,000	Significant
Social Proof	→	Purchase Decision	0.897	0.090	0,000	Significant
Affiliate Marketing→Social Proof→Purchase Decision			Z-value = 2.4181	0.126	0.015	Significant
Online Customer Review→Social Proof→Purchase Decision			Z-value = 4.7023	0.107	0,000	Significant

Source: AMOS output and Sobel Test mediation test, 2024

This study uses social proof mediation variables to connect affiliate marketing and online customer reviews to purchasing decisions. Test the role of mediating variables using the sobel test. The results of the mediation test of the relationship between affiliate marketing

and online customer reviews on purchasing decisions show a z-value = 2.4181 and z-value = 4.7023 greater than the cut of value of 1.96 which indicates the mediating effect of the variables tested.

The direct relationship between affiliate marketing and online customer reviews of social prof shows significant results. The estimated value of online customers in influencing social is more dominant than affiliate marketing. The indirect relationship between affiliate marketing and online customer reviews on purchase decisions through social proof produces significant value. The Z value of online customer reviews is greater in indirectly influencing purchase decisions.

The direct influence of affiliate marketing on social proof shows a significant positive value at an estimated value of 0.339. Likewise, the indirect influence of affiliate marketing on purchase decisions through social proof produces a significant positive value at z value 2.4181. The marketing strategy by Shopee Shop via TikTok by affiliating with third parties in promoting the company's products or services shows good results in increasing sales performance (Naeem, 2021). An affiliate can help a company reach new audiences they may not have known about. Affiliates with various influences and good negotiation communication can influence feelings of trust and consumers ultimately make purchases. In social influence theory, in social media the influence of influencers or viral trends on platforms such as TikTok or Instagram shows how social influence plays a role in shaping consumer preferences.

Sellers at TikTok Shop can work with affiliate content creators, judging by the convenience provided and not much capital spent on promotion through affiliate content creators (Kwan, 2023). Sellers simply provide product samples to affiliate content creators without having to pay any additional costs. Thus, the aim of affiliate marketing is to provide better promotional options to sellers on TikTok Shop so that the products being sold can be reviewed, promoted better without having to spend a lot of money on promotion and in the end it will have an impact on potential consumers to make purchasing decisions (Halim & Devi, 2023). The results of this research are in line with research conducted by (Syrdal et al., 2023) which states that the better the promotions carried out through affiliate marketing, the greater the belief in the benefits of the product, resulting in purchasing decisions (Mangiò & Domenico, 2022). Through the affiliate marketing program provided by TikTok and affiliate content creators or affiliators, TikTok Shop users are expected to be able to increase buying and selling transactions through TikTok Shop and find information related to the products they need more easily through content created by affiliate marketersc (Sihombing et al., 2023).

The direct influence of online customer reviews on social proof shows a significant positive value at an estimated value of 0.560. Likewise, the indirect influence of affiliate marketing on purchase decisions through social proof produces a significant positive value at Z value 4.7023. The estimated value shows dominant results compared to the influence of other variables. This shows that if someone decides to buy a product or service, they need to consider the opinions of many people or communities and groups to be more confident in their product choice (Patil & Rane, 2023). People prefer to get input from various opinions before deciding something, this is so that the value of the money paid is commensurate with the product purchased (Liu et al., 2023). In the world of e-commerce, ratings and reviews are very important, because potential buyers can easily get information about the goods they want to buy. Starting from the quality of the goods, the similarity of the goods, the speed of delivery, to the authenticity of the goods. We can see all information from ratings and reviews from previous buyers. In practice, the TikTok Shop online application gives consumers the freedom

to provide opinions about the products and services provided by the shop/owner, so that consumers get a lot of information about the product and shop (Sulistiyani, Wahyuni, et al., 2024) ;(Inayah et al., 2023).

In the context of social influence theory, social proof is often used in marketing strategies to increase consumer trust, such as customer testimonials, number of buyers, and product ratings. Theory of Planned behaviour asserts that consumers tend to choose products that are considered popular or have positive reviews as a form of normative and informational influence. Social Influence Theory is a framework that explains how individual behaviour is influenced by others through normative and informational mechanisms. This theory is relevant in a variety of contexts, including marketing, consumer behaviour, and social interaction in the digital world.

This research provides a new perspective by placing social proof as a mediator. Previously, many studies discussed the direct relationship between affiliate marketing or online customer reviews and purchasing decisions, but the results were not always consistent. This research has theoretical and practical impacts.

Theoretical impacts include 1) Contribution to Existing Literature. This research provides a new perspective by placing social proof as a mediator. Previously, many studies discussed the direct relationship between affiliate marketing or online customer reviews and purchasing decisions, but the results were not always consistent. By adding social proof as a mediating variable, this study explains the mechanism of how the two independent variables indirectly influence purchasing decisions, strengthening understanding of the role of social proof in digital marketing. 2)The difference in results in previous studies can be bridged by understanding that affiliate marketing and online customer reviews do not always have a direct impact on purchase decisions, but are more effective through increased social proof. Social proof acts as a 'context amplifier' that connects marketing strategies with consumer perceptions, thus providing an answer to the difference in results in previous studies. 3)Validation and Updating of Marketing Theories. This research validates theories such as the Theory of Planned Behaviour (TPB), which shows that subjective norms have an important role in influencing consumer intentions and decisions.

Social Influence theory is also strengthened by empirical evidence that social influence in the form of reviews or affiliate promotions can influence purchases.

Practical Impacts, including 1) Marketing Strategy Efficiency. Shows businesses that affiliate marketing and online customer reviews are not only effective when used individually, but become much more powerful when combined to create significant social proof. Practical example: Using affiliates that actively encourage consumers to leave product reviews creates a domino effect of increased trust and purchases. 2) Social Proof Optimisation in E-Commerce. Identifying the importance of social proof in the buying process helps e-commerce platforms and brands to focus on this element, such as displaying the number of purchases, positive reviews, and ratings. Solution: Platforms like TikTok Shop can increase the credibility and appeal of products by highlighting customer testimonials and live-streaming live interactions.

CONCLUSIONS

Based on the results of data analysis, social proof is proven to mediate the indirect influence between affiliate marketing and online customer reviews on decisions Managerial recommendations include Companies need to increase partnerships with affiliate marketers who have a good reputation and great influence in the target market and encourage consumers to leave positive reviews by offering incentives such as discounts or reward points. TikTok needs to manage and respond to negative reviews quickly and professionally to improve the company's image. Respondents in this study described preferring to buy products by seeking information from previous buyers. This is done to ensure and convince that the product purchased is of the right quality and as desired. Research recommendations, including this study, need to add other variables that can influence social proof and purchasing decisions. Respondents need to be expanded to people outside Central Java or other provinces such as East Java, West Java and provinces outside Java.

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SINTA 2

Mediating Role of Advertisement Credibility in Beauty Influencer Trust and Local Balinese Skincare Purchases

Desak Made Febri Purnama Sari[1)], Ida Ayu Oka Martini[2)], Ida Nyoman Basmantra[3)], Anak Agung Sagung Dinda Savitri Devi[4)]
[1,2,3,4]Universitas Pendidikan Nasional
Email: dskfebripurnama@undiknas.ac.id

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ABSTRACT

Competition in the beauty sector is very competitive, because this industry has many enthusiasts. However, people do not have much knowledge about local skincare products. This study explores the relationship between trust in beauty influencers, advertisement credibility, brand credibility, and the purchase intention of local skincare products. The sample used is 100 Generation Z , the test was conducted with PLS – SEM. The research findings support six hypotheses. The results indicate that trust in beauty influencers enhances brand trust in skincare products. Generation Z consumers trust advertisements because they offer accurate, comprehensive, and appealing product information, thereby eliciting a purchase intention. Additionally, beauty influencers are perceived as capable of providing honest information, which further influences purchase intention. The implications of this study suggest that effective advertisement credibility can increase consumer intention to purchase local skincare products in Bali.

Keywords: advertisement credibility; beauty influencer trust; brand credibility; purchase intention

INTRODUCTION

The beauty industry in Indonesia continues to proliferate, offering a diverse range of products tailored to various needs, sourced both domestically and internationally. This growth is influenced by changing lifestyles and emerging trends. Competition within the beauty industry is fierce, given its large consumer base and significant profitability. Both large and small companies strive to capture a larger market share by offering innovative, high-quality, and affordable products and services. Skincare products cater to various skin issues and are formulated according to individual needs and skin types.

According to Ameen et al. (2022) and Boon et al. (2020), the skincare industry has experienced significant growth, with consumers increasingly investing in skincare products. The Generation Z demographic, born between 1995 and 2012, is a significant consumer group, spending an average of $368 per year on skin care products (Ameen et al., 2022). Therefore, Generation Z is chosen as the target demographic for this study due to their growing presence in the cosmetics industry.

Various cosmetic products, ranging from whitening creams to lipsticks, have flooded the market, with skincare products dominating the current beauty trends. In Bali, four local Bali Balance, Utama Spice, Bali Alus, and Embun Natural have gained prominence, each offering unique products featuring natural ingredients. These brands exemplify the growing awareness among consumers and businesses to create competitive skincare products. The pricing of local skincare products in Bali ranges from Rp 43,000 to Rp 300,000, making them relatively affordable for consumers of varying economic backgrounds. Consumer purchasing decisions regarding these brands are influenced by product suitability for their skin type and positive reviews from fellow consumers or beauty influencers (Britt et al., 2020; Tran et al., 2020).

The emergence of local Balinese brands has garnered significant attention from consumers, particularly due to the influence of social media and beauty influencers (Tafesse & Wood, 2021). Beauty influencers, as defined by Tran et al. (2020), are individuals who provide detailed explanations and reviews of beauty products they have personally used. They establish credibility through engaging with their audience and gaining followers' trust. One way to measure an influencer's engagement is by analyzing the number of likes and comments on their posts (Lou et al., 2019). Therefore, influencers actively interact with their followers to increase engagement and broaden their post reach, thereby enhancing their appeal (Delbaere et al., 2021). For local skincare brands produced in Bali to remain competitive, they must effectively adopt new marketing techniques, leveraging influencers and social media platforms.

However, the observation of each brand's social media presence suggests that local Balinese brands haven't been fully explored social media for promotion yet. The lack of marketing strategies that align with current trends, such as utilizing beauty influencers for social media promotion, has resulted in limited brand awareness for some local brands (Gao et al., 2018; Ihzaturrahma & Kusumawati, 2021). Hence, understanding how to market local beauty brands effectively to compete globally is essential. Ningrum and Ruspitasari (2022) concluded that beauty influencers and product quality significantly influence purchase decisions positively. Influencers' ability to review products effectively attracts audiences, thus increasing purchase decisions. This is because followers of specific influencers tend to trust their recommendations due to their expertise in explaining the products they use (Foroudi, 2019). Syukur (2020) found that beauty influencers can increase purchase intention if they successfully translate it into actual product purchases (Jin & Muqaddam, 2019; Ningrum & Ruspitasari, 2022).

Purchase intention refers to individuals' willingness to purchase goods or services that enable them to obtain desired product (Chang & Geng, 2022). Consumer purchase intention is influenced by various factors, including awareness, brand knowledge, and brand credibility (Ihzaturrahma & Kusumawati, 2021; Zhao et al., 2022). However, many consumers, in this case, are interested in skincare products but need more extensive knowledge about skincare brands. With numerous options available, consumers need help deciding which product is suitable for them. Therefore, beauty influencer reviews serve as an alternative for consumers to strengthen their purchase intention towards skincare products. Through beauty influencer reviews, consumers can make informed decisions about skincare products. Based on the above discussion, this study examines the relationship between trust in beauty influencers, advertisement credibility, brand credibility, and purchase intention for skincare products.

The Theory of Planned Behavior (TPB) explains the causes of behavioural intentions (Nadlifatin et al., 2020). According to this theory, a person's intention to behave is determined by three main determinants: subjective norms, attitudes, and perceived behavioural

control, which are considered an extension of the theory of reasoned action (Ajzen, 2020). To date, the TPB has been widely used in various fields discussing human behaviour. (Aaker, 1997) described brands as entities with human-like personality traits. According to this theory, brands can possess specific personalities that help consumers associate emotional values, behaviors, and identities with the brand. In the beauty industry, influencer marketing presents an intriguing new opportunity. Beauty influencers employ digital marketing strategies known as influencer marketing. They promote beauty products through video content, photos, and written posts on social media (Chen & Dermawan, 2020; Hassan et al., 2021). (Hudders et al., 2021) describe beauty influencers as individuals who disseminate information, teach specific skills, and share content through short videos posted on social media. Relationship Marketing Theory is a marketing approach that focuses on building, maintaining, and strengthening long-term relationships between a company (or brand) and its customers. This theory was developed by (Hunt & Morgan, 1994), emphasizing that trust and commitment are the core elements of a successful relationship. They focus on the beauty industry, have a large following, and significantly influence their followers. Beauty products are essential for many women, and beauty influencers play a critical role in influencing consumer purchase intentions toward specific products. Based on these observations, the following hypothesis was proposed:

H_1: Trust in beauty influencers positively and significantly impacts the credibility of local skincare brands in Bali.

H_2: Trust in beauty influencers positively and significantly impacts the credibility of advertising for local skincare brands in Bali.

Brand credibility is defined as consumers' willingness to trust and rely on a brand, particularly in situations involving risk. It is believed to provide both direct and indirect benefits to a brand (Mandler et al., 2021; Wang et al., 2021). To increase a brand must gain trust based on the available product information and deliver on its promises (Bhandari & Rodgers, 2020; Portal et al., 2019). Consequently, the more credible a brand is, the more likely it is to be included in a consumers purchase list (Chang & Geng, 2022) . Brand credibility is considered an essential factor influencing consumers. Therefore, the following hypothesis was formulated:

H_3: Brand credibility positively and significantly impacts the purchase intentions of local skincare brands in Bali.

Credibility is the quality or power to inspire belief. This term is used for testimony deemed truthful regarding the matter in question. Thus, credibility means something that can be trusted (Ward, 2020). Advertising is a form of promotion using paid non-personal communication by sponsors to convey information about products to the public. Advertising is a non-personal promotion form focused on ideas, goods, and services funded by specific sponsors. Advertising credibility as a value that can be well received by the audience, thus creating a positive influence (Hussain et al., 2020; Lou & Yuan, 2019). The media used to build someone's enthusiasm must have a significant role in the advertising world (Syawaluddin et al., 2019). In the mass media context, advertising refers to messages related to products, companies, and strategies intended to be conveyed to consumers. Therefore, advertising credibility can be effective if it targets potential consumers who need the promoted products (Li et al., 2020). Therefore, the following hypothesis was formulated:

H_4: Advertising credibility positively and significantly impacts the purchase intentions of local skincare brands in Bali.

Purchase intention is someone who plans to buy offered products or services (Chang & Geng, 2022; Ulmaghfiroh et al., 2021). Purchase intention is based on brand awareness, knowledge, and trust (Tan et al., 2022). A consumer will buy a product after evaluating whether it suits them (Lu & Chen, 2021). Consumer purchase intentions can be measured by considering purchasing the product, looking at user reviews, and eventually having the intention to buy. Additionally, purchase intentions can be measured through trust in a beauty influencer's review of a product (Britt et al., 2020; Tran et al., 2020) explains that an individual's lifestyle influences purchase intentions. A brand will target individuals whose lifestyle matches the product, thereby enabling purchase intentions. The intention to purchase arises when consumers receive stimuli from something they see and feel the desire to own a product (Shahid et al., 2018). Based on these explanations, the following hypotheses were proposed:

H_5: Brand credibility mediates the influence of beauty influencer trust on the purchase intentions of local skincare brands in Bali positively and significantly.

H_6 : Advertising credibility mediates the influence of beauty influencer trust on the purchase intentions of local skincare brands in Bali positively and significantly.

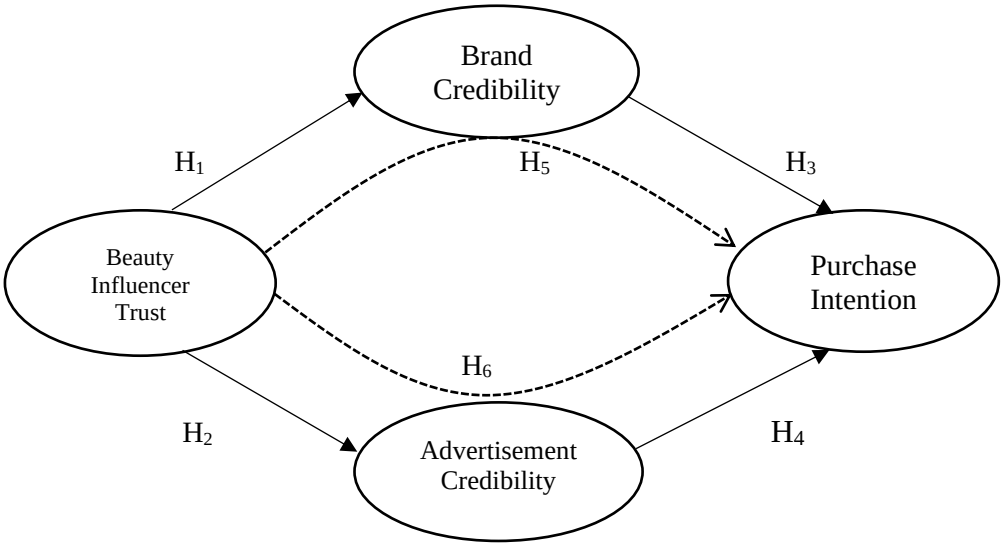

Figure 1. Conceptual Framework

Source: development of previous research studies, 2023

METHODS

This study employed a quantitative research method, with data collected through questionnaires. The questionnaires were distributed online using Google Forms, ensuring a streamlined and efficient process. Distribution channels included direct messages on WhatsApp, Instagram status posts, Facebook, private chats on LINE, and Telegram communities, reaching a wide and diverse audience. The conceptual model was analyzed using PLS-SEM because it provides a robust approach to analyzing complex relationships between variables.The research was conducted in Bali, a region with a substantial population of skincare product users, particularly among Generation Z males and females. This choice was made to ensure the study's findings are applicable to a significant portion of the skincare market, highlighting the importance of understanding the preferences and habits of this demographic. The population for this study consisted of Generation Z males and females, with an average

population of 726.9 thousand individuals in 2023 (Badan Pusat Statistik, 2023). The sampling technique used was accidental sampling, using the Slovin formula with a percentage (0.1). The sample size was 100 respondents. Primary data sources were obtained through the distribution of questionnaires, while secondary data sources included references and citations from various materials such as books, journals, and other informational media, as well as data on the development of skincare products and other topics related to the research.

RESULT AND DISCUSSION

The characteristics of the research respondents were divided based on gender, age, and occupation.

Table 1. Respondent Characteristics

Characteristic	Respondents	Percentage (%)
Gender		
Male	32	32
Female	68	68
Total	100	100
Age		
14 - 20 Year	18	18
20 – 28 Year	82	82
Total	100	100
Occupation		
Student	54	54
Entrepreneur	13	13
Employee	22	22
Other	11	11
Total	100	100

Source: Processed primary data, 2023

Based on the frequency distribution calculation in Table 1, it is evident that the majority of research respondents are consumers or users of local skincare brands in Bali, with 68 female consumers. This is supported by Ivada et al. (2022), who state that women often pay attention to their body condition, especially facial skin, due to the desire for healthy skin. The respondents in this study are predominantly consumers or users of local skincare brands in Bali, ranging in age from 14 to 28 years old. This aligns with Sari & Surwanto (2022), who state that individuals aged 20 and above enter a productive age and are required to present themselves attractively, leading to a high intensity of skincare product usage in this age group, while those below this age range may not have as high productivity. Most consumers or users of local skincare brands in Bali are students or university students. Alviah (2018) notes that students perceive skincare as an essential part of facial care, which is currently considered a basic need for students to enhance their physical appearance compared to other occupations.

Instrument testing was conducted on 30 respondents outside of the primary respondents. Testing included validity and reliability assessments. The validity testing results indicate that all indicators in each research variable covering trust in beauty influencers, brand credibility, advertisement credibility, and purchase intention have obtained Pearson correlation coefficient values above 0.3. This result indicates that the research data meets the validity requirements,

concluding that the research data is excellent and valid. The reliability testing results indicate that each variable in this study, covering trust in beauty influencers, brand credibility, advertisement credibility, and purchase intention, has obtained Cronbach's Alpha values above 0.60. This result concludes that each variable in the study meets the reliability requirements, and the research data can be considered reliable.

Table 2. Convergent Validity

Variables	Indicator	Outer Loading
Brand Credibility	M1.1	0.802
	M1.2	0.822
	M1.3	0.783
Advertisement Credibility	M2.1	0.790
	M2.2	0.716
	M2.3	0.773
Beauty Influencer Trust	X.1	0.822
	X.2	0.840
	X.3	0.782
Purchase Intention	Y.1	0.776
	Y.2	0.661
	Y.3	0.800
	Y.4	0.784

Source: Processed primary data, 2023

Table 3. Discriminant Validity

	Brand Credibility	Advertisement Credibility	Beauty Influencer Trust	Purchase Intention
M1.1	**0.802**	0.341	0.565	0.422
M1.2	**0.822**	0.342	0.500	0.529
M1.3	**0.783**	0.448	0.482	0.448
M2.1	0.504	**0.790**	0.324	0.525
M2.2	0.324	**0.716**	0.246	0.420
M2.3	0.230	**0.773**	0.375	0.463
X.1	0.554	0.421	**0.822**	0.271
X.2	0.490	0.321	**0.840**	0.341
X.3	0.522	0.267	**0.782**	0.417
Y.1	0.532	0.510	0.325	**0.776**
Y.2	0.357	0.433	0.317	**0.661**
Y.3	0.477	0.435	0.274	**0.800**
Y.4	0.374	0.496	0.345	**0.784**

Source: Processed primary data, 2023

Table 4. Average Variance Extracted

	Average Variance Extracted (AVE)
Beauty Influencer Trust	0.664
Advertisement Credibility	0.578
Brand Credibility	0.644
Purchase Intention	0.573

Source: Processed primary data, 2023

Table 5. *Cronbach's Alpha dan Composite Reliability*

	Cronbach's Alpha	Composite Reliability
Beauty Influencer Trust	0.748	0.856
Advertisement Credibility	0.636	0.804
Brand Credibility	0.724	0.844
Purchase Intention	0.750	0.842

Source: Processed primary data, 2023

The results of the outer model testing, which included convergent validity testing, discriminant validity cross-loading testing, and average variance extracted (AVE) testing, provide a comprehensive view of our research findings. The convergent validity testing indicates that all indicators in each variable used in the research, including purchase intention, trust in beauty influencers, advertisement credibility, and brand credibility, have obtained loading values exceeding the requirement of 0.60. The discriminant validity cross-loading testing confirms that the correlation of measurement items or indicators with their constructs is more significant than the correlation with other constructs, meeting the discriminant validity requirements well. The AVE testing indicates that each variable used in this study, including purchase intention, trust in beauty influencers, advertisement credibility, and brand credibility, has obtained AVE values exceeding 0.50. Overall, the data used in this study meets the convergent validity requirements well, and the reliability testing confirms the reliability of our data, with both Cronbach's Alpha and Composite Reliability values for each research construct obtaining values above 0.6.

Table 2. R-*square*

	R Square	**R Square Adjusted**
Advertisement Credibility	0.175	0.167
Brand Credibility	0.414	0.408
Purchase Intention	0.494	0.484

Source: Processed primary data, 2023

The R2 value measures the variation in changes from exogenous variables to endogenous variables. The coefficient of determination has a value between 0 and 1. A low R2 value indicates that the ability of independent factors to explain the dependent variable is minimal.

Q-square (Q^2) is conducted to measure how well the observations are generated by the model and to analyze the diversity value of the research data. The Q2 value or predictive

relevance value of 0.02 can be categorized as weak, 0.15 as moderate, and 0.35 as strong (Ghozali & Latan, 2015). The Q2 results can be seen in the calculation below:

$$Q2 = 1 – (1 – R12) (1 – R22) (1 – R32)$$
$$Q2 = 1 – (1 – 0.175) (1 – 0.414) (1 – 0.494)$$
$$Q2 = 1 – (0.825) (0.586) (0.506)$$
$$Q2 = 1 – 0.245$$
$$Q2 = 0.755$$
$$Q2 = 75.5\%$$

The calculation result of Q2 shows that the predictive relevance value obtained in the research model is 0.755 or 75.5%. The obtained result confirms that the research model can be considered appropriate because it has a diversity of data that can be explained by the model by 75.5%, which falls into the strong category as it exceeds 0.35. Furthermore, the Q2 calculation result demonstrates that the variation of the purchase intention variable can be explained by customer satisfaction, brand credibility, and advertising credibility by 75.5%, while 24.5% can be explained by other factors such as brand image variables, customer satisfaction, or E-WOM variables.

Hypothesis testing is conducted through bootstrapping procedures by examining the path coefficient values and t-values to see the level of significance in the relationship between variables, where the value is considered significant if the t-statistic value is greater than 1.65 for one-tailed hypotheses. The results of the hypothesis test can be explained as follows.

Table 3. Results of Hypothesis Testing for Direct Effects

	Original Sample	T Statistics	P Values	Hypothesis
Beauty Influencer Trust → Advertisement Credibility	0.419	4.228	**0.000**	Accepted
Beauty Influencer Trust → Brand Credibility	0.643	7.354	**0.000**	Accepted
Advertisement Credibility → Purchase Intention	0.446	3.145	**0.001**	Accepted
Brand Credibility → Purchase Intention	0.374	2.098	**0.018**	Accepted

Source: Processed primary data, 2023

Table 4. Results of Hypothesis Testing for Indirect Effects

	Original Sample	T Statistics	P Values	Hypothesis
Beauty Influencer Trust → Brand Credibility → Purchase Intention	0.240	2.045	**0.021**	Accepted
Beauty Influencer Trust → Advertisement Credibility → Purchase Intention	0.187	2.776	**0.003**	Accepted

Source: Processed primary data, 2023

Influences of Beauty Influencer Trust on Brand Credibility of Local Skincare Brands in Bali. The results suggest that the higher the consumer's trust in a beauty influencer, the higher the brand credibility of local skincare brands in Bali. This study found that trust in beauty influencers affects the brand credibility of local skincare products like Bali Balance, Utama

Spice, Bali Alus, and Embun Natural, as these influencers honestly review and explain the benefits and ingredients of these brands. As a result, trust in beauty influencers leads consumers to trust and rely on the reviewed products. The research indicates that trust in beauty influencers has increased brand credibility among Gen Z consumers, who believe the four brands contain safe ingredients and effectively address their skin issues. This aligns with the Theory of Planned Behavior (TPB), which explains that a person's intention to behave is influenced by others' attitudes. In this study, influencers' honest reviews of the four products led Gen Z consumers to trust the brands. This study is supported by (Britt et al., 2020; Tran et al., 2020), who found that beauty influencers positively influence brand credibility. The findings indicate that highly credible beauty influencers discussing and promoting a brand affect the credibility of the brand's advertising and company (Ningrum & Ruspitasari, 2022). Consumers who are fans of beauty influencers tend to trust the products reviewed because they perceive the as high-quality (Boon et al., 2020). The values held by beauty influencers should align with the brand's values.

Influences of Beauty Influencer Trust on Advertising Credibility of Local Skincare Brands in Bali. The results suggest that the higher the consumer's trust in a beauty influencer, the higher the advertising credibility of local skincare brands in Bali. The study found that influencers who effectively explain products and communicate information positively influence the advertising credibility of products like Bali Balance, Utama Spice, Bali Alus, and Embun Natural. The research indicates that information provided by influencers has gained consumer trust, especially among Gen Z, who believe the advertisements provide accurate, complete, and engaging information about these skincare brands. The findings align with the Theory of Planned Behavior (TPB), which discusses how an individual's behaviour can be influenced by the trust. This study shows that trust in beauty influencers leads to trust in the advertised products. This research is consistent with studies by who found that beauty influencers positively impact advertising credibility (Li et al., 2020; Sutia et al., 2023; Xu & Gao, 2021). Influencer advertising is considered adequate when promoting products through their reviews, leading consumers to trust the information provided and increasing their interest in the products (Meylani et al., 2022). (Shaddiq et al., 2021) suggest that highly credible beauty influencers discussing and promoting a brand influence the advertising credibility and company of the brand. Posts or content created by beauty influencers are seen as a form of product advertising that can increase advertising credibility and the brand's company.

The Influence of Brand Credibility on Purchase Intention for Local Skincare Brands in Bali. Brand credibility positively and significantly affects the purchase intention of local skincare brands. This finding suggests that the better the brand credibility of skincare products, the more it can increase consumers' purchase intentions for local skincare brands in Bali. This study's findings indicate that the trust consumers have gained in local skincare brands has successfully generated their purchase intentions. The results explain that local skincare brands such as Bali Balance, Utama Spice, Bali Alus, and Embun Natural have delivered on their promises by continuously providing value and quality, which builds consumer trust and generates purchase intentions for these four local brands. Brand credibility essentially involves earning trust based on the information about the product, depending on consumer perceptions. The findings also show that the honesty provided by these four brands to Generation Z consumers leads to their desire to try and purchase the skincare brands according to their needs. Before intending to buy, they have already researched the benefits of the products, making them confident in the advantages of these four brands. This study's results align with the Theory of Planned Behavior (TPB), which explains the influence of an

individual's behavior. In this study, trust in the four skincare brands can influence consumer behavior, leading to their purchase intentions. This research is also supported by findings from (Martín-Consuegra et al., 2018; Wang et al., 2021), which state that brand credibility has a positive impact on purchase interest in a product.

The Influence of Advertising Credibility on Purchase Intention for Local Skincare Brands in Bali. Advertising credibility has a positive and significant impact on the purchase intention of local skincare brands. This finding indicates that the better the credibility of skincare product advertisements, the more it can increase consumers' purchase intentions for local skincare brands in Bali. The study explains that advertisements for local skincare brands such as Bali Balance, Utama Spice, Bali Alus, and Embun Natural have met their promises by presenting attractive ads and clearly explaining information, generating purchase intentions for these four local brands. The results indicate that the honesty shown in the advertisements of these four brands to Generation Z consumers leads to their desire to try and purchase the skincare brands according to the ad reviews they see. Before intending to buy, they have already seen the advertisements that generate their purchase intentions, considering the four products after viewing the provided ad reviews. This study's results align with the Theory of Planned Behavior (TPB), which explains the theory of planned behavior and how it causes an individual's behavior intentions. In this study, attractive and honest advertisements generate consumer trust and purchase intentions for these four products. This finding is also supported by research conducted by (Hussain et al., 2020; Li et al., 2020), which found that advertising credibility positively affects purchase interest. Advertising credibility fundamentally involves a person's ability to instill trust in others based on the truth conveyed through advertisements (Suwitho et al., 2023). Consumers need to understand the features of a product and what criteria to use to evaluate an advertised product so they know how to form their purchase intentions toward the product.

The Influence of Brand Credibility Mediating the Influence of Beauty Influencer Trust on Purchase Intention for Local Skincare Brands in Bali. The trust in beauty influencers can be mediated by the brand credibility of local skincare brands in Bali to influence purchase intentions. This analysis indicates that the higher the trust in beauty influencers and good brand credibility, the more consumer intentions to purchase local skincare brands in Bali will increase. The study's findings state that beauty influencers have the capability and trustworthiness to provide honest information about products such as Bali Balance, Utama Spice, Bali Alus, and Embun Natural. These findings indicate that Generation Z consumers trust the information provided by beauty influencers, believing that these four products effectively address their skin issues. Additionally, brand credibility, which is the trust in the brand itself, shows that these four skincare brands honestly and reliably communicate their product values and benefits. With brand credibility and trust in beauty influencers, Generation Z consumers' review and actual experience with these brands can influence their purchase intentions for Bali Balance, Utama Spice, Bali Alus, and Embun Natural. This study's results align with the Theory of Planned Behavior (TPB), which explains the planned theory regarding the emergence of behavioral intentions. In this study, the trust in beauty influencers providing honest information, supported by brand credibility, can lead to purchase intentions for products such as Bali Balance, Utama Spice, Bali Alus, and Embun Natural. This finding is consistent with research byBhandari & Rodgers. (2020) and Tan et al. (2022), which proved that brand credibility can act as a mediating variable. Beauty influencers or celebrities to promote a product has a

strong influence due to their popularity, where attractive branding by beauty influencers can highly attract consumers, increasing their purchase intentions.

The Influence of Advertising Credibility Mediating the Influence of Beauty Influencer Trust on Purchase Intention for Local Skincare Brands in Bali. The trust in beauty influencers can be mediated by the advertising credibility of local skincare brands in Bali to influence purchase intentions. This analysis indicates that the higher the trust in beauty influencers and good advertising credibility, the more consumer intentions to purchase local skincare brands in Bali will increase. Credibility is the quality, capability, and strength to influence someone to develop trust (Abdi, 2021). Consumers are attracted to advertisements made by beauty influencers they like and feel suit their needs. This study's findings show that the trust in beauty influencers from their reviews of products like Bali Balance, Utama Spice, Bali Alus, and Embun Natural has earned consumer trust. Therefore, with advertising credibility and trust in beauty influencers, consumers viewing honest and attractive ad reviews can influence Generation Z's purchase intentions for products like Bali Balance, Utama Spice, Bali Alus, and Embun Natural. This study's results align with the Theory of Planned Behavior (TPB), which explains the planned theory regarding the emergence of behavioral intentions. In this study, the trust in beauty influencers providing clear information, supported by credible and attractive advertisements, can lead to purchase intentions for products like Bali Balance, Utama Spice, Bali Alus, and Embun Natural. This finding is consistent with research by (Moslehpour et al., 2021; Singh & Banerjee, 2018; Tiwari & Joshi, 2020), which proved that ad credibility, based on ad likability and informativeness, can mediate the relationship between beauty influencers and product purchase intentions. Additionally, research by (Ihzaturrahma & Kusumawati, 2021) concluded that advertising credibility can mediate the relationship between beauty influencers and purchase intentions. This means that well-designed advertisements can positively influence consumer responses, leading to purchase intentions for a product. If an advertisement can generate purchase intentions in potential consumers, it is deemed credible.

CONCLUSIONS

The trust held by beauty influencers in Bali's local skincare brand products has led the public to understand the content they create when conveying or reviewing these products via their social media platforms. Reviews from trusted influencers have been well-executed, resulting in consumers perceiving them as trustworthy and becoming interested in using these products. The advertising credibility conveyed by these brands has instilled trust, leading consumers to intend to purchase these local skincare products. With the trust that beauty influencers have in the products they advertise or promote, consumer interest in these products increases. Credibility can influence purchase intentions because consumers are attracted to advertising created by beauty influencers they like and that meets their needs. The credibility of advertising and the trust in beauty influencers play a significant role in shaping consumer purchase intentions, as demonstrated by engaging videos and creatively presented explanations that align with consumer desires. The novelty in this study is that the growth of consumer trust in a brand introduced by beauty influencers and skincare product advertisements influences consumer purchasing intentions.

The results of this study are only able to explain the consumer behavior of local skincare brands domiciled in the province of Bali, so it is important for further researchers to study consumer behavior more broadly. Future research could expand the population and sample size

to provide broader insights into the factors influencing consumer purchase intentions toward local brands, such as targeting a larger scale of consumers, with a sample size of up to 200 respondents, or targeting consumers across Indonesia. Brands like Bali Balance, Utama Spice, Bali Alus, and Embun Natural are encouraged to maintain their brand image and enhance strong brand awareness to foster good loyalty to these products. The companies behind Bali Balance, Utama Spice, Bali Alus, and Embun Natural are expected to expand their production market networks beyond Bali and develop products to address various skin and hair issues. These companies are advised to continuously improve their corporate image and maintain integrity within their internal operations, such as employee quality.

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Enhancing Innovation Performance by Utilizing Knowledge Management, Strategic Flexibility, and Organizational Creativity

Trisa Diptami P [1)], Budi W. Soetjipto [2),]
[1.2] Faculty of Economics and Business, Universitas Indonesia
Email: trisadiptami@gmail.com

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ABSTRACT

Market turbulence compels SMEs to innovate through strategic flexibility and organizational creativity to maintain a competitive advantage. In Bali, SMEs face challenges such as a lack of organizational creativity, limited understanding of knowledge management, and the pressing need for innovation in a competitive landscape. This study aims to investigate the relationship between innovation performance and factors such as knowledge management, strategic flexibility, and organizational creativity in Bali's SMEs during the COVID-19 pandemic. While dynamic capability is crucial for organizational sustainability, research connecting strategic flexibility and organizational creativity to innovation performance remains scarce. Adopting a quantitative approach, data will be collected through questionnaires distributed to 431 UKM managers. The findings suggest that SMEs that leverage performance standards, engage in effective strategic planning, and embrace diverse ideas can make significant contributions to their industry and effectively meet customer needs.

Keyword: dynamic capabilities theory; innovation performance; knowledge management; organizational creativity; strategic flexibility

INTRODUCTION

Innovation plays a crucial role for organizations seeking to thrive in the face of intense global competition while ensuring the long-term sustainability of their business (Murswieck, 2021). The concept of innovation performance refers to how companies generate, disseminate, and adapt ideas to create new or improved economic and social products and services (Zizka & Rydvalova, 2021). According to the Global Innovation Index (GII), Indonesia ranks 87th out of 132 economies in the 2021 GII, indicating that the nation produces less innovation output relative to its level of investment in innovation (Intellectual Property Organization, 2021). Therefore, it is essential for Indonesia to enhance its innovation efforts to achieve greater innovative output. Innovation is vital for driving economic development (Hartono & Rafik, 2021). Indonesia is home to various regions with significant creative potential, with Bali Province standing out as a prominent example. Renowned for its creativity and innovation, Bali's economy significantly relies on the tourism sector, the primary contributor to its economic landscape. However, this sector has been severely affected by the Covid-19 pandemic, which has brought tourism activities in Bali to a virtual standstill (Pemerintah

Provinsi Bali, 2020).

The development of creative and innovative tourism products rooted in the culture of Bali Province's districts and cities, along with the enhancement of creative industries focused on folk crafts, are vital strategies for boosting Balinese tourism. Additionally, increasing exports of these creative industries and elevating economic value through innovation are essential for fostering the Balinese economy. To achieve this, fresh ideas and innovations are necessary. Innovation has emerged as a core aspect of organizational success across various dimensions, including strategic planning, concept development, customer engagement, market analysis, organizational learning, knowledge management, and the cultivation of organizational culture and leadership (Saunila, 2017). It plays a vital role for organizations aiming to thrive in the competitive global marketplace, thereby ensuring their long-term sustainability. Assessing innovation performance is critical for organizations to effectively manage innovation and improve overall business performance (Murswieck, 2021).

The notion of innovation performance pertains to the methodologies employed by companies to generate, disseminate, and modify ideas aimed at producing new or enhanced economic or social products and services. This principle is vital for translating innovation potential into market realization, which results from either product or process innovation (Zizka & Rydvalova, 2021). It is imperative to evaluate a company's innovation performance prior to its market introduction, as this assessment significantly impacts its overall innovation performance (Murswieck, 2021).

Innovation is essential for organizations, encompassing strategic innovation, market dynamics, and cultural influences (Saunila, 2017). Enhancing culture-based tourism, advancing local crafts, increasing creative industry exports, and elevating economic value through the creative sector are viable solutions. Small and medium enterprises (SMEs) exemplify this scenario. SMEs face numerous challenges due to limited resources (Baral et al., 2021). This predicament poses a threat to the profitability of their profitability and performance (Brahmana et al., 2022). Thus, fostering innovation is vital from various perspectives, including strategic innovation and the influence of organizational culture and leadership (Saunila, 2017).

Organizations must adopt innovation as a core strategy to tackle internal and external challenges for economic development (Hartono & Rafik, 2021). Moreover, prioritizing innovation can improve organizational productivity (Ndzana et al., 2021). Evaluating innovation is essential for identifying improvement areas related to organizational values and actions (Saunila, 2017). However, the factors underlying innovation are not fully understood, indicating a need for further research into the key drivers that enhance organizational innovation performance.

A crucial factor enhancing innovation performance is knowledge management, enabling organizations to discern innovation sources while addressing challenges (Nasution et al., 2021; Usman et al., 2020). Additionally, strategic flexibility serves as a crucial predictor of innovation performance and organizational success (Nyuur et al., 2018). The interplay between knowledge management and strategic efficiency fosters innovation performance, thereby creating sustainable competitive advantages (Aggarwal & Kapoor, 2021). They also enhance subordinate creativity through transformational leadership (Xiao & Wang, 2021). Knowledge management is essential for promoting organizational creativity, particularly within the SME sector, thus enhancing performance (Arsawan et al., 2020). It also plays a significant mediating role between organizational creativity and resources (Nasution et al.,

2021). The combination of effective knowledge management and strategic flexibility leads to positive innovation performance (Gonzalez & Melo, 2017; Sadeghi Boroujerdi et al., 2020; Usman et al., 2020).

This study targeted SMEs in Bali Province for several reasons: Firstly, Balinese SMEs actively participate in significant global markets, including the EU, South Asia, the Middle East, and the Americas. Secondly, there is a market demand for value-added, high-quality products and services that meet established standards, necessitating innovation. Thirdly, SMEs must innovate to navigate environmental uncertainties and market fluctuations (Dinas Koperasi Usaha Kecil dan Menengah Provinsi Bali, 2021). Fourthly, promoting innovation necessitates the integration of flexibility and creativity (Puriwat & Hoonsopon, 2022; Sadeghi Boroujerdi et al., 2020). In this context, SMEs should adopt knowledge management, suitable strategic flexibility, and organizational creativity to foster innovation. This aligns with dynamic capabilities theory, which underscores the importance of dynamic capabilities in sustaining business model innovation for enduring success (Schiavon et al., 2022). Therefore, assessing innovation performance in relation to knowledge management, strategic flexibility, and organizational creativity is both rational and relevant.

This highly volatile environment necessitates the dissolution of the concept of routine-based dynamic capabilities. In a rapidly changing market marked by unpredictable shifts and unclear boundaries, traditional learning routines are ineffective. This ineffectiveness stems from the inadequacy of existing knowledge to fully comprehend and analyze situations, potentially leading to negative outcomes (Andresen, 2021). The way strategic organizational planning can influence the relationship between the board's decisions to adopt developmental objectives and the subsequent organizational planning of those objectives exemplifies the company's dynamic capabilities (Sanchez et al., 2018).

Dynamic capabilities represent a significant factor influencing an organization’s capacity to assimilate, construct, and reconfigure resources and processes aimed at sustainable value generation and competitive superiority across various market contexts (Wenzel et al., 2021). When assessing a corporation's dynamic capabilities, three perspectives warrant consideration. Firstly, organizations must ascertain the identities of employees and managers who are engaged in the transformation process and analyze their interactions. Secondly, it is imperative for practitioners to seek out "dependable outcomes." Lastly, practitioners ought to comprehend the origins of information pertaining to the change (whether opportunities or threats) and the manner in which it is processed (Wenzel et al., 2021).

Knowledge management encompasses an amalgamation of strategies, tools, and methodologies, including approaches for acquiring structured knowledge and technologies that can enhance the efficacy of individual workforces, teams, or entire organizations (Conway, 2020). In essence, knowledge management can be articulated as the undertaking of requisite actions to optimize the utilization of knowledge resources, which provide numerous advantages such as essential business competencies, expedited innovation, reduced time-to-market, invigorated workforce engagement, the development and provision of superior quality products, enhancement of cycle time and decision-making, reinforcement of organizational commitment, and the establishment of a sustainable competitive work environment (Fernandez & Sabherwal, 2015).

Research indicates that knowledge management serves a pivotal function in the processes of knowledge generation, dissemination, and application, which profoundly influences organizational sustainability (Demir et al., 2021). Moreover, the significance of

knowledge management may manifest in its effects on business models and overall business performance, particularly in the context of implementing innovation and facilitating collaborative efforts that can nurture global and inclusive growth in the contemporary digital landscape (Di Vaio et al., 2021). In essence, effective knowledge management positions organizations to better navigate and compete in an increasingly demanding environment.

Knowledge management constitutes a critical determinant in assessing the efficacy of strategic flexibility implementation (Bamel & Bamel, 2018; Kafetzopoulos, 2022). Additionally, knowledge management has the potential to enhance innovation performance by equipping organizations with essential knowledge processes conducive to innovation (Gürlek & Çemberci, 2020; Nazari et al., 2020; Yusr et al., 2017). Ultimately, the adoption of knowledge management practices may bolster organizational creativity, serving as a vital mechanism for survival and fostering organizational development amidst a volatile and ever-changing environment (Islam & Asad, 2021; Patwary et al., 2022). Consequently, the following hypothesis may be formulated:

H1. Knowledge management has a significant positive effect on strategic flexibility.
H2. Knowledge management has a significant positive effect on innovation performance.
H3. Knowledge management has a significant positive effect on organizational creativity.

The concept of strategy typically entails the establishment of objectives, the identification of actions necessary to attain these objectives, and the mobilization of resources to execute these actions. A strategy delineates the manner in which objectives ought to be accomplished utilizing the resources that are currently available. The significance of strategy is underscored by the fact that the resources accessible for the attainment of these objectives are frequently constrained and may be intentional or may evolve as a pattern of activity as the organization adjusts to its environment or engages in competition. Generally, strategy encompasses two principal processes: formulation and implementation. Formulation encompasses the analysis of the environment or situation, the conduction of a diagnosis, and the development of a guiding policy. Conversely, implementation pertains to the action plan devised to realize the objectives established by the guiding policy (Barad, 2018).

The term flexibility possesses various interpretations within the academic literature pertaining to problem-solving, particularly within the domains of educational research and psychology. Certain strategies are categorized as tension flexibility, while others are classified as representational, and additional strategies involve transitioning from one stimulus to another or from one task to another (Clement, 2022).

Strategic flexibility refers to an organization's capacity to react to significant alterations in its external environment by allocating the requisite resources necessary to address these changes (Barad, 2018; Clement, 2022). Strategic flexibility enhances the efficacy of innovation, including analytical and exploitative innovation, technological innovation, management innovation, among others (Xu et al., 2021). This capability is particularly imperative when an organization confronts unforeseen changes, which may yield extensive ramifications, thereby necessitating prompt adaptation (Andersen, Torp, Linder, 2019).

Furthermore, strategic flexibility possesses the capacity to enhance a corporation's potential in the establishment of new markets and the engagement in innovative endeavors (Guo & Cao, 2014; Kafetzopoulos, 2022). The significance of flexibility within

organizations may serve as a catalyst for the generation of novel creative concepts through the adaptability of their strategy, structure, and operations to foster innovation (Saeed et al., 2021). In light of this, the hypothesis may be articulated as follows:

H4. Strategic flexibility has a significant positive effect on innovation performance.

Creativity is typically linked to the generation of novel and beneficial concepts pertaining to products and service practices or protocols that are both innovative and advantageous for organizations, facilitating the extraction of value in either the short or long term, thus contributing to positive sustainability. Consequently, in order to be deemed creative, ideas must deliver business value by engendering new products and services, capitalizing on business opportunities, and/or enhancing organizational efficacy (Islam & Asad, 2021; Sigala & Chalkiti, 2015; Souto, 2022).

Organizational creativity plays a significant mediating role in the relationship between knowledge management and innovation performance. This is exemplified by organizations that harness organizational learning and creativity, which are more likely to experience enhanced innovation outcomes as a result of effective knowledge management practices (Patwary et al., 2022). Investigations indicate that if an organization is capable of providing a work environment conducive to creativity, organizational creativity will be augmented (Chaubey & Sahoo, 2021).

Creativity and innovative solutions are imperative in the management of change and renewal (Patwary et al., 2022). Moreover, it is essential to optimize both the direct and indirect impacts of organizational creativity on sustainability-oriented innovation (Souto, 2022). Accordingly, the hypothesis may be delineated as follows:

H5. Organizational creativity has a significant positive effect on innovation performance.

Innovation performance represents the extent to which a corporation realizes its innovation potential and its capacity to convert such potential into market realization as a result of product or process innovation. The notion of the pressure innovation framework specifically pertains to the process of generating, disseminating, and altering ideas to yield new or improved economic or social outcomes, such as products and services (Zizka & Rydvalova, 2021).

Evaluating innovation performance prior to market introduction is particularly crucial for corporate leaders who manage finite financial, human, and other pertinent business resources. It is vital to comprehend the determinants that influence innovation performance if one aims to enhance the efficiency of the innovation process and the corresponding ultimate performance (Murswieck, 2021).

It is essential to comprehend the determinants that influence innovation performance if one seeks to augment the efficacy of the innovation process and the resultant ultimate performance (Murswieck, 2021). Consistent innovation performance in ongoing innovation audit metrics provides management with control information pertaining to both historical and prospective contexts (Friedl & Kayser, 2018).

Research reveals that strategic flexibility is a crucial competitive advantage linked to organizational resources and knowledge management capabilities (Bamel & Bamel, 2018; Kafetzopoulos, 2022). Additionally, knowledge management significantly enhances innovation performance by providing essential processes for innovation. These improvements result in innovations that elevate organizational performance (Gürlek & Çemberci, 2020; Nazari et al., 2020; Yusr et al., 2017). Conversely, strategic flexibility

primarily drives company performance in innovation by enabling the creation of new products or services and expanding market potential (Guo & Cao, 2014; Kafetzopoulos, 2022). The importance of flexibility within organizations may generate new creative ideas through adaptable strategies, structures, and operations to promote innovation (Saeed et al., 2021). The essential role of knowledge management is to foster strategic flexibility, thereby improving innovation performance. Accordingly, the hypothesis can be stated as follows:

H6. Strategic flexibility mediates the relationship between knowledge management and innovation performance.

Knowledge management can enhance innovation performance by providing necessary knowledge processes for facilitating innovation and ensuring organizational sustainability (Gürlek & Çemberci, 2020; Nazari et al., 2020; Yusr et al., 2017). Furthermore, organizational creativity is vital for the survival and progress of organizations in a complex and unstable environment. Knowledge management practices that stimulate creativity and promote innovation are critical for achieving organizational creativity and improving innovation performance (Islam & Asad, 2021; Patwary et al., 2022; Souto, 2022). Organizational creativity shows a significant positive mediating effect between knowledge management practices and innovation performance, with knowledge management practices identified as the primary determinant of both organizational creativity and innovation performance (Patwary et al., 2022). The role of knowledge management is to enhance organizational creativity, which subsequently boosts innovation performance. Therefore, the seventh hypothesis can be articulated as follows:

H7. Organizational creativity mediates the relationship between knowledge management and innovation performance.

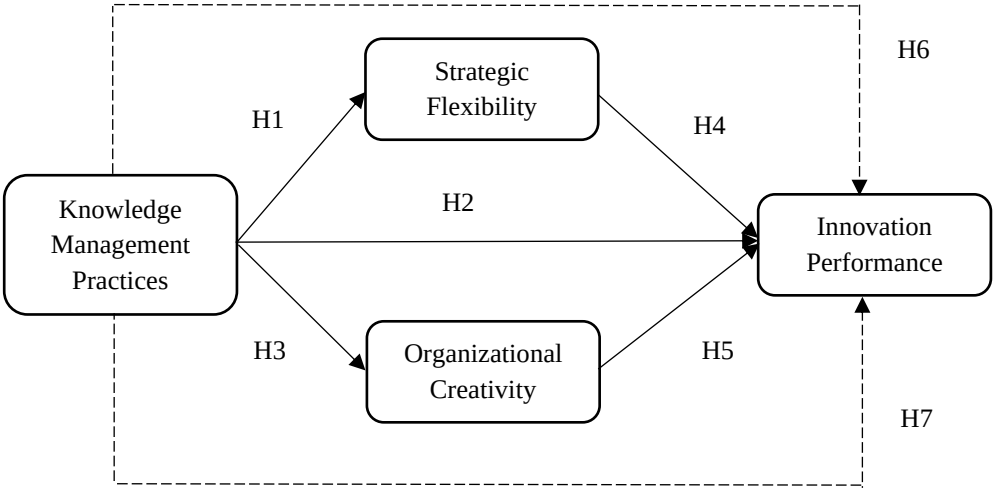

Figure 1. Research Conceptual Model
Source: Author, 2022

METHODS

The research design used is quantitative research, where a group of interrelated constructs or variables are formed into propositions, or hypotheses, which determine the relationship between variables as arguments, discussions, or causes to explain phenomena

that occur in the world (Creswell & David Creswell, 2018). In this study, the phenomena discussed include innovation performance in SMEs in the Province of Bali.

This study aims to investigate the impact of knowledge management, strategic flexibility, and organizational creativity on the innovation performance of Small Trade SMEs, particularly in Bali. The research focuses on a population of 18,838 Small Trade Businesses situated in Bali Province, Indonesia, as documented by the Bali Province Cooperatives and Small and Medium Enterprises Office in 2022 (Dinas Koperasi Usaha Kecil dan Menengah Provinsi Bali, 2022). According to Law Number 20 of 2008, a Small Business is defined as an independent and productive economic entity operated by individuals or business entities that are neither subsidiaries nor branches of larger corporations. These small enterprises must not be owned, controlled, or otherwise connected—either directly or indirectly— to Medium or Large Enterprises, and they must adhere to the criteria specified in this legislation (Pemerintah Indonesia, 2008).

The minimum sample of respondents was selected by the snowball sampling method using the Slovin's formula (1960) with a margin of error of 5%. In this study, the sample data of respondents successfully obtained were 431 SMEs. The data collection method that in this study is distributing questionnaires to 431 Small Trade Business Managers in Bali, Indonesia. Data collection techniques through questionnaires will be carried out by providing pre-determined questions by the researcher and distributing to the respondents. The research questionnaire uses a Likert scale of 1 to 5 (1-strongly disagree to 5-strongly agree) and uses simple and easy-to-understand language so that the research objectives can be achieved. Questionnaires will be distributed to SMEs in Bali Province.

The knowledge management variable is measured by measuring 6 dimensions consisting of knowledge management technology, knowledge management structure, knowledge management culture, knowledge management acquisition, knowledge management conversion process, and knowledge management application process adopted from the study of Hock-Doepgen, Clauss, Kraus, Cheng (2021) and Gold et al. (2001).

The measurement of the strategic flexibility variable uses six indicators adopted from the study of Guo & Cao (2014) which refers to the research of Zahra, Hayton, Neubaum, Dibrell, Craig (2008). Meanwhile, the organizational creativity variable uses five indicators adopted from Souto (2022) which refers to the research of Amabile (1997), Reiter-Palmon and Illies (2004), Borghini (2005), Kraft (2005), and Mitchell and Walinga (2017).

Finally, the measurement of the innovation performance variable uses seven indicators adopted from Wang, Wang, Horng (2010). In measuring this dimension, the author adopted, modified, and elaborated on measurements that best suit the research subject.

The data processing technique used in this study is partial least square–structural equation modeling (PLS-SEM). PLS-SEM is a causal model that aims to maximize the variance explained by the dependent variable (Hair et al., 2017). Additionaly, PLS-SEM can be applied to complex models with multiple indicators, constructs, and relationships, can model formative and reflective variables, and does not require multivariate normality assumptions (D. S. Kumar & Purani, 2018). The data processing technique used in this research is partial least squares-structural equation modeling (PLS-SEM) to estimate the proposed innovation performance model and assess the relationship between variables, both directly and indirectly.

The questionnaire includes a section that requests the respondent's demographic details, such as their tenure at the company, age, company age, and size. The analysis of the demographic data is presented in Table 1, with the following outcomes:

Table 1. Respondent Demographic Data

Characteristics of Respondents	Classification	Frequency	Percentage (%)
Respondent's tenure at the company	Less than 1 year	33	7.7
	1-5 years	152	35.3
	6-10 years	154	35.7
	More than 10 years	92	21.3
Respondent's age	Younger than 20 years	7	1.6
	21-30 years	130	30.2
	31-40 years	174	40.4
	Older than 40 years	120	27.8
Company age	Less than 5 years	62	14.4
	6-10 years	135	31.3
	11-20 years	154	35.7
	More than 20 years	80	18.6
Company size	Less than 50 employees	111	25.8
	50-100 employees	149	34.6
	101-200 employees	128	29.7
	201-500 employees	43	10.0

Source: Author Data Processing Results, 2022

RESULT AND DISCUSSION

The evaluation method utilized in this assessment utilizes SmartPLS to assess the measurement model through reflective indicators. These indicators are deemed to be of high quality if they exhibit a correlation of over 0.70 with the construct under scrutiny. The dataset was derived from the feedback of 431 individuals.

This study applies the bootstrap method with 500 samples to evaluate the significance of the indicators and path coefficients. The results show that the saturated value of the SRMR model is 0.067, and the estimated value of the SRMR model is 0.069. It can be concluded that the observed and expected correlations as an absolute measure of the model are considered suitable.

In addition, testing on the r-square value of the innovation performance variable was obtained at 0.835. This illustrates that 83.5% of the variable innovation performance can be influenced by the variables of knowledge management, organizational creativity, and strategic flexibility.

On the other hand, the r-square value for the organizational creativity variable is 0.658. This illustrates that 65.8% of organizational creativity variables can be influenced by knowledge management variables.

Finally, the r-square value for the strategic flexibility variable is 0.725. This illustrates that 72.5% of the strategic flexibility variable can be influenced by the knowledge management variable. Finally, all variables have positive values, indicating that all variables have good predictive relevance. The following table displays the outcomes of the research instrument's validity test, using a loading factor threshold of 0.70.

Table 2. Measurement Outer Model Variabel Knowledge Management

Variable	Dimensions	Indicator Code	Outer Loading Instrument	Outer Loading Dimensions
Knowledge management	Knowledge management technology	KMT1	0,853	0,846
		KMT2	0,824	
		KMT3	0,823	
	Knowledge management structure	KMS1	0,780	0,837
		KMS2	0,756	
		KMS3	0,820	
		KMS4	0,841	
	Knowledge management culture	KMC1	0,849	0,828
		KMC2	0,836	
		KMC3	0,796	
		KMC4	0,759	
	Knowledge management acquisition process	KMA1	0,802	0,895
		KMA2	0,769	
		KMA3	0,751	
		KMA4	0,802	
		KMA5	0,783	
	Knowledge management conversion process	KMCP1	0,797	0,878
		KMCP2	0,782	
		KMCP3	0,751	
		KMCP4	0,768	
		KMCP5	0,800	
	Knowledge management application process	KMAP1	0,785	0,901
		KMAP2	0,765	
		KMAP3	0,771	
		KMAP4	0,768	
		KMAP5	0,743	
		KMAP6	0,773	
Strategy Flexibility		SF1	0,839	
		SF2	0,781	
		SF3	0,737	
		SF4	0,779	
		SF5	0,719	
		SF6	0,761	
Organizational Creativity		OC1	0,840	
		OC2	0,773	
		OC3	0,770	
		OC4	0,764	
		OC5	0,778	
Innovation Performance		IP1	0,827	
		IP2	0,779	
		IP3	0,748	
		IP4	0,781	
		IP5	0,731	
		IP6	0,725	
		IP7	0,812	

Source: Author Data Processing Results, 2022

Table 3 confirms the five direct relationship hypotheses, according to the analysis results. Firstly, knowledge management and strategic flexibility are significantly related (β= 0.851, STDEV= 0.026, T Statistics= 32.282). Secondly, knowledge management and innovation performance are significantly related (β= 0.207, STDEV= 0.057, T Statistics= 3.663). Thirdly, knowledge management and organizational creativity are significantly related (β= 0.811, STDEV= 0.031, T Statistics= 26.235). Fourthly, there is a significant relationship between strategic flexibility and innovation performance (β= 0.431, STDEV= 0.073, T Statistics= 5.937). Finally, there is a significant relationship between organizational creativity and innovation performance (β= 0.323, STDEV= 0.052, T Statistics= 6.234).

Table 3. Path Coefficients

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T-Statistic (|O/STDEV|)**	**P-Values**
KM -> SF	0.851	0.851	0.026	32.282	0.000
KM -> IP	0.207	0.205	0.057	3.663	0.000
KM -> OC	0.811	0.810	0.031	26.235	0.000
SF -> IP	0.431	0.438	0.073	5.937	0.000
OC -> IP	0.323	0.317	0.052	6.234	0.000

Note: KM – *knowledge management*, SF – *strategic flexibility*, OC – *organizational creativity*, IP – *innovation performance*.
Source: Author Data Processing Results, 2022

According to the analysis results displayed in Table 4, the two hypotheses regarding the mediation relationship have been confirmed. The first hypothesis suggests that strategic flexibility has a considerably positive impact on innovation performance by mediating the influence of knowledge management (β= 0.262, STDEV= 0.045, T Statistics= 5.871). The second hypothesis indicates that the mediation of organizational creativity on the influence of knowledge management on innovation performance is also significantly positive (β= 0.367, STDEV= 0.064, T Statistics= 5.716).

Table 4. Mediation Analysis

	***Original Sample* (O)**	***Sample Mean* (M)**	***Standard Deviation* (STDEV)**	***T-Statistic* (|O/STDEV|)**	***P-Values***
KM -> SF -> IP	0.262	0.257	0.045	5.871	0.000
KM -> OC -> IP	0.367	0.373	0.064	5.716	0.000

Note: KM – *knowledge management*, SF – *strategic flexibility*, OC – *organizational creativity*, IP – *innovation performance*.
Source: Author Data Processing Results, 2022

Based on the explanation above, there are seven hypotheses accepted in the results of this study. This is consistent with the theoretical hypothesis that has been previously addressed. Within the theoretical hypothesis, it is demonstrated that there exists a positive correlation between the variables pertaining to both direct and indirect influence hypotheses.

Initially, a significant correlation is observed between knowledge management and strategic flexibility. This assertion is corroborated by research indicating that knowledge management serves as a critical determinant of the efficacy of strategic flexibility implementation (Bamel & Bamel, 2018; Kafetzopoulos, 2022). The highest outer loading

value within the knowledge management dimension is identified in the knowledge management application process dimension, which stands at 0.901. In this dimension, the instrument exhibiting the highest outer loading value is ascribed to the KMAP1 indicator code, described as "Our organization has a process for using knowledge in solving new problems". Furthermore, strategic flexibility, represented by the indicator code SF1, displays the highest outer loading value of 0.839 with the description "Business strategy planning can capture business opportunities according to economic conditions". Based on the outer loading values, it can be inferred that small and medium-sized enterprises (SMEs) possessing processes for leveraging knowledge in addressing new challenges are capable of formulating business strategy plans that adeptly respond to business opportunities according to economic fluctuations.

Subsequently, a noteworthy influence is evident between knowledge management and innovation performance. This assertion is supported by research that emphasizes the indispensable role of knowledge management in enhancing innovation performance (Gürlek & Çemberci, 2020; Nazari et al., 2020). The direct effect of the knowledge management process as a pivotal determinant of key innovation performance is essential for organizational success and the sustenance of organizational viability within the marketplace (Yusr et al., 2017). The highest outer loading value within the knowledge management dimension is again found in the knowledge management application process dimension, which is quantified at 0.901. Within this dimension, the instrument with the greatest outer loading value is linked to the KMAP1 indicator code, characterized by the statement "Our organization has a process for using knowledge in solving new problems". Additionally, performance, represented by the IP1 indicator code, boasts the highest outer loading value of 0.827 with the assertion "Our new product makes a big contribution to the industry". Based on the outer loading values, it can be concluded that SMEs equipped with processes for utilizing knowledge in addressing new challenges yield products that substantially contribute to the industry.

Thirdly, there exists a substantial impact of knowledge management on organizational creativity. This finding aligns with scholarly research indicating that organizational creativity is deemed essential for sustaining operational viability and fostering innovation within enterprises via knowledge management practices (Islam & Asad, 2021; Patwary et al., 2022). The highest outer loading value within the knowledge management dimension is identified in the knowledge management application process dimension, recorded at 0.901. Within this dimension, the indicator exhibiting the most significant outer loading value is the KMAP1 code, which is defined as "Our organization has a process for using knowledge in solving new problems". Moreover, organizational creativity represented by the OC1 indicator code also holds the largest outer loading value of 0.840, characterized by the statement "There are quite a variety of useful ideas". Consequently, based on the outer loading value, it may be deduced that small and medium-sized enterprises (SMEs) that implement a process for employing knowledge to tackle new challenges generate a diverse array of valuable ideas.

Fourthly, there is a considerable influence of strategic flexibility on innovation performance. This assertion is corroborated by research illustrating that strategic flexibility serves as a principal catalyst for enhancing a company's innovation performance through facilitation of the development of new products or services (Guo & Cao, 2014; Kafetzopoulos, 2022; Saeed et al., 2021). The strategic flexibility indicator, designated as SF1, exhibits the largest outer loading value of 0.839, accompanied by the description "Strategic business planning can attract business opportunities according to economic conditions". Additionally,

the performance indicator coded as IP1 reveals the largest outer loading value of 0.827, articulated by the statement "Our new product makes a big contribution to the industry". Thus, based on the outer loading value, it can be interpreted that SMEs possessing a business strategy that adeptly responds to market opportunities in alignment with economic conditions create products that substantially impact the industry.

Fifthly, a significant influence is observed between organizational creativity and innovation performance. This is substantiated by research indicating that both direct and indirect effects of creativity within a business context can influence the performance and success of innovative enterprises (Patwary et al., 2022; Souto, 2022). The organizational creativity indicator, labeled as OC1, demonstrates the largest outer loading value of 0.840, characterized by the description "There are quite several useful ideas". Furthermore, the performance indicator coded as IP1 also reveals the largest outer loading value of 0.827, supported by the statement "Our new product makes a big contribution to the industry". Accordingly, based on the outer loading value, it can be inferred that SMEs exhibit a diverse range of valuable ideas that facilitate the production of products which significantly contribute to the industry.

Sixth, the mediation of strategic flexibility concerning the effect of knowledge management on innovation performance exhibits a significant positive correlation. This assertion is substantiated by scholarly research which indicates that strategic flexibility is regarded as a source of competitive advantage that is intrinsically linked to organizational resources and the capabilities of the knowledge management process (Bamel & Bamel, 2018; Kafetzopoulos, 2022). The significance of flexibility within organizations serves as a wellspring of innovative ideas by virtue of the adaptability of their strategies, structures, and operations, thereby fostering innovation (Saeed et al., 2021). Strategic flexibility, as denoted by the indicator code SF1, possesses the highest outer loading value of 0.839, accompanied by the description "Business strategy planning can respond to business opportunities according to economic conditions". Furthermore, the highest outer loading value within the knowledge management dimension is identified in the knowledge management application process dimension, which stands at 0.901. Within this dimension, the KMAP1 indicator code is attributed the highest outer loading value, described as "Our organization has a process for using knowledge in solving new problems". Ultimately, innovation performance, as represented by the IP1 indicator code, exhibits the largest outer loading value of 0.827, with the caption "Our new product makes a big contribution to the industry". Based on the outer loading values, one may conclude that SMEs possessing processes for utilizing knowledge to address new challenges yield products that substantially contribute to the industry through the formulation of business strategies that can effectively respond to prevailing economic conditions.

Finally, the mediation of organizational creativity regarding the effect of knowledge management on innovation performance reveals a significant positive correlation. This is affirmed by research which posits that knowledge management practices constitute the most pertinent determinants of organizational creativity and innovation performance (Patwary et al., 2022). The function of knowledge management will enhance organizational creativity, which in turn leads to an augmentation of innovation performance. Organizational creativity, as indicated by the code OC1, exhibits the highest outer loading value of 0.840, accompanied by the description "There are quite a variety of useful ideas". In addition, the highest outer loading value in the knowledge management dimension is again found in the knowledge

management application process dimension, recorded at 0.901. Within this dimension, the KMAP1 indicator code is recognized for possessing the highest outer loading value, with the description "Our organization has a process for using knowledge in solving new problems". Ultimately, innovation performance, denoted by the IP1 indicator code, showcases the largest outer loading value of 0.827, with the caption "Our new product makes a big contribution to the industry". From the outer loading values, it can be concluded that SMEs that implement processes for utilizing knowledge in solving new challenges generate products that make a substantial contribution to the industry, drawing from a considerable variety of valuable ideas.

The implementation of effective knowledge management in product development can enhance organizational creativity, particularly in the context of Small and Medium Enterprises (SMEs) in Bali Province, known for their notable creativity in offerings. The findings of this study may also be applicable to other SMEs in the province that demonstrate high levels of creativity. It is important to recognize that creativity is significant for established companies as well. The results indicate that a majority of respondent companies fall within the 11–20 year age range, highlighting the necessity for established companies to continue innovating to ensure operational continuity.

This study aims to provide insights that can aid managers and practitioners in optimizing knowledge management, strategic flexibility, and organizational creativity to build innovation performance within the SME sector. Several managerial implications arise from the results of this study.

First, concerning knowledge management, it is essential for managers to identify the requirements for maximizing the benefits derived from knowledge resources. This includes ensuring that the company has established procedures for problem-solving, defined operational standards, and processes that adapt to market conditions. Regular discussions among employees about their work and the exchange of information related to business opportunities and conditions with partners are also important.

Second, in the context of strategic flexibility, managers should possess the capability to respond to significant changes in the external environment by allocating appropriate resources. This involves planning business strategies that align with market opportunities and customer needs, as well as developing strategies to address competition and technological advancements.

Third, regarding organizational creativity, managers are encouraged to foster creativity in developing new products or services that contribute to business sustainability. This includes generating unique ideas that are advantageous to the organization and applying these ideas to address emerging challenges.

Lastly, in terms of innovation performance, it is critical for managers to effectively convert innovation potential into marketable outcomes. This entails producing products that meet customer needs and have viable market opportunities, along with the ability to compete with established brands within the industry.

CONCLUSIONS

This study analyzes the relationship between knowledge management, strategic flexibility, and organizational creativity in relation to innovation performance within the SME sector. It identifies strategic flexibility and organizational creativity as intermediary factors in this framework. The study presents three primary conclusions.

First, it confirms that knowledge management, strategic flexibility, and organizational creativity have a positive effect on innovation performance in SMEs. SMEs that possess the necessary knowledge to navigate challenges, adapt strategies to market opportunities, and generate innovative ideas are likely to enhance their contributions to the industry. Second, knowledge management positively influences both strategic flexibility and organizational creativity in SMEs. This suggests that SMEs that leverage knowledge to address challenges are better positioned to develop strategic initiatives and generate ideas essential for capitalizing on market opportunities. Third, strategic flexibility and organizational creativity serve as effective mediators in the relationship between knowledge management and innovation performance in the SME sector. As a result, SMEs that utilize knowledge to tackle new challenges can develop products that significantly enhance their contributions to the industry through responsive strategic planning and valuable ideas.

The researcher also offers several recommendations for future research related to innovation performance in the SME sector. First, in light of the limitations regarding the variables examined in this study, it is suggested to incorporate additional factors that may impact innovation performance, such as leadership. Second, to address limitations in the respondent demographics, research could benefit from including perspectives from various management levels to better represent the organization's current state. Third, due to potential constraints of time, distance, and financial resources that may influence study outcomes, it is recommended to allocate adequate time, maintain proximity, and secure appropriate funding for research efforts to minimize bias. Finally, it should be noted that this study focused exclusively on the Small Trade Business sector, recognizing that regulatory differences across various business sectors could impact the findings.

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Behavioral Biases, Financial Literacy, and Female Investors: the Role of Social Media

Vera Setyadi[1)], Indarto[2)], Dian Indriana[3)]
[1,2,3]Universitas Semarang
Email: verasetyadi@gmail.com

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ABSTRACT

The Indonesian capital market faces challenges in investor growth, particularly with low investment levels among women. Female investors lag behind men in both the number of investors and the value of investments. Despite an increase in the number of female investors, their investment values remain low, indicating limited active participation. This research aims to examine how financial literacy and behavioral biases influence Indonesian female investors decisions, with social media as a moderating variable. Using a sample of 126 female investors, the test was conducted with PLS-SEM. The results showed that regret aversion bias significantly negatively impacts female investors decisions, while financial literacy has a positive and significant effect. Overconfidence bias and herding behavior do not significantly influence investment decisions. Social media does not moderate the effects of these biases and financial literacy on investment decisions but could act as predictor moderation variable with significant positive impact on investment decisions.

Keyword: behavior bias; financial literacy; social media; women's investment decision

INTRODUCTION

Investment is a critical financial decision, involving the commitment of resources for future benefits. Investors seek returns through real assets like land and gold or financial assets such as deposits, stocks, and bonds.In Indonesia, the number of capital market investors has grown rapidly, tripling from 2.4 million in 2019 to 7.4 million in 2021. However, this growth slowed to 38% in 2022 and 5.5% in early 2023, with 10.8 million investors representing only 3.9% of the population as of April 2023. Despite the rise, stock investors remained just 1.5% of the population, lower than in other ASEAN countries (CNBC, 2022). From 2020 to 2023, men dominated Indonesian capital market investments, comprising 62.8% of investors and 80.5% of investment value as of April 2023. Women, while 37.2% of investors, held only 19.5% of the investment value. Although female investors increased by 172%, their investment value grew by just 59%, indicating limited active participation.

Despite these trends, some Indonesian women have achieved significant investment success, such as Ellen May educates on stock investment through social media and seminars, Dea Surjadi leads Golden Gate Ventures, and Melina Subastian is Principal of Investment at Alpha JWC Ventures. Finance Minister Sri Mulyani emphasizes the importance of

understanding investment fundamentals, showcasing the vital role women can play in Indonesia's investment landscape.

Investment decisions are crucial as they shape future financial plans. Rasheed et al. (2018) differentiate between rational investors, who base decisions on clear information and data, and irrational investors, who rely on instinct and feelings. Baker & Ricciardi (2014) emphasize that investment decisions are influenced by both financial analysis and psychological factors, with biases often impacting judgment.

Behavioral biases, systematic errors in judgment (Pompian, 2006), affect financial decisions. These biases are divided into cognitive biases, related to thinking processes, and emotional biases, related to feelings and emotions. Cognitive biases include overconfidence, representativeness, and anchoring, while emotional biases include endowment, self-control, and regret aversion.

This study focuses on overconfidence bias, regret aversion bias, and herding behavior. Overconfidence bias involves excessive confidence in one's abilities and underestimation of risks. Regret aversion bias leads to safer, conservative investments to avoid future regret. Women tend to show higher levels of regret aversion and herding behavior, which is the tendency to follow the majority's actions without independent evaluation (Salem, 2019; Hsu et al., 2021).

Financial literacy, as defined by OJK Regulation No. 76/POJK.07/2016, involves knowledge, skills, confidence, and attitudes that shape financial behavior and improve decision-making and management. High financial literacy helps in understanding investment products, managing risk, selecting goal-oriented instruments, and making rational decisions. The 2022 National Financial Literacy and Inclusion Survey (SNLIK) showed an increase in financial literacy to 49.68% (from 38.03% in 2019), while capital market literacy remained low at 4.11% (down from 4.92% in 2019), highlighting gaps in understanding financial concepts. Among Indonesian women, financial literacy rose from 36% in 2019 to 50% in 2022, with financial inclusion increasing from 75.1% to 83.9%, indicating greater use and understanding of financial products and risks, offering potential to boost female participation in the capital market.

Research on women's investment decisions reveals key insights. Hsu et al. (2021) found that women in Taiwan exhibit higher regret aversion bias than men, but financial literacy reduces these gender differences in biases. Studies by Almenberg (2015) show that women are generally more risk-averse and participate less in the stock market than men. However, with high financial literacy, both genders equally invest in risky assets. Increased financial literacy also decreases the likelihood of encountering behavioral biases (Rasool, 2020).

Women prefer investing in mutual funds, deposits, and gold, often diversifying their portfolios to minimize risk (Koti, 2019). Salem (2019) noted that women exhibit higher herding behavior and lower financial literacy, confidence, and risk tolerance than men, resulting in lower stock investments. Female entrepreneurs are generally risk-averse and conservative due to limited time and knowledge about investment products (Kappal & Rastogi, 2020; Baig et al., 2021).

Studies on Indonesian women’s investment decisions, such as Mahastanti (2014) and Winarta (2018), show that these decisions are influenced by family and close friends, leading to conservative, low-risk investments due to low financial literacy. Conversely, Susanto et al.

(2023) found that Indonesian doctoral students take higher risks than men, which contrasts with earlier studies.

Research by Yeh & Ling (2022), Fadli & Wijayanto (2020), Adil et al. (2022), Iram et al. (2023), and Weixiang et al. (2022) showed that financial literacy positively impacts investment decisions. However Ady (2019), and Arif (2015) found no such influence. Studies on overconfidence bias and herding behavior also show mixed results. Kartini & Nahda (2021) found both biases significantly affect investment decisions, whereas Bakar & Yi (2016) found only overconfidence bias to be significant. Ton & Dao (2014) found no significant effect of overconfidence bias, while Adil et al. (2022) found herding behavior negatively impacted investment decisions and overconfidence bias positively impacted male but not female investors.

Weixiang et al. (2022) and Suresh G (2021) concluded that overconfidence bias, regret aversion bias, and financial literacy significantly impact stock market investment decisions. Conversely, Ady & Hidayat (2019) found that financial literacy and regret aversion bias did not significantly affect investment decisions, while overconfidence bias did. Iram et al. (2021) found regret aversion bias insignificant but financial literacy significant in investment decisions. Overall, these studies suggest that financial literacy and behavioral biases like overconfidence, regret aversion, and herding behavior are crucial in shaping investment decisions, with financial literacy often mitigating the impact of biases.

In the digital era, social media has become crucial for exchanging investment and financial information. A 2022 Populix survey of 1,038 Indonesians revealed that 68% seek investment information via social media, primarily YouTube and Instagram (75% each). Other platforms include WhatsApp (38%), TikTok (37%), and Facebook (36%). Additionally, 42% use the OJK site, 40% consult friends or colleagues, 34% visit financial institution sites, and 32% follow influencer recommendations.

Social media impacts investment decisions by providing broader access to information, improving financial literacy, and reducing heuristic biases. However, it can also confuse investors and increase behavioral biases like herding bias. Despite its potential impact, no research has explored social media as a moderating variable between behavioral bias, financial literacy, and investment decisions. Previous studies, such as Junaidi (2023), indicate that social media and capital market literacy positively impact investor trading behavior. Social media significantly influences investment decisions (Junaidi, 2023; Subramanian, 2021; Abu-Taleb, 2021) and mediates the relationship between financial literacy and financial behavior (Khan & Ahmad, 2022). Yanto et al. (2021) highlighted social media's role in building financial literacy.

The role of social media in investment decision-making still requires further exploration, particularly in the context of its influence on behavioral bias and financial literacy. Therefore, this study introduces the novelty of social media as a moderating variable in the relationship between behavioral bias, financial literacy, and investment decisions, an aspect rarely explored. Additionally, it brings novelty by examining Indonesian female investors' investment decisions, offering new insights into this underrepresented group.

Overconfidence bias, where investors believe their decisions are superior, affects women's investment decisions, leading to higher risk-taking and overly optimistic assessments (Baker et al., 2019). Studies show overconfidence bias significantly impacts investment decisions (Kartini, 2021; Ady & Hidayat, 2019; Weixiang et al., 2022; Suresh, 2021; Iram et al., 2023). Therefore, the hypothesis is:

H1: Overconfidence bias significantly affects investment decision-making.

Regret aversion bias leads individuals to avoid decisions that might result in regret, opting for safer investments. Women often exhibit higher levels of this bias, resulting in conservative strategies (Pompian, 2006; Salem, 2019; Hsu et al., 2021). Research confirms regret aversion bias significantly influences investment decisions (Suresh, 2021). Thus, the hypothesis is:

H2: Regret aversion bias significantly affects investment decision-making.

Herding behavior involves following the majority's decisions without independent analysis, often leading to irrational decision-making. This can influence women to follow group actions. Studies show herding behavior significantly impacts investment decisions (Kartini, 2021; Suresh, 2021; Adil, 2021). Therefore, the hypothesis is:

H3: Herding behavior significantly affects investment decision-making.

Financial literacy involves understanding financial concepts and risks, essential for effective financial decision-making. Studies demonstrate that financial literacy significantly impacts investment decisions (Adil, 2021; Suresh, 2021; Yeh et al., 2021; Fadli et al., 2020; Weixiang et al., 2022; Iram et al., 2023). Thus, the hypothesis is:

H4: Financial literacy significantly affects investment decision-making.

Social media influences investment behavior by providing information and facilitating discussions. It can have positive effects by offering real-time information but can also negatively affect those who cannot critically analyze the information (Ismail et al., 2018). However, it can also have negative effects if users cannot critically analyze the information. Research by Junaidi (2023), Subramanian (2021), and Abu-Taleb (2021) shows that social media significantly influences investment decisions. This study aims to explore social media's moderating role in the relationship between behavioral biases and investment decisions, hypothesizing:

H5: Social media significantly affects investment decision-making.

H6: Social media moderates the influence of overconfidence bias on investment decision-making.

H7: Social media moderates the influence of regret aversion bias on investment decision-making.

H8: Social media moderates the influence of herding behavior on investment decision-making.

H9: Social media moderates the influence of financial literacy on investment decision-making.

By examining these hypotheses, this study seeks to provide insights into how social media interacts with behavioral biases and financial literacy to influence investment decisions among Indonesian women.

METHODS

This study employed purposive sampling to select Indonesian female investors who have been investing in the capital market for at least six months. This criterion ensures that respondents have sufficient investment experience and are not merely experimenting with investing. The study was conducted from November 2023 to February 2024, and data were collected through an online questionnaire distributed via personal WhatsApp messages, stock investor groups, and capital market study groups.

The sample size was determined based on the guidelines provided by Hair et al. (2013, 2017), which recommend that the minimum sample size for Structural Equation Modeling

(SEM) should be 5 to 10 times the number of indicators. With 26 indicators, the minimum required sample size was calculated as 26 × 5 = 125 respondents. A total of 134 responses were collected, but 8 responses were excluded as they did not meet the criteria (male respondents or those without investment experience). This resulted in a final sample of 126 valid respondents.

The study utilized quantitative data collected through structured questionnaires. The questionnaire consisted of five sections: demographic profile, financial literacy, behavioral biases (overconfidence bias, regret aversion bias, and herding behavior), social media usage, and investment decisions). Responses were measured using a Likert scale. The study focused on retail investors, who are individual investors using personal funds rather than institutional investors. This study was conducted in Indonesia, but no specific region was targeted, as the questionnaire was distributed online, allowing participation from female investors across different regions. The collected data were analyzed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS-SEM) approach. The analysis was performed using SmartPLS 3.0 software, which is widely used for testing complex relationships between latent variables.

Table 1. Variables and Indicators

Variable	Operational Definition	Indicators	Source
Overconfidence bias	The tendency of individuals to be overly confident in their knowledge and abilities when considering investment risks (Baker et al., 2021).	Confidence in own opinion over financial analysts' opinions; Belief that personal investment performance is better than the market; Past investment success attributed to personal skills; Belief that personal skills and knowledge can outperform the market.	Baker et al. (2021)
Regret aversion bias	The tendency of investors to regret certain processes in investment decisions due to failure in providing expected returns (Talha et al., 2015).	Experience of investment losses; Feelings of regret when investing; Impact of loss experience on future investments.	Ady, Hidayat (2019)
Herding behavior	The tendency of individuals to follow the decisions and reactions of other investors (Baker et al., 2021).	Investment decisions influenced by other investors; Following social blogs/forums before buying stocks; Following other investors' reactions to stock price changes; Consulting family, friends, or colleagues before buying stocks.	Baker et al. (2021)
Financial literacy	The ability to manage funds to ensure growth and improve future well-being (Putri & Hamidi, 2019).	Budget planning; Banking knowledge (savings and loans); Insurance ownership; Investment portfolio.	Putri & Hamidi (2019)
Social media	Computer-based technology that facilitates the sharing of ideas, thoughts, and information through virtual networks and communities (Tandon, 2022).	Frequency of searching for investment information on social media; Investment decisions based on social media recommendations; Trust in financial experts on social media; Peer pressure on social media influencing investment decisions; Investment in companies with a good/strong image.	Abu-Taleb & Nilsson (2021)
Investment decision	Policy involving two or more investment alternatives with the expectation of future profits (Ady, 2019).	Allocation of part of monthly income for investments; Investment consideration; Willingness to spend all income on high-return investments; Investment based on quick and accurate calculations.	Ady, Hidayat (2019)

RESULT AND DISCUSSION

The characteristics of the respondents include age, education level, occupation, income, investment experience and frequency, and the percentage of income allocated to investments.

Table 2. Data Descriptions

Indicator	Explanation	Frequency	%
Age	18- 26 years old (Gen Z)	20	16
	27- 42 years old (Gen Millennial)	77	61
	43 - 58 years old (Gen X)	29	23
Education	Junior High School	1	1
	High schoolers	9	7
	D3	8	6
	Bachelor	88	70
	≥ Magister	20	16
Occupation	Private Employee	88	70
	Students	13	10
	Entrepreneur/Self employed	7	6
	Housewives	6	5
	Civil servants	4	3
	Others	8	6
Income	≤ Rp 5.000.000	25	20
	Rp 5.000.001 - Rp 15.000.000	72	57
	Rp 15.000.001 -Rp 25.000.000	15	12
	≥ Rp 25.000.000	14	11
Investment	0,5 - 3,5 years	74	59
Experience	4 - 7 years	24	19
	7,5 - 10,5 years	20	16
	14,5 - 17,5 years	5	4
	18 - 21 years	2	2
	21,5 - 24,5 years	1	1
Investment	1 - 7 times per month	107	85
Frequency	8 - 14 times per month	8	6
	15 - 21 times per month	4	3
	29 - 35 times per month	5	4
	36 - 42 times per month	1	1
	50- 56 times per month	1	1
Percentage of	1 - 11 %	66	52
Investment from	12 - 22 %	24	19
Income	23 - 33 %	15	12
	34 - 44 %	2	2
	45 - 55 %	13	10
	56 - 66 %	2	2
	67 - 77 %	2	2
	78 - 88 %	2	2
Source of Investment	Instagram	42	21
Information	WhatsApp	42	21
	YouTube	37	18
	Friend/Colleague	26	13
	TikTok	9	4
	Family	8	4
	Telegram	8	4
	Website/Business News	8	4
	Bank/Application	6	3
	Others	19	7

Source: Data is processed with Excel, 2024

The majority of respondents were millennials aged 27-42 years, comprising 61% of the total (77 respondents). Generation X (43-58 years) made up 23% (29 respondents), and Generation Z (18-26 years) accounted for 16% (20 respondents). Millennials dominated the sample due to their productive age, better financial status compared to Generation Z, and greater willingness to take investment risks compared to Generation X.

Regarding education, most respondents (70%) held a bachelor's degree (88 respondents), followed by 16% (20 respondents) with a master's degree or higher, 8% (10 respondents) with a high school education or equivalent, and 6% (8 respondents) with an associate degree (D3). The prevalence of bachelor's degree holders is consistent with current societal norms, where higher education levels increase investment knowledge and awareness.

In terms of occupation, 70% of respondents (88 respondents) were private employees, 10% (13 respondents) were students, 6% (7 respondents) were self-employed, 5% (6 respondents) were housewives, and 9% (12 respondents) were civil servants or held other professions. The dominance of private employees reflects the prevalent employment type in Indonesia.

Income-wise, 57% of respondents (72 respondents) earned between Rp 5,000,001 and Rp 15 million per month. Those earning ≤ Rp 5 million accounted for 20% (25 respondents), 12% (15 respondents) earned between Rp 15,000,001 and Rp 25 million, and 11% (14) earned ≥ Rp 25 million. The income distribution aligns with the predominance of millennials working as private employees.

Regarding investment experience, 59% of respondents had been investing for 0.5 to 3.5 years, 19% for 4 to 7 years, and 22% for ≥ 7.5 years, indicating a preference for long-term investment. All self-employed respondents had been investing for ≥ 10 years, reflecting their greater experience and risk tolerance. Investment experience showed that respondents with incomes < Rp 25 million predominantly invested for 0.5 to 3.5 years, while those with incomes ≥ Rp 25 million typically invested for 4 to 10.5 years, indicating higher income correlates with longer investment durations.

In terms of investment frequency, 85% of respondents invested 1 to 7 times per month, while 15% invested 8 to 50 times per month. When looking at the percentage of income allocated to investments, 52% of respondents invested 1 to 11% of their income, 19% allocated 12 to 22%, and 29% allocated 23 to 80%.

Most respondents obtained investment information from social media platforms, with Instagram and WhatsApp being the primary sources for 21% each, and YouTube for 18%. Information from friends and family accounted for 13% and 4%, respectively. There were generational differences in preferred social media platforms: Generation Z primarily used YouTube, Millennials preferred Instagram, and Generation X used WhatsApp. For self-employed respondents, friends and colleagues were the main sources of investment information rather than social media.

Table 3. Variables Descriptions

Indicator	Index	Criteria
Average index of variable Y (Investment Decision)	88,2	Moderate
Average index of variable X1 (Overconfidence Bias)	80,15	Moderate
Average index of variable X2 (Regret aversion Bias)	78,8	Moderate
Average index of variable X3 (Herding Behavior	73,8	Moderate
Average index of variable X4 (Financial Literacy)	97,15	High
Average index of variable Z (Social media)	73.52	Moderate

Source: Data is processed by Three Box Method, 2024

The average response regarding investment decisions was 88.2, indicating a moderate level and suggesting that female investor's decisions are not yet optimal. The lowest indicator, willingness to invest all income for higher returns, scored moderately, reflecting cautious behavior. Respondents typically allocate part of their income to diverse instruments, invest regularly and cautiously, conduct technical and fundamental analyses, seek references, understand investment tools, prefer low-risk and value investments, time their investments wisely, and align decisions with personal risk profiles. These responses highlight thoughtful, risk-conscious investing using surplus income.

The average response regarding overconfidence bias was 80.15, indicating a moderate level. Responses revealed mixed confidence levels: some respondents were confident in their investment decisions due to understanding risks, following financial advisors' advice, having relevant backgrounds, and thorough analysis. Others lacked confidence due to limited knowledge, reliance on intuition, or being conservative investors.

The average response regarding regret aversion bias was 78.8 indicating a moderate level. The highest indicator, experience of investment loss was high, showing that respondents had experienced losses. Other indicators, such as feeling regret while investing and the impact of past losses on future investments were moderate, suggesting that female investors remain interested in investing despite past losses. Responses revealed varied levels of fear in making investment decisions: some managed this fear by studying market trends, conducting regular evaluations, and consulting with knowledgeable friends, while others relied on conservative investments and careful financial management.

The average response regarding herding behavior was 73.8, indicating a moderate level. Responses showed that most respondents were not easily influenced by others due to past negative experiences, confidence in their own analysis, and awareness of personal investment styles and risk profiles.

The average response regarding financial literacy was 97.15, indicating a high level. Responses indicated that most respondents felt they had good financial literacy, often tracking income and expenses, engaging in financial planning, and having relevant educational and experiential backgrounds. However, some acknowledged needing more knowledge in specific areas like risk calculation and financial management.

The average response regarding social media was 73.52 indicating a moderate level. Responses indicated social media primarily as an information source to track the latest investment trends and global news that may affect stock prices, monitor market trends, follow bond offerings, and analyze fundamental reviews from experts to gain insights for decision-making. Additionally, they follow credible investment accounts, engage in discussion forums, learn from others' experiences, seek reliable content that teaches proper techniques, and avoid FOMO-driven decisions.

Convergent validity was assessed using outer loading values, with a threshold of greater than 0.60. The correlation between constructs and their respective variables met this standard, indicating that the indicators for each variable can be used as valid representatives of the research variables after the second convergent validity test.

Table 4. Convergent Validity Test

Indikator	Mod 1	Mod 2	Mod 3	Mod 4	Over (OB)	Regret (RAB)	Herd (HB)	Finlit (FL)	Inv (ID)	Sosmed (SM)
Mod 1 (OB*SM)	1,172									
Mod 2 (RAB*SM)		1,031								
Mod 3 (HB*SM)			1,097							
Mod 4 (FL*SM)				0.915						
X12					0.769					
X13					0.789					
X14					0.899					
X22						0.829				
X23						0.930				
X33							0.763			
X34							0.973			
X42								0.817		
X43								0.776		
X44								0.786		
Y1									0.776	
Y2									0.832	
Y4									0.764	
Z1										0.867
Z2										0.747
Z3										0.742

Source: Processed data using Smart PLS 3, 2024

Table 5. Average Variance Extracted (AVE) and Composite Reliability

Variabel	AVE	Composite Reliability
Mod 1 (Over*Sosmed)	1,000	1,000
Mod 2 (Reg*Sosmed)	1,000	1,000
Mod 3 (Herd*Sosmed)	1,000	1,000
Mod 4 (Finlit*Sosmed)	1,000	1,000
Overconfidence Bias	0.674	0.860
Regret Aversion Bias	0.776	0.874
Herding Behavior	0.764	0.865
Finance Literacy	0.629	0.836
Investment Decision	0.627	0.834
Social Media	0.620	0.830

Source: Processed data using Smart PLS 3, 2024

Discriminant validity was measured using AVE values for each construct, with a standard threshold of above 0.50. All variables met this standard, indicating that the validity test using AVE for each variable satisfied the requirements for research data validity. Reliability was evaluated using composite reliability values, with a criterion of greater than 0.70. Each variable achieved a value above this threshold, suggesting that all research variables are reliable. This implies that the variables in this study are consistent and dependable.

The R-Square value for investment decisions was 0.349, indicating that 34.9% of the variance in investment decisions is explained by the independent variables in the model. The remaining 65.1% is influenced by other factors not included in this research model.

Table 6. Test for Independent and Moderation Variables on Dependent Variables

Variables	Original Sample (O)	T Statistics (|O/STDEV|)	P Values	Result
Over -> Inv	0.133	1,174	0.241	Rejected
Regret -> Inv	-0.277	3,207	0.001	Accepted
Herd -> Inv	0.077	0.647	0.518	Rejected
Finlit -> Inv	0.321	3,432	0.001	Accepted
Sosmed -> Inv	0.207	2,251	0.025	Accepted
Mod 1 -> Inv	0.051	0.476	0.634	Rejected
Mod 2 -> Inv	0.138	1,466	0.143	Rejected
Mod 3 -> Inv	-0.180	1,635	0.103	Rejected
Mod 4 -> Inv	-0.081	0.706	0.481	Rejected

Source: Processed data using Smart PLS 3, 2024

Table 6 shows that H1 is rejected, implying no significant effect of overconfidence bias on investment decisions (p-value = 0.241). Meanwhile, H2 is accepted, indicating that regret aversion bias negatively affects investment decisions (p-value = 0.001). H3 is rejected, meaning that herding behavior does not significantly influence investment decisions (p-value = 0.518). H4 is accepted, showing that financial literacy positively impacts investment decisions (p-value = 0.001). H5 is also accepted, indicating that social media significantly influences investment decisions (p-value = 0.025). The moderation effects of the other variables (Mod 1, Mod 2, Mod 3, Mod 4) on investment decisions were insignificant (p-values > 0.05), suggesting these variables do not significantly impact investment choices, contradicting H6, H7, H8 and H9. These results highlight that while financial literacy and social media play important roles in shaping investment decisions, overconfidence bias, herding behavior, and the other moderator variables do not have significant effects.

In this study, the relationship between overconfidence bias and investment decisions showed a positive but not significant value. This result contrasts with findings by Kartini (2021), Ady and Hidayat (2019), Suresh (2021), and Iram et al. (2023), which indicated a significant impact of overconfidence bias on investment decisions. However, it aligns with Ton and Dao (2014), suggesting that overconfidence bias does not affect investment decisions. This also corroborates Adil (2021), who found no significant impact of overconfidence bias on female investors' decisions. Confidence is subjective and varies per individual, explaining why overconfidence bias might not influence investment decisions.

The respondents were primarily millennials (61%) aged 27-42 and Generation X (23%) aged 43-58, with 41% having over four years of investment experience, indicating that older, more experienced investors are less influenced by overconfidence bias. Mature investors manage emotions better, while younger investors are more prone to overconfidence. Experience boosts confidence, as knowledgeable investors feel more responsible for their decisions. Educationally, 70% held a bachelor's degree and 16% a master's, suggesting that higher education reduces overconfidence by promoting cautious decision-making. Middle-income respondents, earning Rp 5,000,001 to Rp 15,000,000 (57%), showed less overconfidence bias, aligning with findings that high-income investors are more prone to it (Elizabeth, 2020). Most respondents, being middle- or lower-income, invested cautiously,

allocating only 1-11% of their income and investing 1-7 times monthly. The moderate overconfidence bias index indicates that respondents did not exhibit excessive confidence. Adil (2021) noted that financial literacy lowers overconfidence, as female respondents demonstrated confidence due to thorough analysis, reflecting sufficient financial literacy.

Regarding regret aversion bias, the study found a significant negative relationship with investment decisions, indicating that higher regret aversion bias reduces investment decisions. This aligns with Weixiang et al. (2022), Suresh (2021), and Kengatharan and Kengatharan (2014). The dominance of millennials and Generation X respondents supports the notion that older generations with more experience exhibit regret aversion in investment decisions. Millennial's fear repeating past losses. Tang (2023) found no regret aversion bias among young Indonesian investors (Generation Z), who are influenced by peer opinions and social status.

Respondent's characteristics, dominated by those with a bachelor's degree (70%), with 0.5-3.5 years of investment experience and a monthly investment frequency of 1-7 times, allocating 1-11% of their income, indicate a lack of confidence and experience, leading to regret aversion bias in investment decisions. Private employees (70%) displayed regret aversion bias, likely due to dependence on their jobs for income and lack of financial freedom, fearing poor investment outcomes. Middle-income respondents also showed regret aversion bias, as they still need funds for daily life, fearing regret from unsuccessful investments. With an average regret aversion bias index at a moderate level, the high score on the indicator for past investment loss experiences suggests that respondents exhibit significant regret aversion. Hsu et al. (2021) found that Taiwanese female investors exhibit higher regret aversion bias. Weixiang (2022) noted that regret aversion causes investors to regret specific investment decisions. Most female respondents feared making wrong decisions, opting for low-risk investments, indicating significant regret aversion.

Regarding herding behavior, the study showed a positive but insignificant relationship with investment decisions. This contradicts Kartini (2021), Weixiang et al. (2022), Suresh (2021) and Adil (2021), who found a significant impact of herding behavior. However, it aligns with Bakar and Yi (2016), Ton and Dao (2014) and Alquraan et al. (2016), indicating no significant impact. Indonesian women investors showed no herding behavior, contrary to Mahastanti (2014) and Winarta (2018), who found that family and friends influenced Indonesian women's investment decisions, indicating a shift in behavior over time.

The dominance of millennials (61%) and Generation X (23%) respondents, with 41% having over four years of investment experience, supports findings that older, experienced investors are less influenced by herding behavior. Usriyono (2023) found that herding behavior does not significantly affect Indonesian millennials' investment decisions. Baker et al. (2018) found that older investors are less likely to seek references from others. Shusha and Touny (2016) showed that more experienced investors are less prone to herding behavior, making decisions more carefully. Respondent's characteristics, with 70% having a bachelor's degree and 16% a master's degree, indicate that higher education levels reduce herding behavior. Shusha and Touny (2016) found that education negatively impacts herding behavior, with higher-educated investors making more informed decisions. Private employees (70%) with non-finance-related jobs tend to exhibit higher herding behavior due to limited investment understanding (Elizabeth, 2020; Sarkar and Sahu, 2018). The study by Shusha & Touny (2016) found that investors with upper-middle income are more likely to exhibit herding behavior compared to those with lower-middle income. The herding behavior index

of 73.8, with the lowest indicator being influenced by other investors' decisions (68), suggested respondents were not heavily influenced by others. Bakar and Yi (2016) stated that most investors do not follow market trends blindly. Respondents are not easily influenced due to past losses when following others' advice, understanding that each person's analysis and risk profile differ, and knowing how to analyze stocks (fundamental and technical) before making investment decisions. Female investors tend to be cautious and avoid following the actions of other investors in their decision-making.

Regarding financial literacy, the study found a significant positive relationship with investment decisions. This aligns with Yeh et al. (2021), Fadli et al. (2020), Weixiang et al. (2022), Suresh (2021), Adil (2021), Iram et al. (2023), and Iram et al. (2021). Higher financial literacy helps female investors make better-informed decisions, understanding financial products, strategies, and risks.

The dominance of millennials (61%) and Generation X (23%) respondents with over four years of investment experience indicates good financial literacy. Shaari et al. (2013) found that age affects financial literacy, with younger individuals having lower literacy due to limited financial experience. Respondents' characteristics, with 70% having a bachelor's degree and 16% a master's degree, indicate higher financial literacy. Higher education levels correlate with better financial literacy, impacting investment decisions positively. Most respondents (70%) were private employees with limited investment experience located at Jakarta, Tangerang, Semarang. Urban location likely contributed to higher financial literacy. Respondents with average monthly incomes of Rp 5,000,001 to Rp 15,000,000 (57%) showed good financial literacy. Suresh (2021) stated that financial literacy improves investors' knowledge, aiding in better stock selection and risk management. Most female respondents reported adequate financial literacy, utilizing resources like financial planning, seminars, and social media for investment education.

Regarding social media, the study found a significant positive relationship with investment decisions. This aligns with Junaidi (2023) and Abu-Taleb (2021), who found social media significantly impacts investment decisions. Subramanian (2021) noted that social media content affects users, particularly in financial investments. The dominance of millennials (61%) indicates that technology-savvy individuals utilize social media for investment decisions. Aziz (2016) found a positive relationship between attitudes toward social media use and behavioral intention, with age influencing this connection. Younger consumers use social media more intensively, while social network size decreases with age. Millennials, being the first to adopt social media as their primary communication tool, are more easily influenced by it in both professional and personal contexts. Respondent’s characteristics, with 70% having a bachelor's degree and 16% a master's degree, suggest higher education correlates with social media use in investment decisions. Aziz (2016) found a positive relationship between attitudes toward social media use and behavioral intention, with education acting as a moderating factor. Highly educated consumers tend to use social media more intensively for communication and view information-oriented platforms like online forums as offering greater connectivity benefits. Most respondents (70%) were private employees, supporting findings that higher education levels correlate with social media use for investment decisions due to better access to relevant information and resources. Middle-income respondents (57%) used social media for investment information, indicating its role in accessible, relevant investment guidance. The social media variable index is moderate, averaging 73.52. The highest score, 91.4, is for investing in companies with a good social media image, while the lowest, 59.4, is for Peer

Influence, indicating respondents prefer using social media for personal analysis over following others. Abu Taleb (2021) highlights the importance of online information for investment decisions, especially due to social media's accessibility and real-time updates. Most respondents, primarily millennial women with higher education and moderate income, use social media for learning analysis, gathering news, and following credible accounts.

This study also provides novelty by demonstrating that social media plays a significant role in investment decisions but does not function as a moderator. Instead, it acts as a direct influencing factor, suggesting that female investors utilize social media primarily as an information source rather than as a behavioral reinforcement tool.

This study found that social media does not significantly moderate the effects of overconfidence bias, regret aversion bias, herding behavior, and financial literacy on investment decisions. Despite its significance as a predictor, social media doesn't impact how these factors influence decisions, possibly due to concerns over the accuracy of social media information. Kumari (2017) stated that people do not fully trust social media information and rely on other sources for investment decisions due to confusion, criticism, increased risk, and irrationality. Supported by strong financial literacy, these cautious investors rely more on personal analysis than on social media. Murthi (2023) similarly notes that robo-advisors, a type of social media technology, do not moderate overconfidence bias as investors prefer making decisions independently.

CONCLUSIONS

This study provides empirical evidence on the role of behavioral biases, financial literacy, and social media in shaping female investors' decision-making. The study found that regret aversion bias negatively impacts investment decisions, while financial literacy and social media positively impact investment decisions. Overconfidence bias and herding behavior did not significantly influence investment decisions in this study. However, social media does not significantly moderate the influence of behavioral biases and financial literacy on investment decisions; instead, it serves as a predictor moderation, introducing novelty in understanding social media's role in investment behavior. This suggests that female investors use social media primarily as an informational tool rather than as a factor that amplifies behavioral biases. This perspective provides new insights into the digital transformation of investment behavior and calls for further research into how social media can be leveraged for financial education.

The theoretical implications of this research contribute to management science by highlighting that one of the factors influencing women's investment decisions is the irrational behavioral bias of regret aversion. This fear of making suboptimal decisions leads female investors to adopt more conservative investment strategies, choosing more stable and conservative financial instruments like bonds and money market mutual funds over riskier options like stocks. This behavior affects the value of Indonesian women's investments in the capital market. The study supports Prospect Theory, which suggests that individuals faced with two choices tend to be risk-averse and choose safer options to avoid future regret. Risk-averse individuals make decisions based on their own evaluations of profit and loss prospects, lacking excessive confidence and not following others' opinions. This is evidenced by the study's findings that investment decisions are not influenced by overconfidence bias and herding behavior.

The practical implications of this study are directed towards female investors and market investment consultants. Understanding psychological biases and the role of social media can help financial advisors and investors make more informed, rational investment decisions, contributing to more effective investment strategies and financial planning. Higher financial literacy and cautious use of social media can mitigate the impact of psychological biases, promoting better investment outcomes. Investors should improve financial literacy through education and experience to enhance decision-making capabilities. Utilizing social media for up-to-date information can aid in better investment choices, but caution is advised to avoid misinformation. Addressing regret aversion bias through education and experience can help investors make more rational decisions. Recognizing that overconfidence does not significantly affect their investment decisions can help them avoid emotional traps and focus on thorough analysis and objective assessment of investment opportunities. This can reduce the risk of errors and lead to better long-term investment decisions. Utilizing financial technology can assist female investors in conducting more structured investment analyses. Understanding that herding behavior does not significantly affect the market in the short term allows them to focus more on fundamental research and analysis, avoiding the pressure to follow the crowd, which may not always yield optimal results. This enables female investors to maintain greater control over their investment portfolios and improve their chances of achieving long-term financial goals. Financial advisors should tailor strategies considering investors' psychological biases and social media's role in modern investment behavior.

The limitations of this study include that social media has not been able to act as a moderating variable for the influence of overconfidence bias, regret aversion bias, herding behavior, and financial literacy on investment decisions. This may be due to respondent's understanding of behavioral biases and questionnaire items, as well as the measurement of the social media variable. Data collection was conducted online using Google Forms distributed through WhatsApp, Telegram, and other means, which may have led to respondent's limited understanding of behavioral bias variables and questionnaire items. Additionally, researchers could not provide direct assistance to respondents, which might have led to questions during the questionnaire completion process. Although social media did not act as a moderating variable, it may serve as an intervening or control variable. Overconfidence bias and herding behavior did not influence the investment decisions of female investors. However, behavioral bias has other proxies.

Future research agendas include re-testing the proposed model with direct explanations to respondents filling out the questionnaires for better understanding, examining social media as an intervening or control variable in the influence of behavioral biases and financial literacy on investment decisions, and testing other proxies of behavioral bias, such as representativeness, anchoring and adjustment, cognitive dissonance, availability, self-attribution, illusion of control, conservatism, ambiguity aversion, mental accounting, confirmation, hindsight, recency, and framing biases, as well as endowment, self-control, optimism, loss aversion, and status quo bias, as independent variables on the investment decisions of Indonesian women. Additionally, cross-country studies may help examine cultural influences on these behavioral factors.

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Heuristic Bias and Loss Aversion Impact an Stock Investment Decision Making in Batam

Fendy Cuandra [1)], Michael Setiawan [2)], Candy [3)], Hesniati [4)]
[1,2,3,4] Universitas Internasional Batam
Email: fendy.cuandra@uib.ac.id

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ABSTRACT

Technological advancements affect an individual's financial management by increasing spending and necessitating investments to meet these needs. This research intends to analyze the effect of heuristic bias and loss aversion on investment decision. This study uses the investment decision variable to be the dependent variable and uses overconfidence, availability, representativeness, anchoring, gambler fallacy, and loss aversion to be the independent variables. This study uses the SmartPLS application to analyze data and uses an online questionnaire to collect respondents' answers. Sampling was conducted using purposive sampling technique to collect samples from investors in Batam. The study shows that gambler fallacy, loss aversion, overconfidence and representativeness bias have a significant positive impact on investment decisions, while anchoring and availability bias have no significant impact on investment decisions.

Keyword: anchoring; availability; gambler fallacy; investment decision; loss aversion

INTRODUCTION

The advancement of technology continues to progress up to the present, impacting the sector of purchasing goods and services. Many products are offered online, facilitating buyers in making purchases. This results in an increase in human needs and desires that seem boundless. According to the latest report from the research firm We Are Social with title “Digital 2023 Indonesia”, no fewer than 178.9 million Indonesians will engage in online purchases from 2022 to early 2023. This figure marks a 12.8% increase compared to the same period last year (CNBC Indonesia, 2023). The increasing desires due to technological advancements can lead to individuals' incomes no longer covering their expenses. To address this issue, it is important for society to manage their finances well. One approach that can be utilized is investing. Investment is something that has several levels of risk and this is what makes a person have to choose what investment is suitable for him. This phenomenon needs to be studied because there are several things that can influence a person in making investment decisions. According to Mastura et al. (2020), investment is a form of capital or capital investment that creates wealth, capable of generating profitable returns, either now or in the future. According to Hamzah et al. (2022), the reason people invest is for a better future life.

Investment can be carried out through various channels such as property, bonds, mutual funds, and stocks. Discussing investment inevitably involves the concept of risk; the

higher the expected return, the greater the risk of experiencing losses, and conversely, the lower the expected return, the lower the risk of experiencing losses (Sudirman et al., 2023). Investments with high expected returns, such as stocks, are widely favored by investors in Indonesia. Until now, the number of investors in the stock market continues to increase. The Indonesian Central Securities Depository (KSEI) records that the number of investors in the capital market reached 11.42 million as of July 2023, marking a 22.53% increase from July 2022, when it stood at 9.32 million investors.

Mahadevi and Asandimitra (2021) defines investment decision as a policy of allocating or investing capital in various assets to gain future profits. In reality, individuals' investment decisions are not always based on rational considerations; they may so arise from irrational aspects related to their psychology, commonly referred to as behavioral finance. One theory frequently used in behavioral finance is the Heuristic theory. Heuristic theory consists of practical rules that facilitate investment decision-making in uncertain and complex situations. According to heuristic theory, decision-making can be quicker and more comprehensive when focusing on important information while disregarding less useful information (Ratnadi et al., 2020). Mahadevi and Asandimitra (2021) propose five variables within heuristic theory: overconfidence, availability, representativeness, anchoring, and gambler fallacy. Additionally, in the investment decision-making process, loss aversion, or the reluctance to accept losses, is one factor that can influence investment decisions. Fear of experiencing losses is one reason individuals refrain from investing (Setiawan, 2020). Hence, this research is conducted to understand the factors influencing individuals' investment decision-making.

Ainia and Lutfi (2019) state that investing involves committing capital or other resources in the present with the expectation of gaining profits in the future. Each investment carries different risks and returns commensurate with the level of risk. Understanding that investment risks and returns vary, it is important for investors to consider factors related to asset allocation. Asset allocation pertains to the decision-making process of how to allocate funds across various asset classes (Ainia & Lutfi, 2019). According to Hesniati and Dedy (2021), investment decision is defined as an aspect occurring within the economic and financial context and closely related to psychological and sociological factors. Investment decision can also be interpreted as an individual's policy to invest their capital in one or more assets to gain profits in the future or the matter of how one should allocate their capital in investments that will yield future profits (Mahadevi & Asandimitra, 2021).

Investment decision starts with identifying investment opportunities, often referred to as capital investment projects. When investors are confronted with lucrative investment decisions, risk becomes a crucial factor to consider, as the level of risk involved in alternative investments will influence investment outcomes. Investors and issuers face market risks associated with the potential for gaining or losing capital due to high risk, high return, and low risk, low return scenarios (Fitri & Cahyaningdyah, 2021). Dangol dan Manandhar (2020) argues that investors thoughts and emotions can change their decision-making process from rational to irrational. In Sudirman et al. (2023) study, every investor aims to attain maximum returns from their investments. All investors strive to make optimal investment decisions. Therefore, optimal rational investment depends on prior financial knowledge.

Anchoring is a phenomenon employed to describe situations wherein individuals utilize initial values to make estimations in investments (Iram et al., 2023). According to Novianto (2021), anchoring can lead investors to concentrate on initial information and hinder

rational decision-making. In the process of decision-making, anchoring plays a crucial role as investors necessitate an initial piece of information to facilitate investment decisions (Dangol & Manandhar, 2020). Sudirman et al. (2023) assert that anchoring serves as the primary guiding principle in investment decision-making. The research conducted by Mahmood et al. (2023) also yields significant findings linking anchoring to investment decisions. Kumara and Kawshala (2021) suggests that the anchoring effect has a significant positive impact on investment decisions. Therefore, this study hypothesizes that there is an anchoring effect on investment decisions.

H_1: The Positive Effect of Anchoring Bias on Investment Decision

According to Sudirman et al. (2023), availability bias is the tendency to make decisions based solely on the information readily available, relying on what is remembered, what has recently been done, and what has recently been seen or heard. Availability bias can lead investors to make investment decisions solely based on well-known investment companies, sometimes resulting in suboptimal returns (Novianto, 2021). In Vukovic (2022) research, significant results were obtained regarding behavioral bias, particularly between availability bias and investment decision. Cuandra and Tan (2021) research shows that the availability bias variable has a significant positive influence on decision-making. Availability bias means that investors rely on readily available information to make investment decisions, and as a result, they tend to favor things that they already know and are easy to use. According to Sudirman et al. (2023), availability bias can prevent investors from making wrong investment choices. In the studies conducted by Dangol and Manandhar (2020); Sudirman et al. (2023), significant results were shown between availability bias and investment decision. Therefore, the hypothesis of this study posits that availability bias has a positive impact on investment decisions.

H_2: The Positive Effect of Availability Bias on Investment Decision

Banerji et al. (2020) state that gambler's fallacy is a belief that an event can repeat within a certain timeframe, leading to errors in decision-making. Gambler's fallacy arises when individuals make inaccurate predictions and investment decisions, which can have both positive and negative impacts (Iram et al., 2023). Pradeepkumar (2021) concludes that an investor's expectations are influenced by gambler's fallacy when making investment decisions. Fitri and Cahyaningdyah (2021) study shows that gambler's fallacy significantly influences investment decision-making because investors with gambler's fallacy tend to make decisions based solely on beliefs, resulting in irrational decisions. Therefore, this study hypothesizes that the gambler's fallacy has a positive impact on investment decisions.

H_3: The Positive Effect of Gambler's Fallacy on Investment Decision

In Gupta and Shrivastava (2022) study confirm that investment decisions are greatly influenced by loss aversion, where investors tend to sell stocks that have reached higher values and hold onto stocks with lower values. Jain et al. (2020) demonstrate in their research that loss aversion can lead to irrational decision-making. This is supported by Saputra et al. (2020) study, which shows that loss aversion affects investment decisions because investors are sometimes too afraid to make investment decisions. The research by Addinpujoartanto and Darmawan (2020); Candy and Vincent (2021) also shows that loss aversion has a significant impact on investment decisions. Therefore, the hypothesis of this study assumes that loss aversion has a positive impact on investment decisions.

H_4: The Positive Effect of Loss Aversion on Investment Decision

Overconfidence can make individuals feel smarter and better informed, leading them to disregard other factors, and often resulting in investment decisions that do not meet expectations (Ainia & Lutfi, 2019). Novianto (2021) study on the relationship between overconfidence and investment decisions also led to positive and significant results as investors are confident in their skills and knowledge when making investment decisions. In the research by Mahmood et al. (2023); Wibowo et al. (2023); Qasim et al. (2019); Cuandra and Rinaldo (2021) consistent significant positive results were shown between overconfidence and investment decision. Therefore, the hypothesis in this study posits a positive influence of overconfidence on investment decision-making.

H_5: The Positive Effect of Overconfidence on Investment Decision

Representativeness guides investors to make investment decisions based on past performance, so if a company's past performance was poor, it is perceived as being poor in the future, and vice versa if the company's performance was good. Vukovic (2022) found that representativeness bias significantly influences investment decision-making. Representativeness bias can affect decision-making processes by causing individuals to disregard important information that does not align with the stereotypes in their minds (Sudirman et al., 2023). According to Kumara and Kawshala (2021); Dangol and Manandhar (2020), representativeness bias can lead investors to make better investment decisions and improve returns. Novianto (2021); Keswani et al. (2019) also found significant results linking representativeness bias to investment decision-making. Therefore, the hypothesis in this study posits a positive influence of representativeness bias on investment decision-making.

H_6: The Positive Effect of Representativeness Bias on Investment Decision

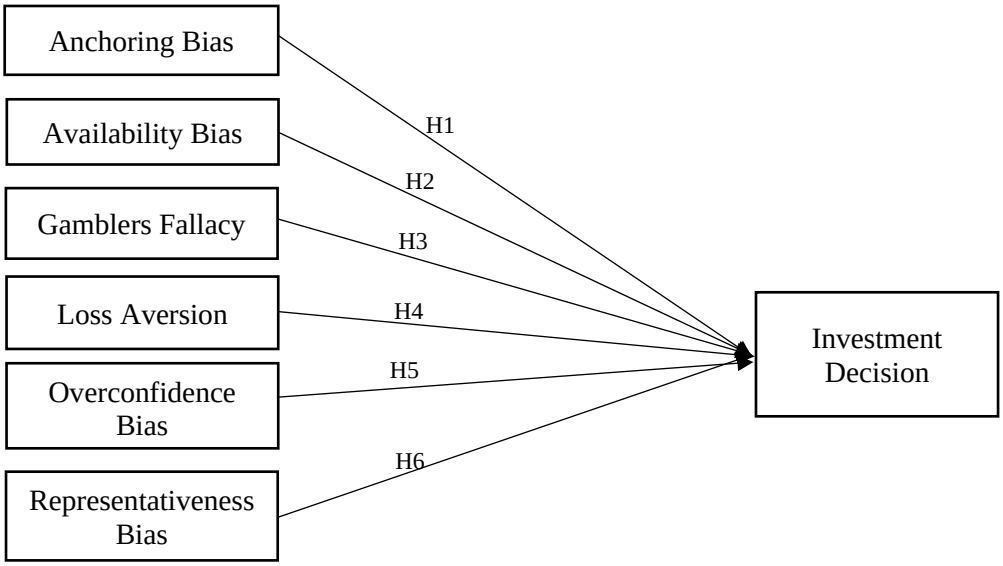

Figure 1. Conceptual Framework of Research
Source: Author, 2024

METHODS

This study employs a quantitative method, which is a research approach used to investigate specific populations or samples using instruments and quantitative/statistical data analysis to test hypotheses (Syahroni, 2022). This research was conducted on stock investors

investing in the Indonesia Stock Exchange (IDX). The object of this research is the community residing in the city of Batam.

Table 1. Questionnaires

Variable	Label	Question
Investment Decision (Iram *et al*., 2023)	ID 1	I prefer to invest in safe options
	ID 2	My investment decisions are optimized to generate interest payments and marginal returns
	ID 3	I prefer to invest in options that have low or medium risk, with better expected returns
	ID 4	I always avoid investing in high-risk options, even if they offer higher expected returns
	ID 5	With some investment decisions, I get better investment returns than I expected before making the investment
Anchoring bias (Iram et al., 2023)	AC 1	I rely on my previous market experience for subsequent investment decisions.
	AC 2	I forecast changes in the market based on recent investment decisions
	AC 3	A high profitability ratio is considered a key motivating factor for investing
	AC 4	Better investment returns encourage me to invest more
Overconfidence (Iram et al., 2023)	OC 1	I am an experienced investor
	OC 2	When I decide to invest, I feel that my knowledge and actions influence the outcome
	OC 3	I think that my investment decisions are wiser than those of others
	OC 4	I feel more confident in my own investment decisions than those made by analysts and advisor
	OC 5	I tend to invest in things that I believe in
Representative ness bias (Iram et al., 2023)	RB 1	I try to avoid deals that have performed poorly in recent times
	RB 2	I use trending financial analysis of random deals to make better investment decisions
	RB 3	I prefer deals that reflect desirable qualities
	RB 4	I rely only on selective sources of information when investing
Availability Bias (Iram et al., 2023)	AB 1	I prefer to invest locally rather than internationally as information about the local market is easier to find
	AB 2	I consider the information I receive from my close friends and relatives as reliable for my investment decisions
	AB 3	I rely on decisions from my social network when I lack relevant information
	AB 4	When making investment decisions, I consider the experience and advice of others
Gambler Fallacy (Siraji, 2019)	GF 1	I prefer to sell stocks when their prices start to rise
	GF 2	You can usually anticipate the end of good or bad market returns
	GF 3	I prefer to hold on to stocks even if they have not performed well in the past
	GF 4	I avoid selling stocks that have decreased in value and readily sell stocks that have increased in value
	GF 5	I prefer to hold on to a stock if its purchase price is greater than its current market price
Loss aversion (Ainia & Lutfi, 2019)	LA 1	price I am cautious of losses caused by changes in stock prices in the market
	LA 2	I am willing to invest in assets that show a definite loss
	LA 3	I often invest in assets that have performed well in the past
	LA 4	I expect to gain from investments that have shown losses

Data collection was carried out by distributing an online questionnaire. The questionnaire avoids statements that are ambiguous or have double meanings, and separates statements based on the existing variables. This research utilized purposive sampling technique in determining the sample. The sample of this study must be a stock investor, being an individual investor, having invested in the last three months. Data collection was conducted from November 2023 to January 2024. Data analysis will be performed using the SmartPLS application because it provides more informative data displays and more accurate information by providing reason codes.

To measure the variables of overconfidence, representativeness, anchoring bias, availability bias, and investment decision, loss aversion, gambler's fallacy this research employed a questionnaire. Assessment was done using a scale from 1 to 5, where 1 indicates strongly disagree and 5 indicates strongly agree.

RESULT AND DISCUSSION

Table 2. Characteristics of Respondents

Gender	**Quantity**	**Percentage (%)**
Male	217	56.4
Female	168	43.6
Status		
Married	184	47.8
Unmarried	201	52.2
Age		
17 - 25 Years	107	27.8
25-35 Years	244	63.35
35-50 Years	33	8.6
Above 50 Years	1	0.25
Profession		
Student (Not Working)	35	9.05
Government Employee	129	33.5
Private Sector Employee	165	42.9
Entrepreneur	56	14.55
Monthly Income		
Rp. 1.000.000 - Rp 3.000.000	41	10.6
Rp 3.000.000 - Rp 6.000.000	249	64.7
Rp 6.000.000 - Rp 10.000.000	85	22.1
Above Rp 10.000.000	10	2.6

Source: Google Form Statistic, 2024

From Table 2, it can be observed that the percentage of male respondents is 56.4% and the percentage of female respondents is 43.6%. This indicates that there are more male investors in Batam compared to female investors, and the majority of investors are unmarried, accounting for 52.2% compared to 47.8% who are married. Among the 385 investors surveyed, only one investor is above 50 years old. Furthermore, there are 107 investors aged between 17-25 years old, with the majority falling in the age range of 25-35 years old, comprising 244 investors or 63.35%. In contrast, there are only 33 investors aged between 35-50 years old. The total number of investors is 385 and predominantly composed of individuals

employed as private sector employees, with a count of 165 individuals and an average income ranging from 3-6 million Indonesian Rupiah per month.

Table 3. Validity Test

Variable	Indicator	Loading Factor	AVE	Description
Anchoring Bias	ANC 1	0.769	0.598	valid
	ANC 3	0.792		valid
	ANC 4	0.761		valid
Availability Bias	AV 1	0.792	0.629	valid
	AV 3	0.757		valid
	AV 4	0.831		valid
Gambler's Fallacy	GF 2	0.824	0.625	valid
	GF 4	0.793		valid
	GF 5	0.756		valid
Investment Decision	ID 2	0.755	0.581	valid
	ID 4	0.762		valid
	ID 5	0.773		valid
Loss Aversion	LA 1	0.830	0.657	valid
	LA 3	0.751		valid
	LA 4	0.849		valid
Overconfidence Bias	OC 2	0.835	0.633	valid
	OC 4	0.715		valid
	OC 5	0.837		valid
Representativeness Bias	RP 1	0.827	0.652	valid
	RP 3	0.767		valid
	RP 4	0.830		valid

Source: Data processed, 2024

According to the research by Hair et al. (2017), validity testing is conducted to measure the accuracy of an indicator in depicting the variable to be measured. Based on the validity testing conducted, there are indicators that have loading factor results < 0.6 that is ANC 2, AV 2, GF 1, GF 3, ID 1, ID 3, LA 2, OC 1, OC 4, and RP 2. These items are removed to avoid influencing the AVE value. Loading factor values and AVE are displayed in Table 3.

Based on the research by Hair et al. (2017), each indicator must have a loading factor value > 0.6 for exploratory research and have an AVE value > 0.5 for each variable used. In Table 3, each indicator and variable already has loading factor values > 0.6 and AVE values > 0.5, thus it can be concluded that all indicators and variables have passed the validity testing.

Table 4. Reliability Test

	Cronbach Alpha	Composite Reliability
Anchoring Bias	0.673	0.816
Availability Bias	0.704	0.835
Gambler's Fallacy	0.699	0.833
Investment Decision	0.641	0.805
Loss Aversion	0.736	0.851
Overconfidence Bias	0.704	0.836
Representativeness Bias	0.732	0.849

Source: Data processed, 2024

Reliability testing is conducted to demonstrate the consistency and accuracy of the instrument in measuring constructs. Reliability testing requires that the cronbach alpha value of each variable is greater than 0 6 and the composite reliability value is greater than 0.6 (Hair et al., 2017). In Table 4, all variables already have Cronbach Alpha and Composite Reliability values above 0.6. Therefore, it can be concluded that all variables are reliable.

Table 5. Discriminant Validity (Fornell Lacker)

	ANC	AV	GF	ID	LA	OC	RP
ANC	**0.774**						
AV	0.381	**0.794**					
GF	0.354	0.493	**0.792**				
ID	0.347	0.494	0.630	**0.763**			
LA	0.475	0.490	0.415	0.549	**0.811**		
OC	0.275	0.578	0.580	0.595	0.523	**0.798**	
RP	0.450	0.450	0.571	0.629	0.591	0.438	**0.809**

Source: Data processed, 2024

Discriminant validity testing is conducted with the aim of evaluating indicators that measure a variable differently compared to other variables. According to Hair et al. (2017), Variables are considered to be valid if the square root of the average variance extracted (AVE) value for each variable is greater compared to the intervariable correlations using the Fornell-Larcker criterion. Based on Table 5, the results of the Fornell-Larcker criterion test indicate that the discriminant validity of each variable is met because the square root of the AVE value for each variable is higher than the square root of the AVE correlation with other variables.

Table 6. Determination Coefficients Test

	R-square
Investment Decision	**0.565**

Source: Data processed, 2024

The determination coefficient test is used to obtain information about the extent of variation in the dependent variable that can be explained by the independent variables. In Table 6, the r-square value of the investment decision variables is 0.565, which means that the variables ANC, AV, GF, LA, OC and RP can explain 56.5% of the variance in the investment decision variables while the remaining 43.5% is explained by other variables which are not considered in this study. According to the research by Hair et al. (2017), if the R-square value is > 0.5, it indicates strong results, thus it can be concluded that all independent variables can strongly explain the dependent variable.

Table 7. Direct Test of Hypothesis

		Path Coefficients	P Values
H_1	ANC -> ID	-0.022	0.635
H_2	AV -> ID	0.052	0.358
H_3	GF -> ID	0.260	0.000
H_4	LA -> ID	0.144	0.008
H_5	OC -> ID	0.227	0.000
H_6	RP -> ID	0.280	0.000

Source: Data processed, 2024

Based on the results of the hypothesis testing, the p-value of anchoring bias variable for hypothesis (1) is 0.635, which means that anchoring bias does not have a significant effect on investment decisions. This result is supported by the majority of the respondents who do not rely solely on the initial information while making investment decisions. The study by Shaleha and Hakim (2022) also supports that Anchoring bias does not significantly affect investment decisions because stock investors do not make investment decisions based on initial values to buy and sell investments. This research is supported by the studies of Madaan and Singh (2019); Sudani and Pertiwi (2022); Saputra et al. (2023); Falah and Haryono (2023) which show that Anchoring bias does not have a significant effect on investment decisions. However, Novianto (2021) argues that investors make investement decisions based on initial information and hinder rational decision-making.

In the second hypothesis (2), the availability bias variable does not have a significant effect on investment decision. This is evidenced by the hypothesis testing results showing that the availability bias variable has a p-value of 0.358, indicating that the majority of respondents do not solely rely on available information to make investment decisions, but rather tend to conduct deeper analysis when making investment decisions. Kumara and Kawshala (2021) stated that availability bias does not have a significant effect because investors tend to focus on current events rather than reflecting on past occurrences. This research is supported by Saeed (2019); Elhussein and Abdelgadir (2020); Loris and Jayanto (2021); Kumar and Nayak (2019); Sudani and Pertiwi (2022) indicating that the availability bias does not have a significant effect on investment decisions. However, Iram et al. (2023); Novianto (2021) argues that availability bias have a significant effect on investment decision because people usually make investment decision with a little information that they know.

In the third hypothesis (3), the gambler's fallacy variable obtains a p-value of 0.000 with a path coefficient of 0.260, indicating that gambler's fallacy significantly and positively affects investment decision. This suggests that gambler's fallacy influences an individual's investment decision-making to continue holding onto declining stocks, hoping for events that could change the stock's value for the better. Herman et al. (2018) in their research also found similar results, suggesting that investors have a logical concept that a stock that has experienced a price decline in previous periods, and even maintains the same price, is likely to experience the opposite in the future. This research is supported by Ratnadi et al. (2020); Keswani et al. (2019); Almansour and Arabyat (2017); Dewi et al. (2020) indicating that Gambler's Fallacy significantly and positively affects investment decisions. However, Darwis et al. (2021) say that gambler’s fallacy don’t have significant effect to investment decision because investors generally achieve more favorable outcomes by conducting thorough analysis prior to engaging in speculative activities.

In the fourth hypothesis (4) states that loss aversion has significantly and positively affects investment decision. This hypothesis evidence by the loss aversion variable obtains a p-value of 0.008 with a path coefficient of 0.144. This occurs because loss aversion makes an investor tend to be afraid to invest in stocks that show poor results and more often make investment decisions on stocks with good performance. Saputra et al. (2020) found that investors loss aversion encourages the desire to invest. This research is supported by Shaleha and Hakim (2022); Pokharel (2020); Elhussein and Abdelgadir (2020); Hunguru et al. (2020); Keswani et al. (2019) indicating that Loss Aversion significantly and positively affects investment decisions. However, Pradhana (2018) argues that loss aversion haven’t significant

effect to investment decision because investors don't experience fear when facing losses, as they are aware that such risks are inherent possibilities in investment activities.

In the fifth hypothesis (5) The overconfidence bias variable has a p-value of 0.000 and a path coefficient of 0.227. Through hypothesis testing, it is evident that the overconfidence bias variable significantly and positively affects investment decision. This indicates that overconfidence bias can lead an investor to make better investment decisions. This is because in making investment decisions, an investor only requires self-analysis and does not need analysis from other investors. According to Jain et al. (2020), being overly confident in making investment decisions can have a positive impact on stock investments. This research is supported by Armansyah (2021); Fitri and Cahyaningdyah (2021); Madaan and Singh (2019); Mahmood et al. (2023); Wibowo et al. (2023) indicating that overconfidence bias significantly and positively affects investment decisions. However, Gamage et al. (2021) argues that overconfidence bias does not have a significant impact on investment decisions, as most investors rely on expert analyses for comparison.

In the sixth hypothesis (6) the representativeness bias variable has significantly and positively affects investment decision. This is evidenced through hypothesis testing with a p-value of 0.000 and a path coefficient of 0.280. This indicates that representativeness bias leads an investor to rely only on clear information when making investment decisions. Vukovic (2022) also stated that representativeness bias impact to investment decision because individuals who are more meticulous, reliable, persistent, confident, and considerate often tend to use trend analysis when evaluating investment alternatives and are cautious when investing in companies that have recently experienced losses. This research is supported by Kumara and Kawshala (2021); Dangol and Manandhar (2020); Novianto (2021); Elhussein and Abdelgadir (2020); Khan et al. (2020) indicating that representativeness bias significantly and positively affects investment decisions. However, Aigbovo and Ilaboya (2019) say that some investors conduct analysis not only based on a company's past performance but also through quantitative assessments of the current market conditions, which indicates that representativeness bias does not have a significant impact on investment decisions.

CONCLUSIONS

The results of the conducted tests show that the variables anchoring bias do not have a significant effect on investment decision because stock investors do not make investment decisions based on initial values to buy and sell investments. Availability bias also do not have a significant effect on investment decision it's because investor do not solely rely on available information to make investment decisions, but rather tend to conduct deeper analysis when making investment decisions. This study also demonstrates a significant influence of gambler's fallacy, loss aversion, overconfidence, and representativeness bias on investment decision. Gambler's fallacy have significant effect to investment decision it's because gambler's fallacy influences an individual's investment decision-making to continue holding onto declining stocks, hoping for events that could change the stock's value for the better. Loss aversion makes an investor tend to be afraid to invest in stocks that show poor results and more often make investment decisions on stocks with good performance. Overconfidence also impact in making investment decisions, an investor only requires self-analysis and does not need analysis from other investors. Representativeness bias make individuals who are more meticulous, reliable, persistent, confident, and considerate often tend to use trend analysis

when evaluating investment alternatives and are cautious when investing in companies that have recently experienced losses

Limitations of this study include its narrow scope, limited to Batam only. The R-square value in this study is only 56.5%, indicating that there are other variables that could be explored to explain the investment decision variable. This study recommends that future research should encompass a broader scope by utilizing a sample of respondents from around the world and incorporating other variables that can explain investment decisions, thereby yielding better research results.

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