

RISK AVERSION, ANXIETY, AND SELF-CONTROL
MODERATE THE RELATIONSHIP WITH SPENDING
DECISION ON BUY NOW PAY LATER (BNPL)

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DECLARATION

We hereby declare that:

- (1) This undergraduate FYP is the end result of this study and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.
- (2) No part of this FYP has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.
- (3) Every group member has contributed equally to the completion of the FYP.
- (4) The word count of this research report is **21861**.

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DEDICATION

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PREFACE

This research project is presented in a partial completion of the degree objectives of Bachelor of Finance (Hons) of Universiti Tunku Abdul Rahman (UTAR). Our study title is “RISK AVERSION, ANXIETY, AND SELF-CONTROL MODERATE THE RELATIONSHIP WITH SPENDING DECISION ON BUY NOW PAY LATER (BNPL)”. The motivation for conducting this study arises from the growing popularity of BNPL services, especially among young consumers in Malaysia. While BNPL provides various conveniences, it may also encourage impulsive spending and weaken financial discipline. Therefore, this study aims to examine the factors influencing consumers’ spending decisions when using BNPL services. This research considers artificial intelligence (AI), financial literacy, and demographic factors as independent variables, while risk aversion, anxiety, and self-control serve as moderating variables. The findings of this study are expected to offer useful insights for future research and enhance the understanding of consumer behaviour in the context of BNPL usage in Malaysia.

ABSTRACT

This research examines the relationship of financial literacy, demographic factors, and artificial intelligence on spending decisions of “Buy Now, Pay Later” (BNPL) in Malaysia. Utilizing Partial Least Squares Structural Equation Modelling (PLS-SEM) with a sample of 600 respondents, this research also assesses the moderating role of psychological and behavioural factors including risk aversion, anxiety, and self-control in these relationships. The findings indicate that financial literacy and demographic factors do not significantly influence BNPL spending decisions, while artificial intelligence, anxiety, and self-control play a significant role in shaping customer spending decisions. In addition, risk aversion was found to moderate the relationship between financial literacy and spending decisions by weakening the relationship, whereas anxiety and self-control did not demonstrate significant moderating effects. The findings suggest that spending decisions are more strongly driven by psychological and technological factors than by financial literacy, underscoring the importance of incorporating responsible digital features such as self-control mechanisms within applications.

Keyword: financial literacy, demographics factors, artificial intelligence, risk aversion, anxiety, self-control, buy now pay later, spending decision.

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LIST OF ABBREVIATIONS

A	Anxiety
AI	Artificial Intelligence
AVE	Average Variance Extracted
BNPL	Buy Now Pay Later
CFPB	Consumer Financial Protection Bureau
CR	Composite Reliability
DF	Demographic Factor
DV	Dependent Variable
FL	Financial Literacy
HTMT	Heterotrait Monotrait Ratio of Correlations
IV	Independent Variable
MV	Moderator Variable
PLS SEM	Partial Least Squares Structural Equation Modelling
QR	Quick Response
RV	Risk Aversion
SC	Self-Control
SD	Spending Decision
SEM	Structural Equation Modelling
SPSS	Statistical Package for the Social Sciences
TPB	Theory of Planned Behavior
VIF	Variance Inflation Factor

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

Buy-Now-Pay-Later (BNPL) services have rapidly gained momentum in recent years, especially with younger customers, yet research on the psychological and behavioral aspects influencing BNPL spending decisions remains limited. This study proposes an alternative viewpoint by examining the role of self-control, anxiety, and risk aversion in shaping consumer behavior towards BNPL services. The first chapter begins by discussing the research background, highlighting the relevance of BNPL in today's financial landscape and the gaps in existing literature. The research problems are formulated to explore and explain how these psychological factors affect consumers' intentions and actual spending decisions when using BNPL services. Consequently, this chapter will include the research backgrounds, research problem, objective, and significance of the study. An overview of the study's organizational structure across the chapters is also presented. Finally, the conclusion provides a summary of this chapter's main ideas.

1.1 Research Backgrounds

BNPL services can be traced back to traditional retail installment plans, a model that has been used for decades. This model allows consumers to acquire goods

without making full payment at the time of purchase. The main difference between BNPL and conventional retail installment plans is that BNPL does not require a pre-existing credit relationship and offers a faster and simpler process. Compared to credit cards, it generally provides fixed installments, interest-free offers, and enhanced payment convenience through integration into the shopping process (Kumar et al., 2024). Meanwhile, BNPL services are usually positioned as a payment method rather than a traditional credit product. By emphasizing convenience, flexibility, and a stress-free installment experience, it effectively reduces users' psychological burden and is particularly favored by younger consumer groups (Cook et al., 2023). Technological advancements have also facilitated the rapid expansion of BNPL payment solutions in physical stores through the use of QR codes and scannable barcode systems (Cornelli et al., 2023).

This has allowed BNPL services to gradually expand from traditional retail into high-value consumption sectors such as healthcare and travel, increasingly being used as a financial tool for consumers to manage large expenditures (Research and Markets, 2025).

In 2021, the global BNPL market continued to show significant regional differences: Europe was the most mature market, with an e-commerce penetration rate of 8%, mainly due to high adoption rates in Sweden (25%) and Germany (20%); North America and other regions were still in the early stages of development (Visa Consulting & Analytics, 2023). However, as BNPL services continue to gain traction and consumer acceptance grows, adoption rates have increased significantly in many regions. The Asia-Pacific region stands out for its transaction volume and growth rate, accounting for 32.5% of the global market in 2024, and is projected to maintain a compound annual growth rate (CAGR) of 26.9% from 2025

to 2030 (Mordor Intelligence, 2025). According to Worldpay (2024), the transaction value of BNPL in e-commerce grew from \$2.2 billion in 2014 to \$342 billion in 2024, demonstrating its rapid growth and widespread adoption globally. Against the backdrop of rapid global market expansion, Malaysia's BNPL market has also shown significant growth. Research and Markets (2024) reports that Malaysia's BNPL market grew growing annually at 24.0% form 2021 to 2024, and is forecasted to reach \$2.52 billion (approximately 11.5 billion ringgit) by 2025, followed by sustained growth until 2030. Additionally, according to Hishamudin (2025), Malaysian BNPL users are primarily concentrated in the B40 group, indicating a high degree of reliance on flexible installment payment solutions among low-income groups.

While BNPL services offer consumers interest-free installment options, they also entail inherent risks, including the potential for excessive consumption and debt accumulation. Consumers' perception of affordability is often influenced by the size of installment amounts. However, caution is needed when opening multiple credit lines with different providers, as this may result in an individual's total credit burden exceeding their repayment capacity (Hayashi & Routh, 2025). The absence of data sharing between BNPL providers and major credit reporting agencies also limits lenders' ability to accurately evaluate borrowers' total debt at the loan approval stage, consequently heightening potential risks (Consumer Financial Protection Bureau, 2022). The CFPB's investigation also noted that BNPL services face insufficient information disclosure, with key details such as loan terms, late fees, and repayment conditions not clearly presented to consumers (Ahmad et al., 2025).

Global regulation of BNPL is currently characterized by fragmentation and divergence. Some countries, including Australia, Sweden, and EU member states,

have established specific regulations to reinforce consumer protection. In contrast, other countries, such as Singapore and India, primarily rely on industry self-regulation or existing credit laws (Cornelli et al., 2023). Currently, Malaysia does not have a comprehensive and specific regulatory framework governing BNPL services (Hishamudin, 2025). However, Bank Negara Malaysia has introduced proposed regulatory drafts, including limits on BNPL loan terms, prohibition of the Rule of 78s interest calculation method, and requirements for borrower repayment capacity assessments, with the aim of enhancing oversight of BNPL products and promoting responsible lending (Nambiar, 2025).

Although BNPL still has certain limitations, its potential value to merchants should not be overlooked. Relevant studies indicate that the introduction of BNPL can significantly optimize merchant performance, not only increasing the probability of transactions by approximately 20%–30% but also driving average order value growth of up to 50% (PYMNTS Intelligence, 2022). According to Tijssen & Garner (2021), BNPL has also been found to enhance customer satisfaction and repeat purchase rates, with 38% of merchants reporting improved customer loyalty.

1.2 Research Problem

In Malaysia's fintech and digital economy, the BNPL consumption model has been expanding quickly in recent years, especially since the COVID-19 outbreak (Mukhtar et al., 2023). The BNPL market in the nation grew annually at 24.0% from 2021 to 2024. (Research and Markets., 2025). However, this growth has brought

regulatory challenges and concerns, particularly raising questions around consumer debt, transparency, and compliance (Ali et al., 2025). Although banks and authorities have not yet taken any action to stop the widespread usage of BNPL, they might be required if BNPL solutions are to become profitable and sustainable in the long run (Alvarez, 2021 and Zainudin & Othman, 2024).

According to Mukhtar et al. (2023) and Ahmad et al., (2025), in the Malaysian context, customers who use BNPL services can benefit from a wide range of advantages, including interest-free installment options, improved convenience in making purchases, financial inclusion, and more control over financial planning and spending, serving as a budgeting tool that helps reduce financial stress and manage cash flow. However, there are also serious hazards associated with BNPL in Malaysia, it can stimulate impulsive purchasing and result in an increase of household debt, even though it enables customers to make purchases instantly and manage payments over time (Podin et al., 2025). These debts can be difficult to spot and detect, and repeated use of BNPL may quietly trap consumers in a cycle of overspending, causing financial stress and potentially undermining long-term financial stability (Halim et al., 2024).

There is still an apparent discrepancy in the literature, despite earlier research acknowledging both the advantages and disadvantages of BNPL. Higher self-control makes it more likely that consumers would use BNPL responsibly, enabling them to take advantage of its benefits without excessive consumption (Adhitya Ananda et al., 2024), while others fall into patterns of overspending and financial distress. This discrepancy raises the possibility that behavioral and psychological variables significantly influence spending decisions. Prior study has demonstrated that financial anxiety negatively impacts financial behavior, frequently leading to

poor financial management and avoidance of financial duties (Xin et al., 2023), self-control is consistently linked to restrained or excessive spending behavior, with high self-control associated with restrained purchases and low self-control with excessive or impulsive spending (Nyrhinen et al., 2023), risk aversion influences spending behavior, with lower risk aversion to riskier decisions and higher risk aversion associated with careful spending (Honjo et al., 2024). Even though research on consumer purchasing behavior is expanding, not many studies have explicitly looked at BNPL in connection to the psychological variables. Thus, our study aims to gain a deeper understanding of why customers have different usage patterns and financial results by examining the moderating impacts of anxiety, risk aversion, and self-control on BNPL spending decisions.

According to Halim et al. (2024), existing research on BNPL has been focused on Western contexts, emphasizing the importance of more varied demographic studies in Malaysia. As a result, our study is performed in Malaysia and takes into consideration demographic factors including age and income. Ahmad (2025) suggests that future research should also use greater sample sizes and include a wider range of demographic groups, instead of focusing only on adults or students. Similarly, another research used purposive sampling with just five individuals, limiting generalizability and introducing possible selection bias (Podin et al., 2025). Its qualitative design offered useful insights, but the findings lacked reliability and could not reflect broader statistical trends. To address these gaps, our study surveys at least 384 Malaysians to provide more reliable, generalizable, and culturally relevant evidence on spending decisions related to BNPL services.

1.3 Research Objectives and Research Questions

1.3.1 Research's General Objectives

Purpose of this study is to assess the relationship between financial literacy, demographic factors, and artificial intelligence on spending decisions of BNPL. In addition, to assess the moderating role of attitudinal and behavioral factors (risk aversion, anxiety, and self-control) in these relationships.

1.3.2 Research's Specific Objectives

Four specific objectives have been constructed to fulfill the research's general objective.

- (i) To investigate the relationship of financial literacy, demographic factors, and artificial intelligence on spending decisions on BNPL.
- (ii) To evaluate the moderating role of risk aversion on the relationship between financial literacy and spending decisions on BNPL.
- (iii) To evaluate the moderating role of anxiety on the relationship between demographic factors and spending decisions on BNPL.
- (iv) To evaluate the moderating role of self-control on the relationship between

artificial intelligence and spending decisions on BNPL.

1.3.3 Research Questions

Against the above targets of research, it has four key research questions that should be constructed.

- (i) Is there a significant relationship for financial literacy, demography, and artificial intelligence on spending decisions in BNPL?
- (ii) Does risk aversion significantly moderate the relationship between financial literacy and BNPL spending decisions?
- (iii) Does anxiety significantly moderate the relationship between demographic factors and BNPL spending decisions?
- (iv) Does self-control significantly moderate the relationship between artificial intelligence usage and BNPL spending decisions?

1.4 Research Significance

The current research provides substantive findings into the responsible and sustainable development of BNPL services in Malaysia. By examining financial literacy, demographic differences, and the influence of artificial intelligence (AI),

together with the moderating effects of risk aversion, anxiety, and self-control, the study provides findings that can inform both industry practices and regulatory frameworks.

The first group to benefit from this study is the users of BNPL. While many Malaysians adopt BNPL for its convenience, some may lack the financial literacy or self-control to use it wisely. The study's findings can inform awareness campaigns and financial education programs that help consumers make informed choices and use BNPL in a way that suits their financial situation and reduce the likelihood of impulsive purchases (Agensi Kaunseling dan Pengurusan Kredit, 2025). BNPL providers will also benefit from these insights. A clearer understanding of how demographics and behavioural traits shape decision-making allows providers to design services that are compatible with different consumer profiles. Providers can use this information to create financial products and services that incorporate AI features which guide and support informed spending decisions, instead of algorithms that push consumers toward unnecessary purchases.

Merchants likewise stand to gain by understanding how income level and age influence consumer responses to BNPL. Such insights enable merchants to position BNPL offerings in line with consumer characteristics, tailor marketing strategies to attract customers who are more likely to use the service sustainably, thereby strengthening long term relationships with their customer base. Lastly, the study carries important implications for policymakers. The findings can serve as an empirical basis for refining regulatory frameworks to ensure that BNPL services operate responsibly and inclusively. Potential measures include increasing minimum age requirements, implementing income or background eligibility checks, and introducing financial literacy programs to strengthen consumer knowledge and

ensure BNPL services are used appropriately across different consumer groups (Abed & Alkadi, 2024). These regulatory refinements will protect consumers while promoting BNPL as a credible, inclusive, and sustainable financial service.

1.5 Conclusion

This chapter has outlined the background and development of BNPL services in Malaysia, along with the research problem, and study objectives. Additionally, it underscores the need to examine factors such as financial literacy, demographic factors, and AI on Malaysian consumer spending decisions. Through this analysis, the study aims to contribute to academic discourse while also providing practical implications for users, providers, merchants, and policymakers. The findings can help design more effective financial education initiatives, strengthen consumer protection frameworks, and encourage responsible BNPL adoption. As BNPL continues to expand rapidly in Malaysia's digital economy, addressing these issues is imperative to ensure balanced industry growth while safeguarding consumer financial well-being. Following chapters review relevant literature to contextualize the research and establish the theoretical framework.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter reviews the theoretical and empirical literature underpinning the span of study of research, focusing on factors that shape spending decisions on Buy Now Pay Later (BNPL). The independent variables studied under this research are Artificial Intelligence (AI), Financial Literacy (FL), and Demographic Factors (age & income). The chapter also positions three individual-difference variables as moderators, each linked to one independent variable: Risk Aversion (with FL), Anxiety (with Demographics), and Self-Control (with AI). This research is grounded in well-established theoretical perspectives, notably the Theory of Planned Behavior (TPB) and Self-Control Theory, supported by relevant empirical studies on consumer finance and technology adoption. By reviewing and synthesizing existing literature, this chapter aims to highlight gaps in previous research, establish solid theoretical foundation and proposed conceptual framework, and justify the hypothesized relationships between variables. Ultimately, the discussion examines not only the direct effects of financial literacy, artificial intelligence, and demographic factors on BNPL spending decisions, but also how risk aversion, anxiety, and self-control function as moderating variables that influence the magnitude and nature of these effects.

2.1 Underlying Theories

2.1.1 Theory of Planned Behavior

TPB has first been formalized by Ajzen (1991) and is the generic explanatory and predictive theory of human behavior for a broad range of applications, such as consumer financial behavior and purchase behavior. TPB argues that behavioral intention serves as the immediate determinant of behavior, which is determined by individual's attitude toward the behavior, perceived social pressures (subjective norms), and perceived behavioral control (Ajzen, 2020).

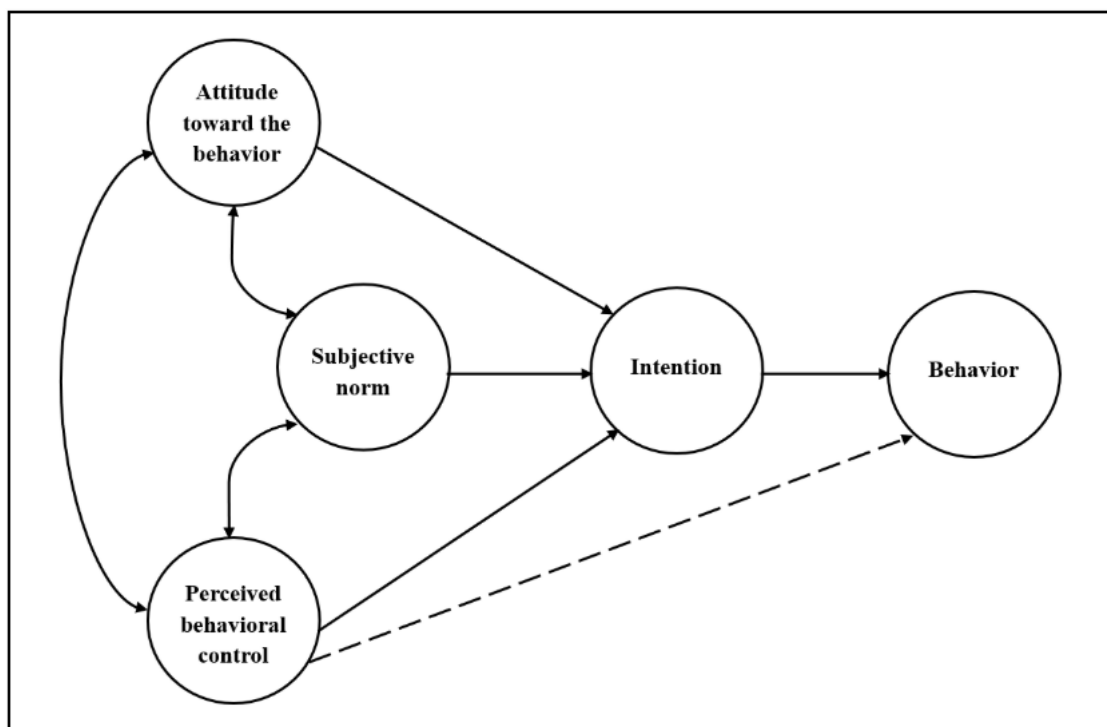


Figure 2.1. Theory of Planned Behavior. Adapted from Ajzen, I. (1991). *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.

Attitude is the positive or negative judgment of the person the actor performing the behavior; subjective norms are social expectations that encourage or discourage that behavior; and perceived behavioral control is the perceived ability of the person to perform the behavior (Conner & Armitage, 1998).

Empirical testing has repeatedly shown the predictive power of TPB in situations ranging from health behavior (McEachan et al., 2011) to pro-environmental behavior (Yuriev et al., 2020). Generalization to financial decision-making rests on the assumption that paying, saving, or credit-based purchase taking, BNPL result from deliberate decisions motivated by attitudes, social norms, and self-efficacy in the use of financial resources. Favorable attitudes toward BNPL, for instance, and social support perceptions alongside feeling able to handle repayment will tend to increase BNPL service use intentions (Kautonen et al., 2015).

Flexibility of the TPB also allows incorporation of moderating variables for personality and psychological characteristics. Experiments have shown that psychological constructs like self-identity (Rise et al., 2010), past behavior (Godin & Kok, 1996), and even impulsiveness (Collins et al., 2011) have the ability to enhance or diminish the attitude–intention or control–intention links. Theoretically speaking, the incorporation of risk aversion, anxiety, and self-control as moderating variables in this study is appropriate because these can affect the manner in which individuals evaluate the perceived benefits and risks of BNPL transactions.

Moreover, TPB's consistency in numerous contexts of behavior has been echoed in meta-analytic findings with the three antecedents and intention to perform having

strong correlations (McDermott et al., 2015 and Riebl et al., 2015). This further justifies its application as the theoretical model for studying BNPL consumption decisions, where decision is decided through cognitive evaluation, normative influence, and perception of control, alongside personality-based moderators.

2.1.2 Self-Control Theory

Self-Control Theory, or the General Theory of Crime, was formulated by Gottfredson and Hirschi (1990) and explains a wide range of impulsive, risky, and similar behavior in terms of one enduring dispositional trait, self-control.

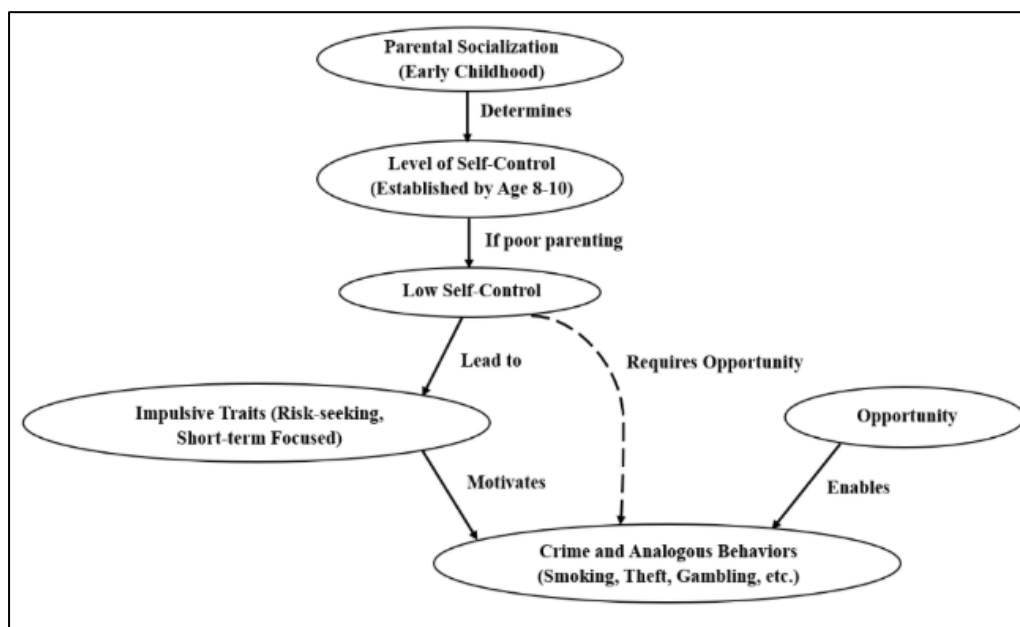


Figure 2.2. Self Control Theory. Adapted from Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford University Press.

Self-control low persons are characterized by risk-seeking, preference for present gratification, short time perspective, and impulsiveness; these characteristics heighten the likelihood of behavior with immediate payoffs but delayed costs like poor spending and monetary decisions (Gottfredson & Hirschi, 1990, Pratt & Cullen, 2000 and Piquero et al., 2000).

Empirical evidence for the theory's predictive power for crime and other similar acts is overall across a wide array of research, indicating that empirically supported scales for self-control are consistently associated with dangerous and spontaneous behaviors (Paternoster & Brame, 1998, Paternoster & Brame, 2000 and Burt et al., 2006). Measurement and specification analyses have yielded more definitive insights into how to measure self-control while also laying the groundwork for prudence in psychometrics in applying the construct to predict non-criminal behavior.

Longitudinal and developmental studies have probed the etiology and continuity of self-control, with variable findings on parenting effects and intraindividual change over life; recent literature therefore advocates integrating developmental, neurocognitive, and situational processes while keeping self-control at the center as a fundamental dispositional predictor (Vazsonyi & Huang, 2010, Forrest et al., 2019 and Burt, 2020).

Applications to consumer and technology contexts suggest that low self-control can predict impulsive consumption, Internet piracy, drug and alcohol harms, and other costly behaviors, and that contextual affordances such as low-friction digital spaces

heighten dispositional inclinations (Higgins, 2004, Costello et al., 2014 and Kerley et al., 2008). Cross-cultural studies also confirm the applicability of the theory to risky and petty offending acts across different populations (Lu et al., 2013 and Stewart et al., 2004).

Self-control in this study is the proximal dispositional predictor of choice to spend and moderator and mediator in combination with anxiety, risk aversion, financial literacy, demographics, and technology environment (AI). According to the General Theory, we therefore hypothesize that low self-control will increase impulsive or improper spending choices directly, and low-friction AI settings will increase this effect for individuals who have low self-control. We also hypothesize that anxiety will work together with self-control such that anxious individuals with low self-control are most prone to compensatory or impulsive expenditures. Empirical testing will utilize validated self-control scales along with measures of affect, financial literacy, risk aversion, AI exposure, and demographic covariates, and will utilize mediation and moderation analyses to test hypothesized pathways.

2.2 Review of Literature

2.2.1 Dependent Variable: Spending Decisions

Spending decision refers to the mechanism of consumers to evaluate, prioritize,

and allocate financial resources to acquire goods or services. This decision-making process is shaped by internal factors including financial goals, income, and wealth, and exogenous influences like cultural norms, marketing strategies, and macroeconomic conditions (Azam, 2025). Furthermore, Sussman et al. (2023) examines consumers' spending choices are also affected by their available budgets, preferred payment methods, and access to financing mechanisms, including BNPL services. Other influential factors include financial literacy, demographic factors, and even emerging technologies such as artificial intelligence.

From psychological standpoint, spending decisions extend beyond purely economic phenomenon but also involves cognitive bias and emotional responses. Critical theory explaining this is mental accounting theory, which proposes that individual place different values on money based on factors such as source and intended purpose. This cognitive bias can lead to irrational decision making on spending such as treat windfall gains differently from regular income. Complementing this, research by Broekhoff & Van (2024) and Shree et al. (2021) have examined the “pain of paying”, the psychological discomfort experienced during spending which tends to diminish when payment is separated from consumption. As a result, when there is a reduction on psychological discomfort associated with spending, people are more inclined to spend on items or services they typically would avoid in daily.

The widespread adoption of digital payment methods including BNPL, credit instruments, e-wallets, and online banking has fundamentally transformed consumer spending decision by significantly altering the way individuals perceive and interact with money. In contrast to cashless transactions, cash payment means physically handing over notes and coins, which triggers this “pain of paying”. This

tangible exchange acts as a psychological barrier for individual, and prevent them overspending (Reshadi & Fitzgerald, 2023). Cashless transactions remove the physical interaction, thereby reducing the salience of expenditures and creating a psychological detachment from spending (Alkadash et al., 2025 and Bai et al., 2025). This detachment lowering individuals spending awareness and contributes to behavioural and emotional changes that promote higher and less restrained consumption. Among these digital payment innovations, BNPL services have emerged as a particularly influential factor in consumer spending. BNPL is a digital financing model that permits consumers to defer payments into one or more interest-free instalments. The rising popularity of BNPL schemes has coincided with the rapid expansion of online shopping, a trend further accelerated by the movement restrictions imposed during global health crisis (Relja et al., 2023). The BNPL model reduces the immediacy and visibility of payment, thereby weakening the consumer's psychological perception of financial loss. Unlike traditional credit cards, which generally require stable income and credit history, BNPL schemes often impose less stringent eligibility criteria, making them accessible to a broader and more diverse consumer base (Di Maggio & Williams, 2022 and Aalders, 2022). The simplified eligibility criteria of BNPL make it more inclusive, reaching segments of society that may not qualify for traditional credit products (Aalders, 2022 and Schomburgk, 2023). Given these developments, consumers are increasingly inclined toward impulsive spending without fully recognising the financial consequences, leading to increased spending with a diminished sense of financial strain.

Supporting this perspective, Presbitero et al. (2023) indicates that expanded credit cards limits encourages overspending, which highlighting how the deferred payment options impact spending behaviour. Several recent studies have also explored the relationship between BNPL services and consumer spending decision.

Ashby et al. (2025), Maesen & Ang (2024), as well as Khan & Haque (2020) all provide evidence that BNPL influences consumer spending decisions. Specifically, Kumar et al. (2024) investigated the effect of BNPL on consumer buying behaviour in online purchases contexts and reported that the adoption of BNPL services led to a 6.42% escalation in aggregate online spending. In the Malaysian context, there are over 6.5 million users engaged in BNPL services offered by providers such as Atome, Shopee PayLater, and rely in first half of 2025. The predominant spending area includes food and restaurant, retail shopping, transportations and services. The market experienced a 44.9% increase in BNPL transaction volume, rising from RM4.9 billion to RM7.1 billion between the first and second halves of 2024, which shown a rapid growth in spending pattern (Consumer Credit Oversight Board, 2025).

2.2.2 Independent Variable: Artificial Intelligence

Self-control is an individual's capacity to manage their emotions, thoughts, and actions when encountering temptations and impulses, especially while striving to achieve long-term goals (Zahrai et al., 2021 and Du & Zhang, 2022). In the context of intertemporal choice, self-control is often examined through individuals' capacity to delay immediate gratification for larger future rewards (Yu et al., 2023). One theoretical perspective that explains self-control is the hot/cool system framework which distinguishes between two interacting modes: the cool system and the hot system (Salehinejad et al., 2021). The cool system is cognitive, emotionally neutral, and enabling deliberate thought (Gagne et al., 2021). In contrast, the hot system is emotionally driven, reflexive, and shaped by basic affective responses such as fear

(Sun et al., 2023). While the cool system serves as the seat of self-regulation and supports goal-directed action, the hot system plays a fundamental role in emotional conditioning and can undermine self-control when it dominates. Failures of self-control occur when the hot system overrides the cool system.

Empirical studies highlight the importance of maintaining cool-system dominance for effective self-control. For instance, self-control can reduce the harmful effects of behaviors including smartphone addiction (Geng et al., 2021) and is linked to decreased levels of depression, anxiety, internet addiction, as well as psychopathological symptoms (West et al., 2021). High self-control is also linked to greater educational and career success, which subsequently contribute to promote greater financial stability (Cobb-Clark et al., 2022) and healthier lifestyle choices, while lack of self-control is associated with problematic behaviors, including poor financial management and unhealthy habits (Conner et al., 2022 and Chavali et al., 2021). These findings suggest that self-control enables individuals to manage short-term impulses in order to prioritize long-term goals. Expanding this evidence, Conner (2022) further reports that individuals with greater self-control tend to respond more strongly to cognitive attitudes and perceived behavioral control, while being less affected by habits and social norm. This suggests that self-control supports deliberate, health-promoting actions over automatic, potentially harmful behaviors. Beyond health, self-control similarly influences financial behavior and consumer spending decisions. Individuals with a strong preference for immediate rewards are more prone to impulsive spending, whereas those with a future-oriented mindset tend to make more prudent consumption decisions (Zahari et al., 2025). Self-control is a key determinants in the regulating consumer spending behavior. Zhao et al. (2025) conceptualize unplanned purchases as a tension between willpower and desire, while Jain et al. (2023) and Mao et al. (2022) frame them as

clear manifestations of self-control failure. Such behavior often occurs when immediate emotional responses override long-term goals. Recent research suggests that impulsive spending can serve as a proxy for low self-control, particularly when driven by situational cues and individual differences in impulsivity (Sun et al., 2023).

The increasing integration of digital commerce has introduced persuasive technologies that challenge consumer self-regulation. BNPL services reduce purchasing friction by separating acquisition from payment, which increases the likelihood of impulsive spending. Moreover, targeted advertising and personalized recommendations delivered through social media and e-commerce platforms amplify this effect. Empirical evidence shows that self-control moderates consumer susceptibility to these digital influences. As reported by Nyrhinen et al. (2023), lower self-control levels are directly associated with an increase in impulsive buying patterns when individuals are exposed to personalized recommendations. Compared to those with higher self-control, reflecting diminished regulatory capacity in highly stimulating digital environments.

The enjoyment derived from social commerce further intensifies unplanned purchasing behavior, as individual who engage frequently with these platforms often experience reduced self-regulatory control Swiątek et al. (2023). This suggest that sustained interaction within digital environments may erode consumers self-regulatory capacity in spending decisions. Consequently, increased time spent in these digital contexts may amplify the likelihood of impulsive purchases and enhance consumers' vulnerability to such behaviour. Additionally, algorithmic personalization accelerates decision-making by generating tailored purchase prompts, disproportionately influencing individuals

with lower self-control (Roy et al., 2024 and Wang et al., 2022). In BNPL payment method, where payment is deferred, the impulsive spending risk increases, especially among consumers with low self-control. Therefore, the impact of AI on spending decisions is significantly moderated by an individual's level of self-control.

2.2.3 Independent Variable: Financial Literacy

With the widespread adoption of financial technology (FinTech) and digital finance, the barriers to accessing financial services have been significantly lowered, making financial literacy increasingly important in this context. This is because increased accessibility to financial products does not necessarily mean better financial decisions. Research indicates that households lacking financial literacy often lack awareness of the consequences of debt-related choices, which may lead to excessive borrowing and financial distress (Jin et al., 2021).

Given its growing significance, understanding the concept of financial literacy has become essential. Financial literacy can be described as an individual's ability to comprehend and apply financial knowledge effectively, which supports better decision-making in areas such as budgeting, investing, saving, risk evaluation, and debt management in personal finance (Amirtha, 2024; Mishra & Malik, 2025). Such decisions often involve mathematical calculations, such as calculating interest rates, loan repayments, and rates of return on investments, as well as assessing the potential costs or benefits of different financial choices. This highlights that mathematical skills are also an integral part of financial literacy, helping individuals

to more accurately assess options and respond to financial changes.

Moazezi et al. (2025) further showed that higher financial literacy is associated with better financial decision-making and demonstrate stronger coping abilities during market fluctuations, as they possess a more effective understanding of financial concepts and stronger information analysis capabilities. Additionally, previous studies have established that financial literacy significantly influences investment, credit, and consumer-related decisions (Ansar et al., 2023; Munawar, 2023; Sady et al., 2024). These findings suggest that financial literacy is a multidimensional skill that encompasses knowledge, analytical skills, and behavioral application in everyday financial decisions.

A wide range of financial literacy measurement instruments assess individuals' knowledge of core financial concepts, including interest rates, inflation, and risk, primarily through objective-based questions. Questions centered around these three concepts have also been proven to be highly effective and accurate in evaluating individuals' understanding of fundamental financial knowledge (Lusardi & Mitchell, 2023). Over time, financial literacy assessment has evolved beyond basic financial concepts. Organisation for Economic Co-operation and Development (2022) highlights that it now covers a broader range of areas, including digital financial products and services, as well as individuals' attitudes toward and engagement with sustainable finance.

According to Arbani & Iqbal (2025), a strong association between financial literacy and financial well-being. This is due to the fact that financial literacy enables individuals to make more responsible decisions regarding consumption, savings,

and budget management, ultimately contributing to improved financial well-being. . The findings of Xie et al. (2024) also suggest that financial literacy has a stronger effect on non-essential (discretionary) consumption than on essential (subsistence) consumption. This implies that individuals with greater financial literacy are more likely to make more rational spending decisions and are less likely to engage in impulsive purchases when dealing with non-essential expenses.

Moreover, financial literacy is also considered a significant determinant of financial technology adoption. Research has demonstrated that financial literacy can enhance an individual's capacity to obtain online financial information, builds trust in digital platforms, and lowers risk aversion, thereby propelling the utilization of digital financial instruments (Yang et al., 2023). The findings of Sujatmiko and Al Kausar (2025) also indicate that financial literacy significantly affects both its adoption and overall consumer financial behaviour. This further illustrates that consumers with higher financial literacy can better identify and respond to the risks posed by emerging financial services. Beyond its role in consumption and technology adoption, financial literacy also functions as a protective mechanism against financial fraud. Wei et al. (2021) reported that individuals with higher financial literacy exhibit stronger fraud detection abilities, especially among those with otherwise low financial awareness. In summary, financial literacy improves individuals' ability to make sound financial decisions, promotes the adoption of financial technology and risk management, and enhances the ability to prevent financial fraud. Financial literacy is also a key safeguard that helps consumers take full advantage of digital financial services while reducing the likelihood of encountering potential risks.

2.2.4 Independent Variable: Demographic Factor

Demographic factors such as age and income continue to play a key role in shaping consumer spending behavior. These characteristics influence preferences, financial priorities, and purchasing decisions across different groups. Even with evolving technologies, consumer behavior often varies significantly within and across demographic segments.

Age is one of the most frequently examined demographic variables. According to Yu et al. (2022), older adults frequently exhibit financial judgment and decision-making errors, which may result from cognitive impairment, memory decline, or dementia. However, even without such conditions, many still show inadequate financial capability. Conversely, middle-aged individuals tend to make fewer financial mistakes than both younger and older adults, likely due to greater experience, higher education levels, and more stable income. As a result, financial errors tend to follow a U-shaped pattern across lifespan (Okamoto & Komamura, 2021 and Nguyen et al., 2022). Besides, younger people are more probable to utilize new tools and technologies since they have grown used to the digital world and are thus more tolerant and adaptable to developments (Mulia & Wardhani, 2024). Older people typically avoid new financial activities, financial instruments and technology out of fear of scams and financial risk, and they frequently lack information and comprehension, in part because they are not given enough advice (Han & Ko, 2025 and Kemp et al., 2024). As people get older, their appetite for risk declines. Young people, due to their limited experience, are generally more willing to take risks in financial decisions compared to older adults, who place a high priority on long-term stability and financial security (Nolte & Hanoch, 2024).

Income is an important factor in determining life quality and a major impact on financial behavior, influencing financial literacy, access to financial tools, and opportunities (Mawad et al., 2022). People with high incomes, who are not under immediate monetary stress, are better able to tolerate unemployment, as they are more likely to have accumulated savings and investments through prior long-term budgetary planning (Simonse et al., 2024). The relationship between unemployment and financial anxiety is stronger among lower-income individuals, who often face credit constraints and lack extra funds, so they prioritize immediate needs (Yeboah, 2024 and Rahman et al., 2021). Moreover, numerous studies have shown a strong connection between income and financial literacy. Therefore, families with higher financial literacy also have higher income mobility and greater resilience (Suryadi et al., 2022). In conclusion, income influences risk behavior, digital access, financial knowledge, long-term planning, and financial capability.

2.2.5 Moderator: Self Control

Self-control refers to the mental capacity to regulate impulses, emotions, and behaviors in alignment with long-term goals (Bertrams et al., 2022). Research by Anatasya et al. (2024), Du Plessis et al. (2025), and Rifani et al. (2024) indicates that individuals with high self-control exhibit greater resistance to impulsive purchases, enhanced financial security, and spending behaviors consistent with budgeting. Conversely, individuals with low self-control tend to incur higher debt levels and face increased risk of financial hardship (Hernandez-Perez & Rambaud, 2025).

The expansion of e-commerce has introduced persuasive technologies that challenge consumer self-regulation. Buy Now Pay Later (BNPL) services reduce purchasing friction by separating acquisition from payment, which increases the likelihood of impulsive spending. Moreover, targeted advertising and personalized recommendations delivered through social media and e-commerce platforms amplify this effect. Empirical evidence shows that self-control moderates consumer susceptibility to these digital influences. Specifically, Nyrhinen et al. (2023) reported that consumers with diminished self-control show increased impulsive buying when exposed to personalized recommendations compared to those with higher self-control, reflecting diminished regulatory capacity in highly stimulating digital environments.

The enjoyment derived from social commerce further intensifies unplanned purchasing behavior, as individual who engage frequently with these platforms often experience reduced self-regulatory control Swiątek et al. (2023). This suggests that frequent interaction in digital environments is linked to lower self-control in spending. Consequently, increased time spent in these digital contexts may amplify the likelihood of impulsive purchases and increase consumers' susceptibility to such behaviour. Additionally, algorithmic personalization accelerates decision-making by generating tailored purchase prompts, disproportionately influencing individuals with lower self-control (Roy et al., 2024 and Wang et al., 2022). In BNPL payment method, where payment is deferred, the impulsive spending risk increases, especially among consumers with low self-control. Therefore, self-control serves as a key moderating factor in the relationship between AI and spending decisions.

2.2.6 Moderator: Risk Aversion

Risk refers to the impact that uncertainty may have on achieving objectives, which can lead to both positive and negative consequences (Azuma & Ibrahim, 2024). Risk aversion refers to the tendency of individuals to refrain from taking risks, even when such actions may yield greater benefits in the long term (Milczarski et al., 2025). Rahman et al. (2023) highlighted that individuals' tendencies toward regret, trust, and overconfidence are significantly associated with their financial risk tolerance. These behavioural characteristics serve as indirect indicators of the degree of risk aversion and elucidate the psychological factors that influence their risk-related decisions. Furthermore, Grable et al. (2024) emphasize that risk aversion represents a transient risk attitude, meaning that individuals' risk preferences can vary depending on the situation or context. This suggests that risk aversion should be viewed as a dynamic response shaped by psychological factors and environmental conditions, rather than a fixed personality trait.

Risk aversion, as a core behavioural tendency, has been extensively shown to affect a wide range of financial decisions. The theoretical model proposed by Bommier et al. (2023) suggested that higher risk aversion strengthens individuals' precautionary saving motives, leading them to accumulate more wealth as a buffer against future uncertainties. During normal economic periods, risk-averse individuals or corporations are more likely to purchase non-life insurance as a safeguard against transaction and bankruptcy-related costs (Ahmed et al., 2025). Furthermore, Honjo et al. (2024) report a negative relationship between risk aversion and angel investment behaviour, indicating that individuals with higher risk aversion are less

likely to participate in high-risk investment activities.

Beyond its direct effects, risk aversion is often examined as a moderating variable to explain how various individual and situational factors influence intention and behaviours across different contexts. The findings of Pham et al. (2023) indicate that risk aversion significantly moderates how conformity affects purchase intention. Specifically, when consumers are concerned about the quality of a product, individuals with higher risk aversion are more susceptible to the influence of others' opinions, thereby generating purchase intention. Moreover, Eshet et al. (2024) found that, in certain disciplines, risk aversion acts as a moderator in the link between academic anxiety and mindfulness, with risk-averse students showing higher mindfulness under high anxiety and risk-seeking students showing lower levels. This suggests that risk aversion can mitigate the negative effects of high anxiety, helping students better regulate their emotions and reduce the occurrence of maladaptive behaviours. Despite the fact that its moderating role extends across multiple fields, extant research on risk aversion as a moderating variable remains limited and warrants further in-depth exploration.

2.2.7 Moderator: Anxiety

Anxiety is a mental health condition defined by tension, worry, and uneasiness about the uncertainty of the future. It is mostly regulated by the brainstem and amygdala and includes both protective actions and physiological reactions to perceived threats (Kenwood et al., 2022). According to Szuhany & Simon (2022), anxiety is a chronic condition that impact around 40% of American adults at some

time in their life. In critical circumstances, it can interfere with daily functioning and reduce quality of life, frequently accompanied by symptoms like breathlessness and an accelerated heartbeat. Across all mental illnesses, comorbidity is common especially depression and phobias frequently interact with anxiety disorders because of the negative bias, inadequate regulation of autonomic arousal, and avoidance behaviors that are characteristics of these conditions can be caused by disruption of particular nodes in the prefrontal cortex (PFC) that interface with inhibitory systems (Kalin, 2020 and Kenwood et al., 2022).

Anxiety significantly affects sleep, with at least 50% of individuals with anxiety frequently experiencing sleep disturbances, particularly insomnia. This results in further aggravation of anxiety because of a vicious cycle in which poor sleep quality and insufficient sleep (Chellappa & Aeschbach, 2022). During the COVID-19 pandemic, anxiety levels escalated, with a considerable proportion of individuals experiencing significant negative effects on their mental health due to feelings of loneliness, social isolation, economic pressures, fear of infection, and uncertainty about the future, including the trajectory of the epidemic (Vidović et al., 2024 and Zhu et al., 2023). According to Santomauro et al. (2021), there has been a significant reduction in mental health worldwide, with severe depression cases rising by 27.6% and anxiety cases rising by 25.6%.

In the context of financial behavior, anxiety has been demonstrated to play a substantial role in influencing individuals' financial judgments and spending behavior. Higher anxiety makes people less likely to take chances and may make financial decisions more difficult (Xin et al., 2023). Anxious people may find it more difficult to implement their knowledge into practice, which might limit the overall advantages of financial literacy. This psychological condition can also

reduce the beneficial influence of financial literacy on financial behavior (Grable et al., 2020). According to research, financial anxiety lowers self- confidence, affects cognitive function, and makes people prefer low-risk financial options. For instance, select a very secure project like savings instead of an investing project (Hamzah et al., 2024).

Anxiety is no longer just considered an independent variable in behavioral finance, it has increasingly been examined as a psychological moderator that affects the direction and intensity of correlations between important dimensions including financial behavior, risk perception, and financial capability (Jones, 2021 and Grable et al., 2020). According to Jones (2021), anxiety was initially considered as a purely negative factor, but the conclusion was that anxiety could also interact with things like perceived control or financial literacy, which might reduce the degree to which these things influence real behavior. This shows that anxiety can act as a moderator influencing financial decisions.

Although direct evidence on the moderating role of anxiety in BNPL-related spending decisions is limited, the characteristics of BNPL services, like delayed payments and financial uncertainty, along with personal anxiety levels, may affect personal financial decision-making and the use of financial tools.

2.3 Proposed Conceptual Framework

The proposed conceptual framework depicts consumer consumption decisions in

the BNPL context by integrating cognitive (financial literacy), demographic factor, technological (artificial intelligence), and psychological (risk aversion, anxiety, self-control) determinants in a singular, empirically testable model (Cavite et al., 2022).

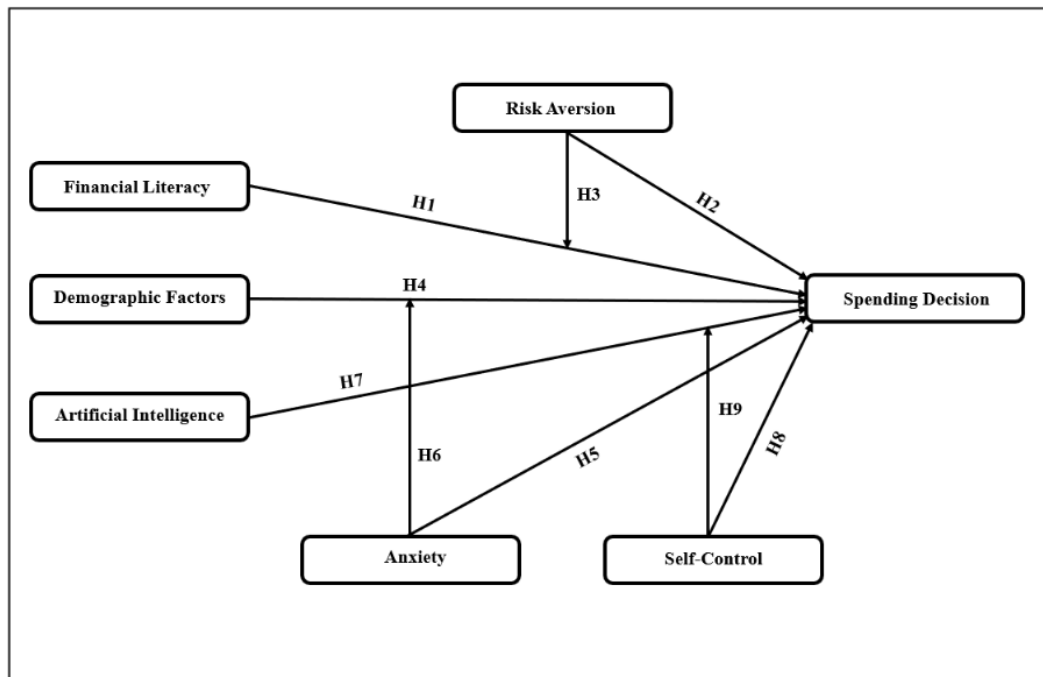


Figure 2.3. Proposed Conceptual Framework. Adapted form Cavite et al., (2022), Dhewi et al. (2023), Di Crosta et al. (2021), Kamis et al. (2021), Kee et al. (2025), Sobaih & Elshaer (2023), and Song & Wang (2024)

Financial literacy will reduce impulse BNPL use as financially literate consumers are better placed to calculate interest, charges, budgeting, and long-term credit implications (Kee et al., 2025). Empirical evidence shows that increased financial awareness relates to more mindful consumption and reduces susceptibility to overextension of credit (Ammer & Aldhyani, 2022). Financial literacy can also indirectly operate by driving budgeting behavior and deployment of mental

resources, and in doing so mediate technology and affective states influences on consumption (Bai, 2023).

Demographic characteristics (age and income) invariably shape financial socialization, limitations, and predispositions, and therefore determine BNPL adoption and spending habits (Kamis et al., 2021). Certain cohorts—particularly young adults and low-income earners—are found to have greater usage of BNPL and higher impulses for impulse purchasing, suggesting considerable heterogeneity to be explored (Hossain & Siddiqua, 2022).

Artificial intelligence (offer personalization, offer prediction, frictionless checkout, and auto-approval) alters the context of choice by reducing search and action costs and enhancing offer salience, possibly elevating purchase intent and impulse BNPL expenditure (Song & Wang, 2024). Explainable AI and multi-criteria decision methods analysis concludes both the promise and risk of algorithmic nudges in financial situations (Černevičienė & Kabašinskas, 2022). Early empirical studies from new fintech economies document that AI functionality statistically changes consumers' behavior and decisional pace, emphasizing the need to study AI exposure as an independent predictor (Akour et al., 2024).

Risk aversion is theorized to directly suppress BNPL uptake and over-spending, and to amplify the hedging role of financial literacy (i.e., literate but risk-averse clients are especially cautious) (Sobaih & Elshaer, 2023). Anxiety, as a feeling in reaction to uncertainty or stress, can potentially fuel emotionally driven consumption—either initiate coping purchases or credit avoidance—and is therefore expected to increase impulsive BNPL spending in some situations (Di

Crosta et al., 2021).

Self-control, the capacity to resist short-term temptation, reduces directly on impulse purchasing and BNPL overuse; effective self-control strategies identified in meta-analytic and field studies suggest interventions that can be integrated into fintech design (Davydenko et al., 2021). Experimental and field evidence on impulse purchasing suggests that shopping lifestyle and situational cues interact with self-control to impact actual purchases, offering concrete behavioral levels for intervention (Dhewi et al., 2023).

All these elements combined form an integrative and functioning framework linking cognitive capacity, socio-demographic factors, AI-commerce, and psychological factors in predicting and explaining BNPL expenditure in contemporary fintech environments.

2.4 Hypothesis Development

Financial literacy may be described the capacity of individuals to understand and use financial knowledge and skills effectively across areas including saving, budgeting, investing, risk assessment, and debt management, which enabling them to make informed financial decisions (Amirtha, 2024; Mishra & Malik, 2025). It encompasses not only fundamental financial knowledge (e.g., interest rates, inflation, risk) but also analytical and mathematical skills necessary for evaluating financial options, adapting to market changes, and responding to emerging digital

financial services. As a multidimensional construct, financial literacy integrates knowledge, analytical capacity, and behavioural application, enabling individuals to improve financial well-being, exercise prudent consumption, adopt financial technologies, and protect against financial risks and fraud (Arbani & Iqbal, 2025; Xie et al., 2024 and Wei et al., 2021).

In BNPL settings, which allow consumers to delay payments and may encourage impulsive purchases, financial literacy may act as a protective factor. Consumers with limited financial literacy may not fully comprehend key financial elements such as interest rates, repayment terms, or basic budgeting, which increases their likelihood of engaging in financially risky behaviours such as overspending (Cervellati et al., 2025). In contrast, consumers with stronger financial literacy are more likely to understand the long-term effects of debt and interest accumulation, and therefore tend to avoid BNPL-driven consumption unless it aligns with their budget and financial goals. These findings are supported by Sujatmiko and Al Kausar (2025), who show that financial literacy significantly influences both the adoption of Paylater services and the manner in which consumers manage the associated risks.

Based on the above discussion, the following hypothesis is developed.

H1: There is a relationship between financial literacy and spending decisions on BNPL.

Risk aversion refers to the tendency of individuals to avoid uncertainty, often choosing safer options even when taking risks may lead to better long-term

outcomes (Milczarski et al., 2025). In the financial domain, individuals who are risk-averse tend to engage in precautionary behaviours, such as increasing savings or avoiding high-risk investments (Bommier et al., 2023 and Ahmed et al., 2025). This cautious approach extends to their use of financial products, where they tend to avoid mechanisms that involve uncertain future outcomes or potential losses. Consequently, they may be less inclined to adopt tools involving deferred liability, such as BNPL services, which require future repayment and may incur additional costs.

Raj et al. (2025) found that perceived risks reduce consumers' intention to use BNPL services. As individuals with higher levels of risk aversion are more sensitive to potential losses, they are likely to perceive greater risks in BNPL usage, which can influence their spending decisions. According to Halim et al. (2024), the use of BNPL services is linked to increased impulsive purchasing and a higher likelihood of financial strain, particularly for younger and lower-income individuals. As risk-averse individuals tend to avoid financial products that could create long-term repayment obligations or financial instability, they are likely to limit their BNPL spending to mitigate such risks.

Beyond its direct influence on BNPL usage, risk aversion can also play a moderating role in the link between financial literacy and spending behaviour. Zhuang & Yang (2025) reported that individuals with higher risk aversion are more likely to engage in retirement planning, regardless of their level of financial literacy. These results imply that risk aversion affects how effectively financial literacy is translated into real financial actions. Based on the Theory of Planned Behaviour (Ajzen, 1991), risk aversion can be viewed as an extension of perceived behavioural control, influencing the process by which individuals translate intentions into actual

behaviour. While financial literacy strengthens individuals' capacity to assess and manage financial tools, high risk aversion can hinder action, as individuals become more sensitive to uncertainty and possible losses. In a BNPL context, due to the existence of future repayment obligations, individuals with high risk aversion may limit related spending even if they fully understand the advantages of the product, thereby weakening the impact of financial literacy on BNPL usage.

Based on the above discussion, the following hypothesis is developed.

H2: There is a relationship between risk aversion and spending decisions on BNPL.

H3: Risk aversion moderates the relationship between financial literacy and spending decisions on BNPL.

Even with constant innovation and the introduction of new payment options, demographic characteristics continue to be important indicators of consumer purchasing patterns. The term "demographics" refers to the characteristics of a population in a certain location, such as age, income, gender, race, and religion. Nonetheless, customers frequently exhibit notably distinct trends in their usage of payment instruments, even within certain demographic categories. Therefore, the specific emphasis of this study will be on how age and income influence spending decisions on BNPL services.

Age is a crucial demographic factor that significantly influences spending behavior

in BNPL usage. Since BNPL is equivalent to providing an additional credit plan, in addition to accepting individuals with weaker creditworthiness, BNPL does not need interest payments. Therefore, it is not only convenient and flexible, but also very popular especially among young consumers (Kumar et al., 2024). According to Waliszewski et al. (2024), age and BNPL show an inverse relationship, meaning older consumers use them less, while younger people, the likelihood of using BNPL services is higher among generations Y and Z. According to the Bank for International Settlements (2023) states that most users of the BNPL app are younger than 35. This also confirms that in the digital age, young people are more open to new payment methods (Chen et al., 2024). Research shows that BNPL may elicit intense psychological responses such as instant gratification, while masking the consequences of delayed payment. Younger users, driven by emotional impulses and digital familiarity, are particularly susceptible to marketing stimuli and interface designs associated with BNPL (Juita et al., 2024). Despite the numerous advantages and accessibility of BNPL, including its convenience and minimal threshold, young individuals frequently ignore the potential repayment risks.

Another important demographic component is income, spending decisions and access to financial resources such as BNPL services, which are strongly predicted by income level. According to Pettersson & Möller Dahlberg. (2025) and Greene et al. (2024), research indicates that individuals with lower income are often younger, particularly among Generation Y and Z, as they are at the early stages of their careers. Therefore, these younger and lower-income customers are more likely to use BNPL as a tool for solving short-term liquidity shortages, they typically underestimate and do not plan for long-term risks and costs (Mavridis & Gebeyehu, 2023). Though their use is typically more calculated, high-income people also utilize BNPL for its ease and budgetary advantages. Income also has an impact on risk tolerance and self-control. High earners are less anxious about money and feel

more secure, which makes them less likely to be influenced by marketing incentives or impulsive purchases due to discounts compared to lower income earners (Appelhans, 2023).

Based on the above discussion, the following hypothesis is developed.

H4: There is a relationship between Demographic factors (age, income) and spending decisions on BNPL.

Anxiety, particularly financial or economic anxiety, has been demonstrated to reduce perceived control and cognitive clarity, which impairs decision-making in difficult situations (Huang, 2025). Despite a lack of direct empirical data, related research offers important insights into the relationship between anxiety and decisions to spend money on BNPL services. For instance, a study on online purchasing behavior discovered that anxiety and depression significantly raise the possibility of developing an addiction to online purchasing, whereas a negative financial perspective (Erzincanlı et al., 2024). This implies that people may react to anxiety by making impulsive or emotionally motivated purchases, particularly in digital environments where instant gratification is readily available (Ellyawati & Tarigan, 2024). These results suggest that people who are concerned would either ignore BNPL services completely out of fear of future responsibilities or abuse them as a temporary fix.

For a long time, demographic variables like age and income have been used to forecast the financial behavior of consumers. However, these factors can be affected by psychological factors, particularly financial anxiety, leading to biased

predictions. For instance, financial anxiety is more common in young people, according to various research, which can result in impulsive spending or a decreased usage of BNPLs while making spending decisions (Hassan et al., 2023). Similarly, people with low incomes are more inclined to suffer from financial concern due to insufficient income to cover monthly expenses or repay existing debts, which could affect how they use BNPL services (Hamzah et al., 2024).

Throughout the COVID-19 outbreak, uncertainties about the future, such as job, income, savings and when the pandemic lockdown would end, significantly heightened financial and economic anxiety (Simonse et al., 2022). Even those with steady or high salaries felt fears of future shortages. As a result, people began storing and making impulsive purchases of necessities like food, medication, and home supplies. Unusual consumer behaviors were extensively reported, most notably the worldwide stockpiling of toilet paper (Laato et al., 2020). According to Savolainen et al. (2021), young people appear to have higher levels of anxiety during this pandemic. This may be because many young people have unstable earnings and limited savings, leading them to engage in “revenge buying” to ease their anxiety (Hashmi, 2021). Consequently, anxiety made panic buying and "revenge consumption" have been observed across different income and age groups.

Based on the above discussion, the following hypothesis is developed.

H5: There is a relationship between anxiety and spending decisions on BNPL.

H6: Anxiety moderates the relationship between demographic factors (age,

income) and spending decisions on BNPL.

The integration of AI into various industries has significantly transformed consumer spending decisions by reshaping the way individuals interact with products and services online. AI technologies including personalized recommendation systems, machine learning models, and forecasting algorithms are widely employed to shape consumer spending behaviour and enhance the user purchasing experience (Alfakihuddin et al., 2025 and Hou et al., 2025). According to the findings of Bolesnikov et al. (2022), 86.7% of AI users believe that AI is beneficial for purchasing decisions. These technologies analyze consumer data, preferences, and browsing history in real-time to deliver tailored suggestions to the individual, thereby increasing the probability of purchasing. Prior research suggests that AI-driven systems enhance consumer engagement, interest in promoted products, and improve purchasing process (Sung et al., 2021 and Asante et al., 2023).

The application of artificial intelligence also reduces the information overload faced by consumers, making the decision-making process more efficient (Darnell & Gopalkrishnan, 2023). When combined with BNPL payment schemes, which enabling consumers to attain immediate possession of goods while delay payment without incurring upfront costs, the willingness of individuals to spend become stronger (Waliszewski et al., 2024). The reduction in both cognitive and financial barriers encourages more frequent purchases, as consumers perceive lower risk, additional liquidity and greater ease in completing transactions. Thus, the hypothesis is :

H7: There is a relationship between Artificial Intelligence and spending

decisions on BNPL.

Self-control serves as a key mechanism in consumer spending behavior by regulating impulses and enabling individuals to favour their long-term financial goals instead of immediate gratification. High self-control enables consumers to exhibit disciplined spending habits which align with their budget and avoid unnecessary purchases, thereby contribute to greater financial security (Du Plessis et al., 2025). Conversely, deficits in self-regulation heighten consumers' susceptibility to impulsive purchasing, makes it difficult to resist tempting offers, and increases the likelihood of accumulating debt and financial hardship (Nyrhinen et al., 2023 and Alshebami & Aldhyani, 2022).

In AI-driven platform such as e-commerce and social media, users are often targeted with algorithmically curated content, limited time promotions, and personalized product recommendations. These tools are designed to capture user attention and facilitate rapid decision-making that may bypass rational evaluation. The influence of AI is greater for consumers with low self-control. These individuals are more susceptible to immediate rewards and less likely to delay gratification (Schnell et al., 2021). Alongside AI-driven marketing tactics, financial innovations like BNPL payment method also lower psychological barriers of individual to spending by allowing them to receive products without paying the full payment, thereby increasing the attractiveness of spending decision.

Conversely, high self-control demonstrates greater cognitive deliberation in their spending decisions. These individuals have greater ability to resist persuasive information and evaluate the future-oriented consequences of their decisions (Bai,

2023). Therefore, the effect is likely to vary depending on the consumer's level of self-control.

H8: There is a relationship between self control and spending decisions on BNPL.

H9: Self control moderates the relationship between Artificial Intelligence and spending decisions on BNPL.

2.5 Conclusion

In this chapter, the foundational theories and relevant literature supporting this study were reviewed to establish a strong theoretical and empirical basis. The Theory of Planned Behaviour and Self-Control Theory provide the conceptual framework for understanding the psychological and behavioral factors influencing consumer spending decisions.

The literature review explored several key independent variables that have been shown to impact consumer spending decisions. AI, influences consumer choices by delivering personalized recommendations and targeted marketing. Demographic factors, including age and income level shape spending decision by reflecting differences in financial capability, preferences, and priorities. Financial literacy affects an individual's ability to make informed and rational spending decisions,

while self-control regulates impulsive spending. Anxiety influences financial decision-making through emotional responses, and risk aversion affects the willingness to engage in financial commitments.

Significantly, this chapter highlighted the moderating effects of several psychological traits on the relationships between independent variables and spending decision. Self-control moderates the relationship between AI and consumer spending decisions, suggesting that individuals with higher self-control may better resist AI-driven marketing influences than those with lower self-control. Similarly, anxiety moderates the effect of demographic factors on spending decisions, indicating that emotional states can alter how demographic characteristics translate into financial behaviour. Risk aversion moderates the relationship between financial literacy and spending decisions, highlighting that an individual's tolerance for risk influences the extent to which financial knowledge impacts spending patterns.

Drawing upon these theoretical perspectives and empirical findings, the chapter developed nine testable hypotheses. These hypotheses aim to elucidate the dynamic interplay between psychological traits, demographic factors, technological factors, and financial behaviours in shaping consumer spending decisions in the BNPL context.

CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter describes the research methodology adopted in the study and explains the procedures involved in data collection and analysis. It addresses the research design, sampling approach, development of the questionnaire, measurement of variables and constructs, data collection procedures, and statistical methods applied. Data were collected using a structured questionnaire, producing quantitative information for analysing BNPL spending behaviour in a systematic manner.

3.1 Research Design

Utilizing a descriptive research design, this research aims to examine Malaysian consumers' spending decisions in the context of BNPL services. Descriptive research is appropriate when the study aims to present an accurate account of events, behaviors, or situations without manipulating the variables. It is useful for examining associations among variables and for documenting phenomena in their natural context. This study seeks to analyse impact of demographic factors, levels of financial literacy, and artificial intelligence are related to consumer spending behaviour in BNPL. Moreover, descriptive research is essential for systematically presenting the current conditions of a population, thereby offering a factual basis for further analysis. For this reason, the descriptive approach provides a clear and structured understanding of BNPL practices in Malaysia and the

elements influencing consumer decision-making.

3.2 Sampling Design

3.2.1 Target Population

To maintain data accuracy and align with the research objectives, the study stipulated that all respondents must come from the predefined target group. The target group consists of individual consumers in Malaysia who used BNPL services, forming the core elements of the study, with each respondent being considered an independent unit of analysis. This study focused on users currently using BNPL services because their consumption decisions were in a dynamic process, better reflected the role of demographic characteristics, financial literacy levels, and perceptions of artificial intelligence in actual consumption behavior. According to Bank Negara Malaysia (2024), the number of active BNPL users in December 2024 was approximately 5.1 million. Therefore, the size of the target population in this study was estimated at around 5.1 million individuals.

3.2.2 Sampling Frame and Technique

In an ideal scenario, the study would target all individuals in Malaysia who are currently engaged in using BNPL services as its sampling population. This would involve accessing user databases from major BNPL service providers, such as Atome, Shopee PayLater, and Grab PayLater. However, due to concerns regarding commercial confidentiality and privacy protection, researchers were unable to obtain complete user lists directly.

Consequently, given the inaccessibility of a complete user list, this study employed a non-probability sampling strategy, combining purposive and convenience sampling to identify respondents. Convenience sampling was used to identify respondents through a predetermined set of accessible online and offline channels. These channels included social media platforms (e.g., TikTok, Facebook, and Instagram), online communities focused on e-commerce and personal finance, and on-campus questionnaire distribution. This approach was strategically selected because these channels enabled the study to reach digitally active consumers across different age groups, including younger adults, who constituted a significant segment of BNPL users.

To ensure the relevance of the sample, purposive sampling was applied by targeting individuals who were familiar with BNPL services. The questionnaire included items related to BNPL usage behaviour, such as whether respondents considered the availability of BNPL before making a purchase and whether the use of BNPL influenced their spending amount. These questions helped capture insights from respondents who had awareness or experience with BNPL services. Although convenience sampling may reduce the generalizability of the results, this combined approach was deemed suitable and effective for this study, given the practical

constraints and the need to efficiently reach a specific and dispersed target population (Creswell & Creswell, 2018).

The data collection process was conducted in Malaysia, with a sample of respondents drawn from three major urban centers: Kuala Lumpur, Selangor, and Penang. These locations were selected as they represent key hubs of e-commerce activity and digital payment adoption, which underpin the growth of BNPL services in Malaysia (Mordor Intelligence, 2025; Research and Markets, 2024). To enhance representativeness, the study included adult consumers from various age groups. Young adults and middle-aged consumers, particularly those aged between 21 and 45 years old, were of particular interest, as they represent a significant proportion of BNPL users in Malaysia (Fintech News Malaysia, 2025).

3.2.3 Sample Size

Table 3.1

Krejcie & Morgan Table

N (Population's Size)	S (Sample's Size)
50000	381
75000	382
1000000	384

Note. From Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for

research activities. *Educational and Psychological Measurement*, 30(3), 607–610.

Malaysian BNPL users constitute the target population of this study, with an estimated size of approximately 5.1 million individuals (Bank Negara Malaysia, 2024). Due to the large population, the sample size was determined based on the Krejcie and Morgan (1970) table, which outlines suitable sample sizes for different population groups. According to their recommendations, for populations exceeding one million, a minimum sample of 384 respondents is considered sufficient to provide a statistically reliable representation of the population.

To enhance representativeness and account for potential nonresponses or incomplete surveys, 600 questionnaires were distributed and successfully collected from respondents across three major urban centers: Kuala Lumpur, Selangor, and Penang.

3.3 Data Collection Methods

3.3.1 Primary Data

Data from respondents' questionnaire responses was used in this investigation, which constituted primary data. Our study used the survey approach, with the

primary tool being a structured questionnaire. Primary data collection allowed researchers to focus on a particular target audience and region. Therefore, the target population of this survey was Malaysians across all age groups. Since the focus of this research was on spending decisions linked to BNPL, a service that could be used by anyone of any age, there was no age restriction.

The adoption of surveys was justified by their affordability, accessibility, and effectiveness in collecting region-specific data, particularly within the Malaysian context. Questionnaires were used to acquire a better comprehension of respondents' views, beliefs, and behaviors in relation to the study variables.

We mainly used Google Forms to create online surveys as part of our data gathering strategy because of the benefits and convenience of technology. This improved the reliability and legitimacy of the data by increasing exposure and coverage, allowing respondents to participate in different states. Our target respondents received a link to the Google Form, which they used to access and complete the survey.

3.3.2 Questionnaire Design

For this study, 23 questions were provided, and participants were told to attentively follow the instructions and select the most appropriate responses. There were three primary components of the questionnaire. The first section focused on the dependent variable related to the spending decisions on BNPL. The second section examined the independent variables, including Financial Literacy, Demographic

Factors, and Artificial Intelligence. The third section covered the moderating variables, consisting of Anxiety, Risk Aversion, and Self-Control. The majority of the second and third parts are assessed using a 5-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

3.3.3 Questionnaire

Table 3.2:

Survey Instrument

Variables	Label	Measurement Item	Scale Description	References
-	B1	State	– Kuala Lumpur – Selangor – Penang – Others	(Yaacob et al., 2022)
Spending Decision on BNPL (DV)	DV1	Do you look for the availability of a BNPL option before making a purchase?	– Yes – No	(Porwal & Devani, 2024)
	DV2	Has using BNPL affected the amount you usually	– Yes – No	

		spend?		
Financial Literacy (FL)	FL1	“I carefully manage my personal financial needs.”	Strongly Disagree	(Kenian Irsya, 2024)
	FL2	“I have knowledge of a financial product before using it.”	Disagree	
	FL3	“I choose spending rather than saving.”	Neutral	
	FL4	“I accept a certain level of risk when investing.”	Agree	
Demographic Factors (DF)	D1	Age	21-25 26-30 31-35 36-45 Above 45	(Khan, 2022)
	D2	Monthly Income (RM)	Less than 3,000 3,001 to 4,000 4,001 to 5,000 Above 5,001	
Artificial Intelligence	AI1	AI enhances audience, image, and sentiment	Strongly Disagree	(Song &

(AI)		analysis, which influences consumer spending decisions.	Disagree Neutral Agree Strongly Agree	Wang, 2024)
	AI2	AR and VR supported by AI are utilized for marketing and user engagement, shaping spending behavior.		
	AI3	AI uses customer-related data such as purchases and demographics to influence spending patterns.		
	AI4	AI tools for brand logo recognition help analyze user interests and guide purchasing decisions.		
Risk Aversion (RV)	RV1	“Even if BNPL offers attractive benefits, I hesitate to use it because of the risk of overspending or debt.”	Strongly Disagree Disagree Neutral Agree Strongly Agree	(Geetha, et al., 2023 and Sobaih & Elshaer, 2023)
	RV2	“I avoid using BNPL because I see it as financially risky.”		
	RV3	“I am unwilling to take risks when using BNPL for		

		purchases.”		
Anxiety (A)	A1	“I often feel mentally tired.”	Strongly Disagree Disagree Neutral Agree Strongly Agree	(Sharma, 2021)
	A2	“I sometimes feel so upset that I can cry.”		
	A3	“I often feel overwhelmed by my difficulties.”		
	A4	“I worry too much about things that are not important.”		
Self-Control (SC)	SC1	“I focus on enjoying the present rather than planning for the future.”	Strongly Disagree Disagree Neutral Agree Strongly Agree	(Mawad et al., 2022)
	SC2	“I would rather spend money now than save it for the future.”		
	SC3	“The main purpose of money is to be spent.”		

3.4 Proposed Data Analysis Tool

3.4.1 Descriptive analysis

It is employed to provide an overview of the dataset, to summarise the characteristics of the respondents in a clear and meaningful way, and to gain insights into the distribution of the data without making inferences or predictions about a larger population. Descriptive analysis serves as a statistical technique used to analyse data and synthesize the characteristics of collected dataset, without the intention of making generalisations beyond the sample. This includes the calculation of statistical measures, including the mean, median, mode, standard deviation, and variance, coupled with the visual representations including tables, graphs, and charts to facilitate clear data presentation. This study utilizes the Statistical Package for the Social Sciences (SPSS), a widely recognized tool for quantitative data analysis. SPSS is employed to compute central tendency indicators to summarise average response patterns, and measures of dispersion (standard deviation and variance) to examine variability within the dataset.

3.4.2 Reliability Analysis

Reliability analyses are employed to evaluate the internal consistency among the measurement items applied within this study. It is critical to ascertain the data collected accurately reflect the constructs under investigation and the results can be interpreted with confidence. This allows researchers to ensure their instruments are reliable, thereby enhancing the accuracy of the results. Also, reliability analysis helps researchers identify potential weaknesses in their research instruments and

make necessary adjustments.

The predominant metric for evaluating internal consistency is cronbachs alpha (α), it evaluates the average correlation among items within construct. The coefficient operates on a scale from 0 to 1, a higher coefficient indicating stronger reliability and greater interrelation between items. As advocated by Pallant (2010), for scales with fewer than 10 items, a value exceeding 0.50 is considered acceptable, while values greater than 0.80 reflect exemplary consistency. Conversely, α below 0.50 reflect weak inter-item reliability, implying the observed variables may not effectively capture the same theoretical dimension. Cronbach's Alpha depends on both the number of items their covariance. A very high coefficient (greater than 0.95) may not necessarily indicate extremely high reliability; instead, it can be a sign of redundancy in the scale items.

Alongside α , Composite Reliability (CR) is utilised to further examine the internal consistency and reliability of a construct. CR is considered a more accurate reliability indicator in structural equation modelling (SEM), as it takes into account the actual factor loadings of items rather than assuming that all items measure the same trait using the same scale in α . A construct is regarded as reliable when value surpassing 0.70, whereas values above 0.95 may indicate item redundancy.

Furthermore, indicator reliability is determined by analysing the factor loadings of each measurement item on its corresponding construct. This analysis is used to determine how well statements measure the intended concept. According to Truong and McColl (2011) and Hulland (1999), a standardized factor loading should attain

a minimum threshold of 0.50, with values exceeding 0.70 serving as the benchmark. High values signify the construct sufficiently explains the variance of the indicator.

Moreover, convergent validity is assessed using Average Variance Extracted (AVE). AVE quantifies the proportion of variance that is captured by a construct. In general, AVE value should be at least 0.50, which suggests sufficient convergent validity (Hair et al., 2021; Franke & Sarstedt, 2019; Fornell & Larcker, 1981). However, the value of 0.40 is deemed permissible if the composite reliability value is adequate.

Lastly, discriminant validity is established via heterotrait monotrait ratio of correlations (HTMT). HTMT measures the similarity between latent variables in the model. Simulation studies suggest that values less than 1 are considered acceptable and indicate that the constructs are different. Conversely, values above this threshold indicate insufficient discriminant validity (Henseler et al., 2015 and Hair, 2021).

3.4.3 Inferential analysis

Inferential statistics employed to test hypotheses of this research as well as evaluate the relationships between variables. Inferential statistics allow conclusions to be drawn from sample data and generalised to a wider population.

Firstly, variance inflation factor (VIF) is applied detect potential multicollinearity issues among independent variables in regression models. Multicollinearity occurs when two or more predictor variables exhibit a high degree of correlation, leading to increased standard errors and reduced model accuracy. Generally, a VIF value equal to 1 indicates no multicollinearity is detected among factors, while higher VIF value suggests stronger correlations and more severe multicollinearity (Fiveable, 2024; Johnston et al., 2018). Researchers recommend a VIF threshold of below 5 to ensure the path coefficients do not exhibit bias by multicollinearity.

Next, partial least squares structural equation modelling (PLS SEM) is employed to analyze the relationship among the latent and observed variables. Path coefficient is used to measure the relative strength and direction of the effect of a causal variable on an outcome variable. Positive coefficient indicates a positive linear trend, where a rise in the independent variable corresponds to a concurrent increase in the dependent variable; conversely, negative coefficients reveal a divergent path.

Moreover the significance of hypothesized relationship is assessed using the bootstrapping. This technique involves resampling from an initial dataset to generate a sampling distribution by repeatedly drawing random samples with replacement (Streukens & Leroi-Werelds, 2016). Bootstrapping enables the estimation of statistical measures such as standard errors, confidence intervals, t-values, and p-values. These statistics are used to determine whether the hypothesized relationship between variables are statistically significance.

Coefficient of determination (R^2) serves as a metric for the model's explanatory power, as it quantifies the proportion of variance in explained variable that is

explained by the collective influence of predictor variable (Chicco et al., 2021). In social sciences, an R^2 value ranging from 0.20 to 0.50 is considered acceptable (Gupta et al., 2024). Additionally, the F-square (f^2) to determine the incremental effect of each exogenous variable, with larger values indicating a more substantial effect. Following the f^2 guidelines established by Cohen (1988), effect sizes are categorized as small ($f^2 \geq 0.02$), medium ($f^2 \geq 0.15$) and large ($f^2 \geq 0.35$).

Lastly, Q-squared (Q^2) is utilized to assess the predictive relevance of model. It measures the model's predictive power and ensuring the relevance of the hypothesized relationships. Positive value signifies the presence of predictive relevance, whereas a negative value indicate a lack of predictive relevance (Inthavong et al., 2023).

3.5 Conclusion

This chapter has outlined and discussed the research design, sampling, data collection techniques, questionnaire, measurement structures, data processing methods, and suggested analytical tools. Following the requirement, based on a 95% confidence level and a $\pm 5\%$ margin of error, at least 384 respondents were needed. Therefore, a total of 600 valid questionnaires were selected for analysis. Additionally, this chapter and the following chapter were related, as the content and elements discussed in this chapter served as the fundamental framework for the subsequent analysis. Based on this groundwork, the next chapter would discuss the findings and conclusions related to the research questions and hypotheses.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

The analysis of data and interpretation are presented in this chapter by using SmartPLS 4.0 for the procedure for analyzing data to assess measurement and structural models, while the demographic features of the respondents are examined using SPSS. Respondents from Kuala Lumpur, Selangor, and Penang are the main subjects of our study. This study obtained 600 valid responses from participants, which were used for the analysis presented in this chapter.

This chapter includes descriptive statistics about the profiles of the respondents as well as numerical and tabular data. The results of hypothesis testing are also represented to assess the statistical significance of the relationships among those explanatory variables, moderator variables, and the dependent (outcome) variable.

4.1 Descriptive Analysis

The purpose of descriptive analysis used to facilitate a comprehensive in-depth knowledge of the data. Section A, which consists of respondents' demographic characteristics, was analyzed. The findings are presented systematically through tables and pie charts for ease of interpretation.

4.1.1 Respondents' Demographic Profiles

The purpose of research examines demographic figures: state, age, and monthly income. Each variable is explained separately in the subsections below.

4.1.1.1 State

Table 4.1:

State's Descriptive Analysis

		Count of Responses	Percentage Distribution	Valid Percent	Cumulative Frequency Percentage
Valid	Kuala Lumpur	149	24.8	24.8	24.8
	Selangor	161	26.8	26.8	51.7

	Penang	290	48.3	48.3	100.0
	Total	600	100	100	

Source: Developed for study.

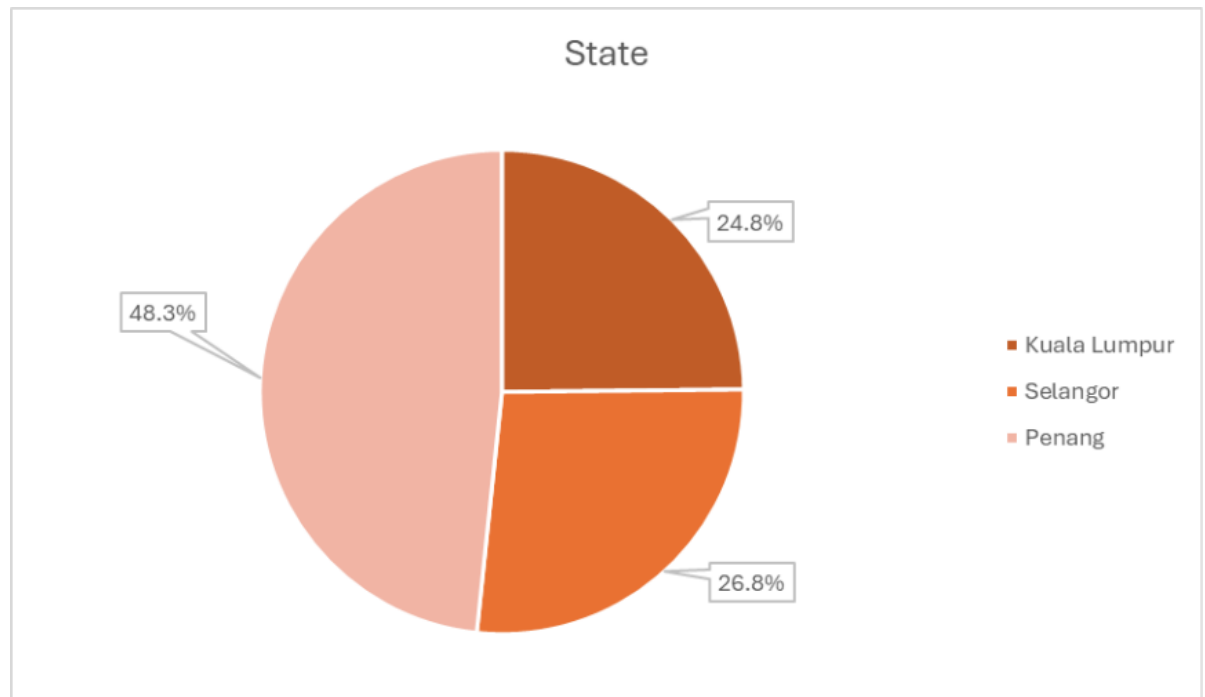


Figure 4.1. State's Descriptive Analysis. Source: Developed for study.

As summarized in table 4.1 and figure 4.1, the results illustrated that 48.3% (290 respondents) of the survey are from Penang, followed by 26.8% (161 respondents) from Selangor. Meanwhile, the remaining 24.8% (149 respondents) are from Kuala Lumpur. These figures indicate that the highest number of respondents for this study are located in Penang, while Kuala Lumpur represents the smallest portion of the sample.

4.1.1.2 Age

Table 4.2:

Age's Descriptive Analysis

		Count of Responses	Percentage Distribution	Valid Percent	Cumulative Frequency Percentage
Valid	21-25	324	54.0	54.0	54.0
	26-30	103	17.2	17.2	71.2
	31-35	49	8.2	8.2	79.3
	36-45	96	16.0	16.0	95.3
	Above 45	28	4.7	4.7	100.0
Total		600	100	100	

Source: Developed for study.

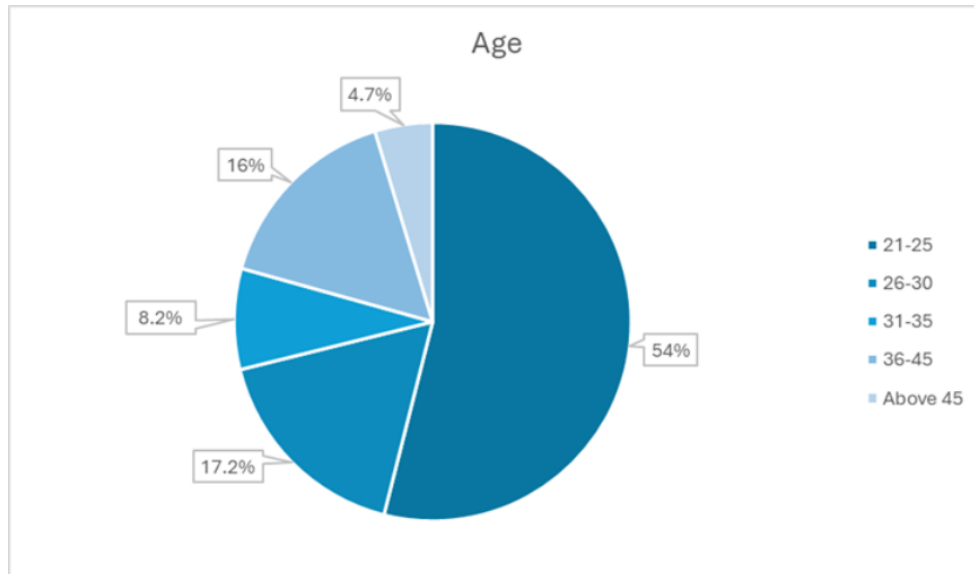


Figure 4.2 Age's Descriptive Analysis. Source: Developed for study.

As summarized in table 4.2 and figure 4.2, the results illustrated that 54.0% (324 respondents) in the survey are under the 21-25 age group, and it follows by 17.2% (103 respondents) in the 26-30 age group. Respondents aged 36-45 accounted for 16.0% (96 respondents), while 8.2% (49 respondents) fell into the 31-35 age category. The remaining 4.7% (28 respondents) are aged Above 45. These figures indicate that most of the respondents were young adults aged between 21 and 25.

4.1.1.3 Monthly Income (RM)

Table 4.3:

Monthly Income's Descriptive Analysis

RM		Count of Responses	Percentage Distribution	Valid Percent	Cumulative Frequency Percentage
Valid	Less than 3,000	324	54.0	54.0	54.0
	3,001 to 4,000	121	20.2	20.2	74.2
	4,001 to 5,000	86	14.3	14.3	88.5
	Above 5,001	69	11.5	11.5	100.0
Total		600	100	100	

Source: Developed for study.

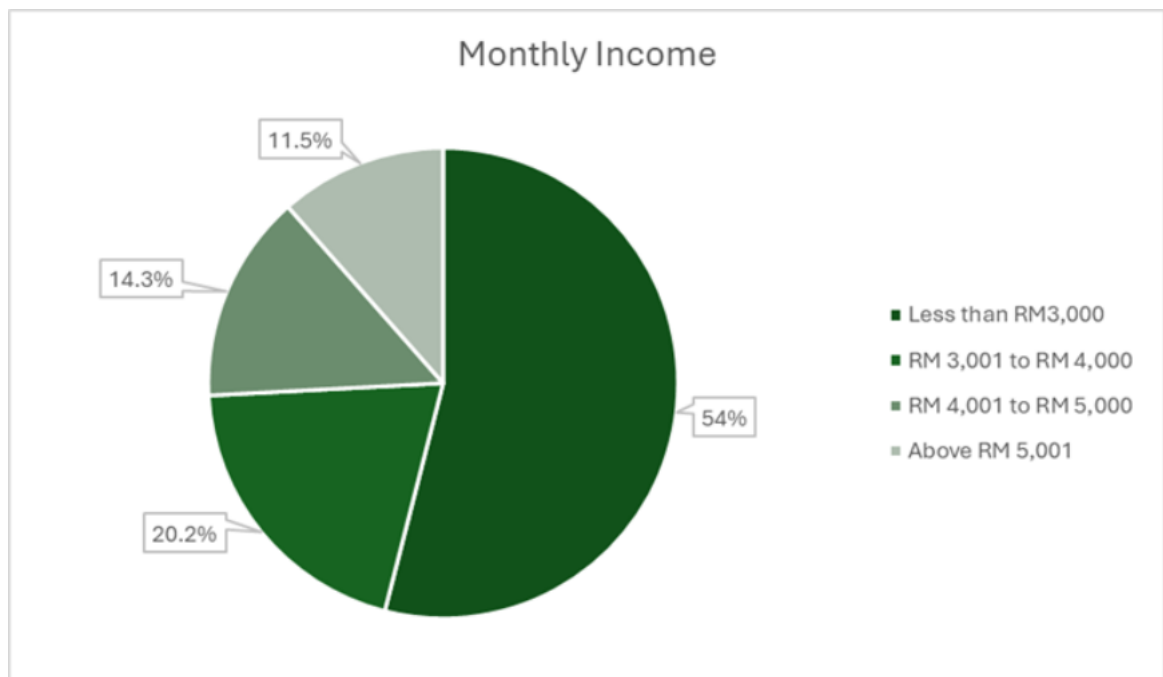


Figure 4.3 Monthly Income's Descriptive Analysis. Source: Developed for study.

As summarized in table 4.3 and figure 4.3, the results illustrated that 54.0% (324 respondents) in the survey have a monthly income of less than 3,000 (RM), which represents the largest group of the survey. This is followed by 20.2% (121 respondents) with an income between 3,001 to 4,000 (RM). Respondents earning 4,001 to 5,000 (RM) accounted for 14.3% (86 respondents), while the remaining 11.5% (69 respondents) earn Above RM 5,001. These figures indicate that most of the respondents are from lower-to-middle income bracket.

4.1.2 Central Tendencies and Dispersion Measurement of Constructs

This section presents the descriptive statistics of the dependent, independent, and moderator variables. The analysis focuses on evaluating central tendency (mean) and dispersion (standard deviation) for each construct. Additional indicators such as skewness and kurtosis are also considered to further examine the distribution of the data. Each variable is examined separately following a structured sequence to ensure clarity in the analysis.

4.1.2.1 Central Tendencies Measurement of Dependent Variable

First, the dependent variable is analyzed, and the results are presented in Table 4.4.

The items for this variable are measured on a binary scale, with 1 indicating “Yes” and 0 indicating “No”.

Table 4.4:

Central Tendencies Measurement for Spending Decision on BNPL

DV: Spending Decision on BNPL

Code	Statements	Mean (μ)	Standard Deviation (σ)	Excess Kurtosis	Skewness
DV1	Do you look for the availability of a BNPL option before making a purchase?	0.975	0.156	35.329	-6.100
DV2	Has using BNPL affected the amount you usually spend?	0.968	0.175	26.845	-5.362

Source: Developed for study.

For DV1, the mean (μ) is 0.975 with a standard deviation (σ) of 0.156, while DV2 has a μ of 0.968 and a σ of 0.175. As these variables are coded as 0 and 1, μ can be represents the proportion of respondents who selected "Yes." This finding suggests that approximately 97.5% of respondents consider the availability of BNPL services before making a purchase (DV1), and approximately 96.8% of respondents indicated that BNPL influenced their typical spending amount (DV2). The σ for both variables are less than 1 and generally low, reflecting a relatively high level of consistency in respondents' answers. Furthermore, given that the

majority of respondents selected the "Yes" option, the data distribution is clearly skewed toward "Yes", resulting in a negative skewness value. The kurtosis values for both variables exceed 1 and are relatively high. However, this is expected given the binary nature of the data and the strong concentration of responses and thus does not substantially affect the overall interpretation of the results. The findings show that BNPL does influence consumers' purchasing decisions to a certain extent.

4.1.2.2 Central Tendencies Measurement of Moderator Variables

Second, the moderating variables, namely risk aversion (RV), anxiety (A), and self-control (SC), are examined individually. A five-point Likert scale is used to assess all items, with responses ranging from strongly disagree (1) to strongly agree (5).

Table 4.5:

Central Tendencies Measurement for Risk Aversion

MV1: Risk Aversion

Code	Statements	Mean (μ)	Standard Deviation (σ)	Excess Kurtosis	Skewness
RV1	"Even if BNPL offers attractive benefits, I hesitate to use it because of the risk of overspending or debt."	4.522	0.665	6.626	-1.984

	“I avoid using BNPL				
RV2	because I see it as	4.367	0.739	5.881	-1.873
	financially risky.”				
	“I am unwilling to take risks				
RV3	when using BNPL for	4.482	0.757	5.599	-2.053
	purchases.”				

Source: Developed for study.

Table 4.6:

Central Tendencies Measurement for Anxiety

MV2: Anxiety

Code	Statements	Mean (μ)	Standard Deviation (σ)	Excess Kurtosis	Skewness
A1	“I often feel mentally tired.”	4.543	0.706	5.797	-2.079
A2	“I sometimes feel so upset that I can cry.”	4.465	0.780	5.743	-2.100
A3	“I often feel overwhelmed by my difficulties.”	4.383	0.702	4.939	-1.651
A4	“I worry too much about things that are not important.”	4.467	0.697	5.572	-1.851

Source: Developed for study.

Table 4.7:

Central Tendencies Measurement for Self-Control

MV3: Self-Control

Code	Statements	Mean (μ)	Standard Deviation (σ)	Excess Kurtosis	Skewness
SC1	“I focus on enjoying the present rather than planning for the future.”	4.408	0.708	3.894	-1.564
SC2	“I would rather spend money now than save it for the future.”	4.432	0.828	4.944	-2.043
SC3	“The main purpose of money is to be spent.”	4.483	0.645	4.032	-1.505

Source: Developed for study.

Across the three moderator constructs, all μ values exceed 4.0, ranging from 4.367 to 4.543. This suggests consistent behavioural and psychological tendencies relevant to spending decisions. The σ values range from 0.645 to 0.828 and are all below 1, indicating a high degree of consistency in responses. Specifically, for the risk aversion, the μ values range from 4.367 to 4.522, indicating agreement with statements related to cautious financial behaviour. This may suggest that

respondents tend to be careful and hesitant when engaging with BNPL, particularly due to concerns about potential financial risks such as overspending or debt.

For anxiety, the μ values range from 4.383 to 4.543, suggesting that respondents tend to agree with statements reflecting emotional strain. This may suggest that respondents utilise with BNPL in the presence of feelings such as anxiety, worry, or psychological distress, which could influence their spending decisions. Notably, the highest μ value across all constructs is observed for the A1 “I often feel mentally tired” ($\mu = 4.543$), further highlighting the presence of emotional strain among respondents.

Similarly, for self-control, the μ values range from 4.408 to 4.483, indicating agreement with statements related to present-oriented spending behaviour. This finding suggests that respondents may tend to prioritise immediate consumption over future financial planning, reflecting lower levels of spending restraint. Notably, the highest μ in the self-control constructs is observed for the SC3 “the main purpose of money is to be spent” ($\mu = 4.483$), which further reinforces the tendency towards present-oriented financial behaviour among respondents.

4.1.2.3 Central Tendencies Measurement of Independent Variables

Finally, the independent variables, namely financial literacy (FL), demographic factors (DF), and artificial intelligence (AI), are analyzed separately. Responses for most items are captured using a five-point Likert-type scale, with answer choices

ranging between strongly disagree (1) and strongly agree (5). However, demographic factors are measured using categorical variables, including age (D1) and monthly income (D2), which differ from the Likert-scale measurements. Specifically, age (D1) is categorized into five groups and coded from 1 to 5, while monthly income (D2) is divided into four categories and coded from 1 to 4. The results for each variable are presented in separate tables.

Table 4.8:

Central Tendencies Measurement for Financial Literacy

IV1: Financial Literacy

Code	Statements	Mean (μ)	Standard Deviation (σ)	Excess Kurtosis	Skewness
FL1	"I carefully manage my personal financial needs."	4.543	0.587	5.415	-1.530
FL2	"I have knowledge of a financial product before using it."	4.522	0.583	2.459	-1.123
FL3	"I choose spending rather than saving."	4.448	0.742	5.911	-1.993
FL4	"I accept a certain level of risk when investing."	4.447	0.584	2.637	-0.952

Source: Developed for study.

Table 4.9:

Central Tendencies Measurement for Demographic Factor

IV2: Demographic Factor

Code	Statements	Mean (μ)	Standard Deviation (σ)	Excess Kurtosis	Skewness
D1	Age	2.002	1.297	-0.538	0.953
D2	Monthly Income	1.833	1.056	-0.535	0.924

Source: Developed for study.

Table 4.10:

Central Tendencies Measurement for Artificial Intelligence (AI)

IV3: Artificial Intelligence

Code	Statements	Mean (μ)	Standard Deviation (σ)	Excess Kurtosis	Skewness
AI1	AI enhances audience, image, and sentiment analysis, which influences consumer spending decisions.	4.562	0.568	3.015	-1.254

	AR and VR supported by AI				
	are utilized for marketing				
AI2	and user engagement,	4.580	0.551	3.430	-1.279
	shaping spending				
	behavior.				
	AI uses customer-related				
AI3	data such as purchases and	4.513	0.589	5.721	-1.502
	demographics to influence				
	spending patterns.				
	AI tools for brand logo				
AI4	recognition help analyze	4.518	0.591	5.349	-1.477
	user interests and guide				
	purchasing decisions.				

Source: Developed for study.

Across the independent variables, the μ values for financial literacy and artificial intelligence (AI) are all above 4.0, ranging from 4.447 to 4.580. The σ values are relatively low and remain below 1, suggesting a high degree of consistency in responses. The skewness values for financial literacy and artificial intelligence (AI) are negative, indicating that responses are skewed towards agreement. The kurtosis values exceed 1, suggesting that responses are relatively concentrated around the μ .

Specifically, for financial literacy, the μ values range from 4.447 to 4.543, indicating agreement with statements related to financial knowledge and behaviour. This suggests that respondents are generally confident in managing their financial

decisions and demonstrate awareness when engaging with financial products. Notably, the highest μ is observed for FL1, “I carefully manage my personal financial needs” ($\mu = 4.543$), suggesting that respondents generally perceive themselves as being careful in managing their personal finances.

For artificial intelligence (AI), the μ values range from 4.513 to 4.580, indicating strong agreement across all items. In particular, the highest μ value is observed for AI2 ($\mu = 4.580$), which relates to the use of AI-supported technologies such as AR and VR in marketing and user engagement. This suggests that respondents are highly receptive to immersive and interactive technologies in shaping their spending behaviour. Similarly, high μ values for AI1 and AI3 indicate that respondents acknowledge the importance of AI in analysing audience sentiment and customer-related data (e.g., purchase history and demographics) to influence spending decisions.

In contrast, demographic factors are measured using categorical variables rather than Likert-scale items. D1 is coded from 1 to 5, while D2 is coded from 1 to 4. Therefore, the μ values reported for these variables represent the central tendency of category distributions rather than levels of agreement. Specifically, the μ for D1 is 2.002, suggesting that most respondents belong to the second age category (26–30 years). Similarly, the μ for D2 is 1.833 suggests that most respondents are concentrated between the first and second income categories, with a tendency towards the lower income group (below RM4,000). The kurtosis values for both variables are negative (D1: -0.538; D2: -0.535), which reflects a flatter distribution relative to a normal distribution.

Overall, the findings indicate that all independent variables show meaningful patterns in relation to consumer behaviour. Notably, artificial intelligence (AI) demonstrates a relatively stronger influence, as reflected by its consistently higher μ values. This suggests that AI-related factors may play a more prominent role in shaping consumers' spending decisions in the context of BNPL.

4.2 Measurement Model Assessment

Measurement model evaluation focuses on determining the quality of the constructs used in the study by assessing their reliability and validity. To ensure that the items employed accurately reflect the target variables, it involves evaluating internal consistency, indicator reliability, and both convergent and discriminant validity.

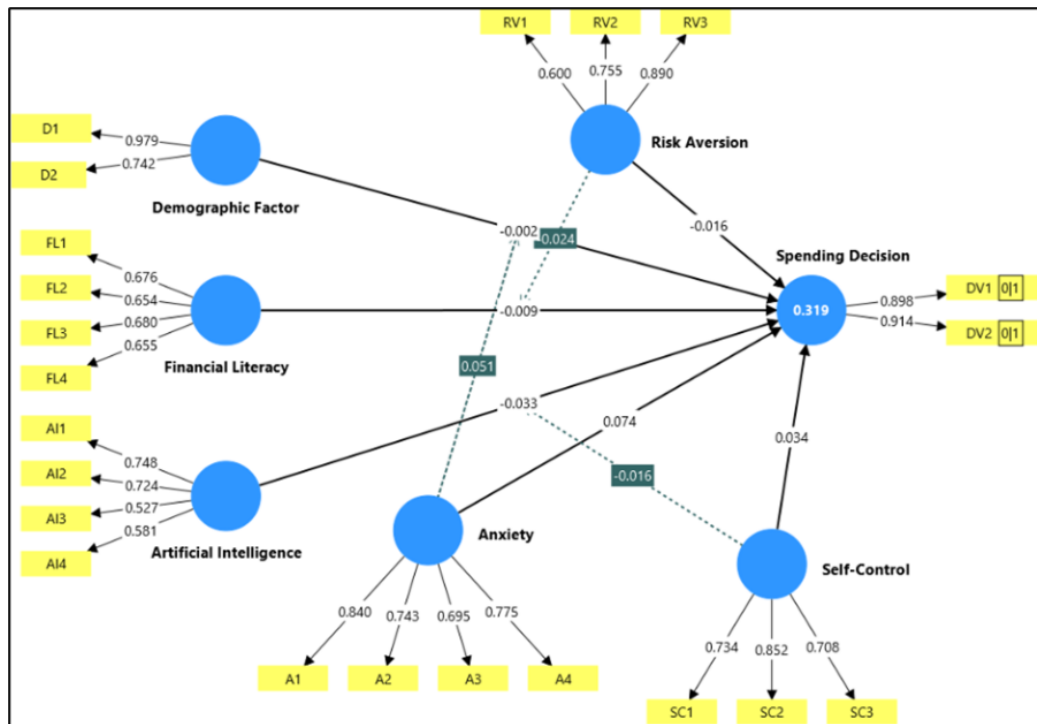


Figure 4.4. Measurement Model. Source: Developed for study.

4.2.1 Indicator Reliability

Table 4.11:

Reliability Statistics and Validity

Construct	Item	Outer Loadings	Croabach's Alpha	Composite Reliability	Average Variance Extracted
DV1:	DV1	0.898	0.782	0.901	0.821
Spending Decision	DV2	0.914			

Risk Aversion, Anxiety, And Self-Control Moderate the Relationship

With Spending Decision on Buy Now Pay Later (BNPL)

		RV1	0.600	0.691	0.798	0.574
MV1:		RV2	0.755			
Risk Aversion		RV3	0.890			
		A1	0.840	0.758	0.849	0.585
MV2:		A2	0.743			
Anxiety		A3	0.695			
		A4	0.775			
		SC1	0.734	0.688	0.810	0.588
MV3:		SC2	0.854			
Self-Control		SC3	0.708			
		FL1	0.676	0.583	0.761	0.444
IV1:		FL2	0.654			
Financial Literacy		FL3	0.680			
		FL4	0.655			
IV:		D1	0.979	1.609	0.858	0.754
Demographic		D2	0.742			
Factor		AI1	0.748	0.593	0.743	0.425
IV:		AI2	0.724			
Artificial		AI3	0.527			
Intelligence		AI4	0.581			

Source: Developed for study.

Outer loadings show the degree to which each item accurately reflects the corresponding construct. According to Table 4.11, it displays the outer loadings derived from the analysis. In general, the values fall between 0.527 and 0.914. Based on suggested guidance, values between 0.50 to 0.70 are deemed acceptable, especially in exploratory research, while outer loadings of 0.70 and higher show strong indicator reliability and extremely satisfactory. In our research, the majority of items show loadings higher than 0.70, showing a high degree of dependability. However, several items such as RV1 (0.600), A3 (0.695), the financial literacy items (0.654–0.680), as well as AI3 (0.527) and AI4 (0.581), have loadings below 0.70. Nevertheless, the majority of these results are within the range that is appropriate for exploratory study. Although AI3 and AI4 are kept since their loadings are higher than the minimum requirement of 0.50 and do not significantly impact the construct's overall reliability.

Cronbach's alpha quantifies a construct's internal consistency, showing how strongly the items are connected and provide accurate outcomes. High reliability is indicated by values of 0.70 and above, while acceptable values fall between 0.50 and 0.60. In Table 4.11, it also displays Cronbach's Alpha results using SmartPLS 4.0 with the 95% confidence interval. The majority of constructs, including Spending Decision (0.782) and Anxiety (0.758), show good reliability by exceeding 0.70. Meanwhile, variables like Self-Control (0.688), Artificial Intelligence (0.593), and Financial Literacy (0.583) are just below 0.70, suggesting modest but still acceptable and adequate dependability levels for exploratory research.

4.2.2 Internal Consistency Reliability (composite reliability (CR))

Composite reliability (CR) was employed to evaluate the constructions' internal consistency because it is considered to be more accurate than Cronbach's alpha within the PLS-SEM framework. Based on Table 4.11 illustrates all constructions showed satisfactory reliability with 95% confidence intervals. All of the constructs in this study attained or beyond the minimum threshold, even though values normally fall between 0.70 and 0.90. In particular, Spending Decision (0.901), Anxiety (0.849), and Self-Control (0.810) showed strong consistency, while Financial Literacy (0.761) and Artificial Intelligence (0.743) remained well within the acceptable range.

4.2.3 Convergent Validity

Convergent validity was assessed using the Average Variance Extracted (AVE), which shows how much of a construct's variation is captured in relation to measurement error, with a recommended threshold of 0.50. Table 4.11 shows several constructs, including Spending Decision (0.821), Self-Control (0.588), Anxiety (0.585), and Risk Aversion (0.574), exceeded the benchmark, indicating robust convergent validity. Even though the AVE for Artificial Intelligence (0.425) and Financial Literacy (0.444) fell below of the required 0.50 standard, their Composite Reliability (CR) exceed over the benchmark of 0.6, hereby satisfying the necessary requirements.

4.2.4 Discriminant Validity

Table 4.12:

Output of Heterotrait-Monotrait (HTMT)

		DV	RV	A	SC	FL	D	AI	RV xA	x D	SC x AI
DV											
RV	0.392										
A	0.546	0.827									
SC	0.498	0.604	0.718								
FL	0.460	0.740	0.826	0.778							
D	0.094	0.108	0.076	0.110	0.180						
AI	0.303	0.388	0.775	0.656	0.901	0.272					
RV x FL		0.421	0.863	0.500	0.421	0.651	0.121	0.354			
A x D		0.217	0.480	0.729	0.660	0.441	0.040	0.407	0.254		
SC x AI		0.382	0.075	0.446	0.479	0.492	0.101	0.820	0.160	0.336	

AI

Source: Developed for study.

Discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio, which evaluates how distinct constructs are from one another. All HTMT values were below the 0.85 threshold, as indicated in Table 4.12, showing excellent discriminant validity and ensuring the empirical individuality of each construct. For example, distinct differentiation was confirmed by the HTMT values between the dependent variable (DV) and other constructs, which ranged from 0.094 to 0.546. HTMT values below 0.85 were also found for the independent variables and interaction factors, indicating that they are empirically distinct. The only exception was the HTMT value between Financial Literacy (FL) and Actual Intention (AI), which marginally overlapped the threshold at 0.901, showing a little overlap between these variables. Overall, the outcomes offer enough proof of the measurement model's discriminant validity.

4.3 Structural Model Assessment

To examine the proposed relationships in Chapter 1, this research adopted the PLS-SEM. This is a useful technique that helps examine complex theoretical relationships among multiple variables, as suggested by prior research. Consistent with recommendations, the size of bootstrap used was 5000 resamples to evaluate the probabilistic significance of the hypothesized relationships. The two-tailed test was applied at a 5% significance level in this research.

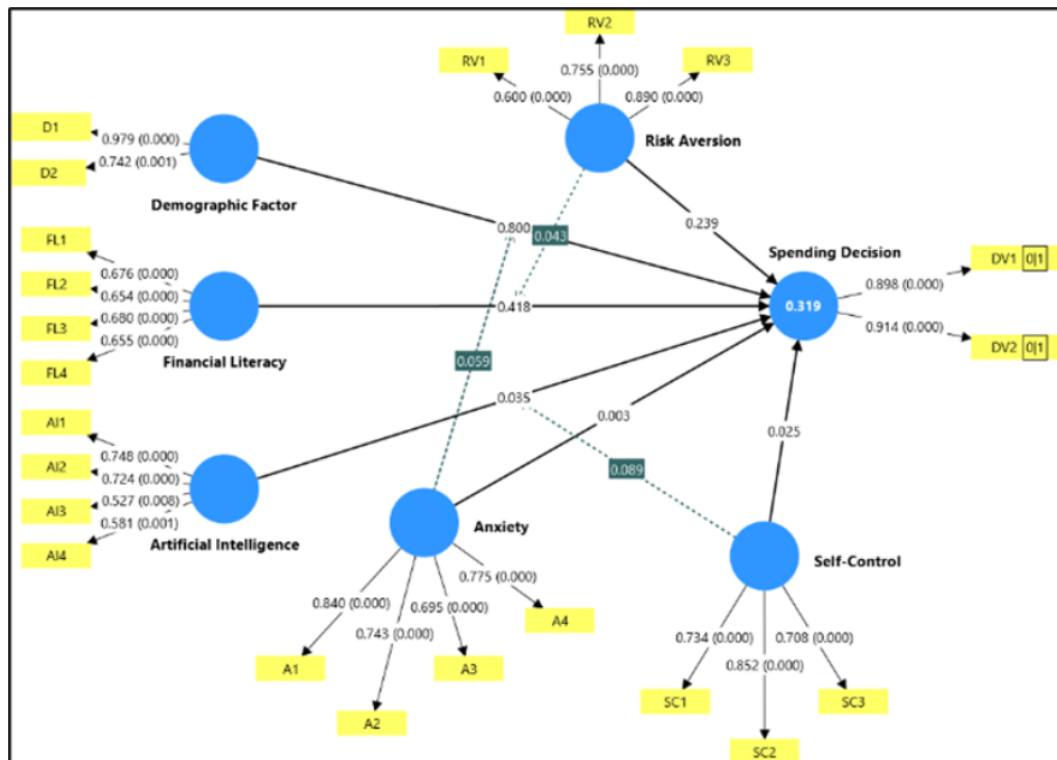


Figure 4.5 Structural Model. Source: Developed for study.

4.3.1 Collinearity

Table 4.13:

Outputs of Variance Inflation Factors (VIF)

Construct	Variance Inflation Factors (VIF)
RV > DV	2.419
A > DV	2.971

SC > DV	1.745
FL > DV	1.936
D > DV	1.140
AI > DV	2.083
RV x FL > DV	2.161
A x D > DV	2.007
SC x AI > DV	1.891

Source: Developed for study.

In Table 4.13, all VIF values range from 1.140 to 2.971, which comply with the suggested threshold of 5. As higher VIF values suggest stronger correlations and more severe multicollinearity, these results confirm the absence of significant multicollinearity issues in this study. Consequently, each variable contributes uniquely to the model without substantial overlap in explanatory power. Thus, the absence of multicollinearity enhances the reliability of this model and ensures the relationships between the constructs can be interpreted with a high degree of certainty.

4.3.2 Assess Path Coefficients

Table 4.14:

Beta Coefficient, Standard Error, T-value, P-value and Hypotheses Testing

Hypotheses	Description	Beta	Standard Error	T-Value	P-Value	Decision
H1	FL →SD	-0.009	0.011	0.809	0.418	Do not reject H ₀
H2	RA →SD	-0.016	0.013	1.177	0.239	Do not reject H ₀
H4	DF →SD	-0.002	0.007	0.254	0.800	Do not reject H ₀
H5	A →SD	0.074	0.025	2.984	0.003	Reject H ₀
H7	AI →SD	-0.033	0.015	2.114	0.035	Reject H ₀
H8	SC →SD	0.034	0.015	2.248	0.025	Reject H ₀

Source: Developed for study.

First, results of H₁ indicate financial literacy is not found to have a significant effect on individuals' spending decisions. Since p-value (0.418) is above 0.05 significance level, H₀ is not rejected. Although the beta coefficient (-0.009) is negative, the magnitude is statistically marginal, signifying a weak inverse relationship. This suggests that variations in financial literacy levels among the respondents are unlikely to result in meaningful differences in their spending decisions.

Next, the findings of H₂ show that risk aversion does not have a significant impact on spending decisions. In table above, the analysis yielded a beta (-0.016), t-value (1.177) and a p-value (0.239). Since the p-value (0.239) is exceed above 0.05, do not rejected H₀. Although the beta coefficient (-0.016) indicates an inverse

relationship, the magnitude of the effect is small, suggesting a weak association between both constructs. This further implies high risk aversion are associated with minimal changes in individuals' spending decisions.

With respect to H₄, the results do not show a significant relationship. As presented in Table 4.14, the beta coefficient is -0.002, with high p-value of 0.800. As the p-value exceeds 0.05, do not reject H₀. The nearly zero beta coefficient reveals that demographic factors have negligible impact on spending decisions. This implies that individuals' age and monthly income do not significantly influence their spending decisions, suggesting that decisions to spend are motivated by other external factors rather than demographic factors.

In contrast, H₅ presented the path coefficient of 0.074, t-value 2.984 and p-value of 0.003, indicating that anxiety has significant effect on spending decisions. As the $p=0.003$ falls below the threshold of 0.05, reject H₀. This suggests that consumers with elevated anxiety scores are more likely to make spending decisions. Positive beta (0.074) further suggests each incremental increase in level of anxiety, their tendency to make a spending decisions significantly increases.

With respect to H₇, the findings show that AI negatively and significantly affects spending decisions. Given that the p-value (0.035) is below significance level, reject H₀. Negative beta coefficient (-0.033) further suggests an inverse relationship between AI and spending decisions, reveals that as the presence of AI increases, the tendency of individuals to make spending decisions decreases.

Finally, the results for H₈ demonstrate a significant positive association between

self-control and spending decisions. As p-value (0.025) is well below significance level, reject H_0 in this study. The positive beta coefficient reflects a direct relationship, suggesting that as individuals' level of self-control increases, their tendency to engage in spending decisions also increases.

4.3.3 Coefficient of Determination(R^2)

Table 4.15:

Determination of Coefficient (R^2)

	R-square	R-square adjusted
DV	0.319	0.308

Source: Developed for study.

As illustrated in above table, the R^2 value for spending decisions is reported as 0.319. This indicates that approximately 31.9% of the variance in the endogenous construct (spending decisions) can be explained by the exogenous variables which include anxiety, self-control, demographic factors, financial literacy, artificial intelligence, and risk aversion. Within social science research, R^2 values in the range of 0.20 to 0.50 are typically considered indicative of acceptable explanatory power. Therefore, R^2 value of 0.319 can be interpreted as moderate, suggesting the model explains a moderate proportion of variability in spending decisions. Conversely, 68.1% of the variance is influenced by other external factors that fall outside the scope of this specific study.

Furthermore, the adjusted R^2 value is reported as 0.308, which is 0.011 lower than R^2 value. The similarity between R^2 and adjusted R^2 suggests the model is stable and not overfitted. This indicated the inclusion of additional independent variables does not artificially inflate explanatory power of the model, thereby supporting its reliability.

4.3.4 Assess Effect Size(F^2)

Table 4.16:

Determination of Effect Size (F^2)

	Original Sample f^2
A>SD	0.099
A x DF >SD	0.048
AI >SD	0.027
DF >SD	0.000
FL >SD	0.002
RA >SD	0.005
RA x FL >SD	0.048
SC >SD	0.036

SC x AI >SD	0.058
-------------	-------

Source: Developed for study.

Effect size (f^2) was assessed to evaluate the contribution of each independent variable to spending decisions. Adhering to the f^2 guidelines, values of 0.02, 0.15, and 0.35 indicate small, medium, and large effect size, respectively. Table 4.16 shows that the interaction effects of self-control x artificial intelligence ($f^2 = 0.058$), anxiety x demographic factors ($f^2 = 0.048$), risk aversion x financial literacy ($f^2 = 0.048$) demonstrate small effect sizes on spending decisions. Similarly, self-control ($f^2 = 0.036$) along with artificial intelligence ($f^2 = 0.027$) exhibit small effects. Among all variables, anxiety shows the highest effect size ($f^2 = 0.099$). In contrast, risk aversion ($f^2 = 0.005$), financial literacy ($f^2 = 0.002$), and demographic factors ($f^2 = 0.000$) exhibit negligible effect sizes on spending decisions.

4.3.5 Assess Model's Predictive Relevance (Q^2)

Table 4.17:

Determination of Predictive Relevance (Q^2)

	Original Sample Q^2
DV1	0.059
DV2	0.054

Source: Developed for study.

According to prior research, a positive Q^2 value indicates predictive relevance, while values of zero or below indicates a deficiency in predictive capability. As presented in Table 4.17, Q^2 values for DV1 and DV2 are 0.059 and 0.054, respectively. Both Q^2 values exceed zero, indicating predictive relevance for both endogenous constructs. This suggests that the exogenous constructs are able to predict the endogenous variables.

4.3.6 Moderation Analysis

Table 4.18:

Beta Coefficient, Standard Error, T-Value, P-Value and Hypotheses Testing

Hypotheses	Description	Beta	Standard Error	T-Value	P-Value	Decision
H3	RA x FL >SD	-0.024	0.012	2.028	0.043	Reject H_0
H6	A x DF >SD	0.051	0.027	1.887	0.059	Do not reject H_0
H9	SC x AI >SD	-0.016	0.009	1.704	0.089	Do not reject H_0

Source: Developed for study.

As presented in Table 4.18, the result for H_3 examines the moderating effect of risk

aversion on relationship between financial literacy and spending decisions. As the p-value (0.043) is below 0.05 significance level, the findings demonstrate a significant interaction effect. Therefore, H_0 is rejected. Although the findings reveal that financial literacy (H_1) was statistically insignificant, the significant results of H_3 prove that this relationship is moderated by risk aversion. In other words, individual with higher risk aversion diminish the effect of financial literacy on spending decisions.

In contrast to H_3 , result of H_6 shows that anxiety has no significant moderating role in the relationship between demographic factors and spending decisions. Although the beta coefficient (0.051) reveals positive relationships, the moderating effect is relatively small and not significant ($0.059 > 0.05$). This indicates that anxiety possesses a non-significant moderating influence on the association between demographic factors and spending decisions. Therefore, the relationship between demographic factors (age and income) and spending decisions does not vary across different levels of anxiety.

Lastly, the result for H_9 investigates moderating effect of self-control on the relationship between artificial intelligence (AI) and spending decisions. The findings reveal that the interaction effect is not statistically significant, as the p-value (0.089) exceeds significance threshold. While the negative beta coefficient (-0.016) suggests a weakening effect, the magnitude of the effect is small and statistically insignificant. This implies that whether individuals possess high or low level of self-control, the effect of AI on their spending behaviour remains unchanged.

4.4 Conclusion

In this chapter, according to the reliability analysis, the questionnaire scales are dependable. Additionally, the data satisfied all preliminary screening criteria, such as outer loadings, multicollinearity checks, validity and reliability tests, and HTMT assessment. In the PLS-SEM model, the independent variable which was Artificial Intelligence (AI), significantly influenced BNPL spending decisions. However, as moderators, anxiety and self-control also had a major impact on the direction and strength of this relationship. There were no apparent effects from other variables, such as risk aversion, financial literacy, and demographics.

CHAPTER 5: DISCUSSION, CONCLUSION & IMPLICATIONS

5.0 Introduction

In this chapter, the study's discussion, implications, limitations, recommendations,

and conclusions are presented. The chapter first reviews the major findings derived from Chapter four, providing further insights into the relationships identified among the variables. Following this, the implications of the study are highlighted, followed by a discussion of the limitations that may have influenced the results. Based on these findings and limitations, recommendations for practical application and future research are proposed. This chapter concludes by outlining the study's main findings and its overall contributions.

5.1 Discussion of Major Findings

This study aims to explore how consumers make assessments about how much to spend on BNPL services are influenced by financial literacy, demographic factors, and artificial intelligence. Additionally, the moderating effects of risk aversion, anxiety, and self-control within these relationships will be evaluated. This study assesses how these factors collectively affect BNPL spending behavior by systematically analyzing both the direct impacts of the independent variables and the interaction effects of the moderators.

Table 5.1 :

Summary of Bootstrapping Test with Interaction Effects

Subtopic hypothesis	Hypothesis	P-value	Significance of correlation	Decision

5.1.1 Hypothesis 1	H₀: There is no relationship between financial literacy and spending decisions on BNPL H₁: There is a relationship between financial literacy and spending decisions on BNPL	0.418	Insignificance	Do not reject H ₀
5.1.2 Hypothesis 2	H₀: There is no relationship between risk aversion and spending decisions on BNPL H₂: There is a relationship between risk aversion and spending decisions on BNPL	0.239	Insignificance	Do not reject H ₀
5.1.3 Hypothesis 3	H₀: Risk aversion no moderates the relationship between financial literacy and spending decisions on BNPL H₃: Risk aversion moderates the relationship between financial literacy and spending decisions on BNPL	0.043	Significance	Reject H ₀
5.1.4 Hypothesis 4	H₀: There is no relationship between Demographic factors (age & income) and	0.800	Insignificance	Do not reject H ₀

	spending decisions on BNPL H₄: There is a relationship between Demographic factors (age & income) and spending decisions on BNPL			
5.1.5 Hypothesis 5	H₀: There is no relationship between anxiety and spending decisions on BNPL H₅: There is a relationship between anxiety and spending decisions on BNPL	0.003	Significance	Reject H ₀
5.1.6 Hypothesis 6	H₀: Anxiety no moderates the relationship between demographic factors (age & income) and spending decisions on BNPL H₆: Anxiety moderates the relationship between demographic factors (age & income) and spending decisions on BNPL	0.059	Insificance	Do not reject H ₀
5.1.7 Hypothesis 7	H₀: There is no relationship between Artificial Intelligence and spending decisions on BNPL	0.035	Significance	Reject H ₀

	H₇ : There is a relationship between Artificial Intelligence and spending decisions on BNPL			
5.1.8 Hypothesis 8	H₀ : There is no relationship between self-control and spending decisions on BNPL H₈ : There is a relationship between self-control and spending decisions on BNPL	0.025	Significance	Reject H ₀
5.1.9 Hypothesis 9	H₀ : Self-control no moderates the relationship between Artificial Intelligence and spending decisions on BNPL H₉ : Self-control moderates the relationship between Artificial Intelligence and spending decisions on BNPL	0.089	Insignificance	Do not reject H ₀

Source: Developed for study.

According to Table 5.1, several correlations between the independent variables, moderators, and spending decisions on BNPL are statistically significant. In particular, as their p-values were higher than the acceptable threshold, financial literacy (H1), risk aversion (H2), and demographic factors (H4) were determined to have no significant direct relationship with BNPL spending decisions. Therefore,

these hypotheses were rejected. On the other hand, anxiety (H5), artificial intelligence (H7), and self-control (H8) showed strong direct correlations with BNPL spending decisions, indicating that these variables have a major impact on consumer behavior. As a result, these hypotheses were not disproved.

The relationship between financial literacy and BNPL spending decisions was found to be considerably moderated by risk aversion (H3), demonstrating that the influence of financial literacy on spending patterns is contingent upon an individual's degree of risk aversion. However, these hypotheses were rejected since anxiety (H6) and self-control (H9) didn't show substantial moderating effects on their respective connections. Overall, the findings show that some psychological variables and moderating effects significantly contribute to the explanation of BNPL spending decisions, even though not all direct correlations are significant.

5.1.1 The Impact of Financial Literacy on Spending Decision on BNPL.

The findings of this study demonstrate that financial literacy does not significantly correlate with BNPL purchasing decisions, as indicated by a p-value of 0.418. This result contradicts earlier research that highlights the significance of financial literacy in encouraging suitable financial behavior, such as debt management and budgeting (Amirtha, 2024; Mishra & Malik, 2025). According to previous research, financially capable individuals are also more inclined to evaluate their repayment

obligations and avoid from using BNPLs impulsively (Cervellati et al., 2025; Sujatmiko & Al Kausar, 2025). The convenience of use and availability of BNPL services, which decrease the significance of financial literacy in decision-making, might be responsible for the insignificant outcome. Additionally, the relevance of anxiety and self-control in this study suggests that psychological factors like impulsive purchases and emotional spending may have a greater impact. Overall, the results imply that behavioral and technical factors may have a greater impact on BNPL spending decisions than financial literacy.

5.1.2 The Impact of Risk Aversion on Spending Decision on BNPL.

The results of this investigation show that risk aversion does not substantially correlate with spending decisions regarding BNPL, as indicated by a p-value of 0.239. Consequently, is rejected, indicating that people's tendency for avoiding risk does not substantially affect their BNPL spending behavior in this study. This results inconsistent with the earlier research in Chapter 2. According to prior studies, risk-averse persons typically stay clear of financial products like BNPL services that involve uncertainty and future repayment responsibilities (Milczarski et al., 2025; Bommier et al., 2023; Ahmed et al., 2025). Furthermore, according to Raj et al. (2025) discovered that perceived risk lowers customers' willingness to use BNPL. Higher risk aversion should result in reduced BNPL spending, according to these findings. However, the nature of BNPL services, which frequently reduce the impression of risk through features like interest-free installments, simple implementation procedures, and automatic integration into online purchasing platforms, may explain for the study's irrelevant conclusion. Due to this, even

people who are risk averse might not consider BNPL to be a high-risk financial instrument. Furthermore, convenience and short-term purchasing motivations might have a bigger influence on real spending behavior than risk factors. Overall, the results indicate that although its theoretical significance, risk aversion may not directly affect BNPL spending choices in this situation.

5.1.3 Risk Aversion Moderate Financial Literacy and Spending Decision on BNPL.

The study's findings demonstrate the relationship between financial literacy and BNPL spending decisions is considerably moderated by risk aversion. This implies that people's degree of risk aversion influences how financial literacy affects BNPL spending decisions. This finding corresponds to alignment with the literature that was covered in the earlier investigation. According to earlier research, risk aversion affects how people apply their financial knowledge to their real financial behavior (Zhuang & Yang, 2025). It is possible to identify risk aversion as a form of perceived behavioral control that influences individuals to conduct based on their financial knowledge within the framework of the Theory of Planned Behavior (Ajzen, 1991). Even though financial literacy improves people's capacity to assess financial decisions, people who are more risk averse may still restrict their use of BNPL because of worries about potential financial risks and future payback responsibilities. This indicates depending on their risk tolerance, even financially proficient people may act differently in the context of BNPL. While people with lower risk aversion could be more inclined to utilize BNPL services, individuals exhibiting higher levels of risk aversion are more inclined to BNPL spending even

though they are aware of its advantages. Therefore, the effect of financial literacy on BNPL spending decisions is either strengthened or weakened by risk aversion.

5.1.4 The Impact of Demographic Factor on Spending Decision on BNPL.

The outcomes of this study show that BNPL spending decisions are not significantly influenced by demographic factors such as age or income. This result contradicts the information reviewed in the second chapter. Previous research has demonstrated that BNPL usage is significantly influenced by demographic factors, especially age and income. For example, impulsive behaviors and digital familiarity make younger consumers more likely to adopt BNPL (Kumar et al., 2024; Waliszewski et al., 2024). Furthermore, it has been demonstrated that BNPL adoption is influenced by income level, with those with lower incomes more likely to use BNPL dealing with temporary financial difficulties (Mavridis & Gebeyehu, 2023; Greene et al., 2024). However, the expanding nature of BNPL services, which are now widely available across many demographic groups, may account for the study's insignificant outcome. BNPL usage may become more general rather than group specific as a result of the growing incorporation of BNPL into digital platforms and e-commerce environments. Furthermore, when it comes to influencing purchasing decisions, behavioral and the psychological components might be more important than demographic characteristics. Overall, the results indicate that in our research, technological and psychological variables may have a greater influence on BNPL spending behavior than demographic variables.

5.1.5 The Impact of Anxiety on Spending Decision on BNPL.

This study found that anxiety was significant for the spending decisions regarding BNPL services. This implies that anxiety is an important factor for shaping the financial decision-making behavior of individuals. This supports the previous literature which states that anxiety decreases the cognitive clarity and sense of control, which affects the rational decision-making process for complex situations (Huang, 2025). Consistent with the previous literature, individuals who experience high levels of anxiety are likely to exhibit impulsive buying behavior (Erzincanlı et al., 2024; Ellyawati & Tarigan, 2024). This behavior occurs especially among individuals who prefer online shopping due to the gratification they receive from purchasing online products (Huang, 2025). In the present study, regarding the BNPL service, it was found that anxious individuals might prefer BNPL services as an escape mechanism for their psychological distress. Additionally, past studies showed that during economic challenging situations, such as the COVID-19 pandemic, financial anxiety was high among the public, which led them to exhibit impulsive buying behavior (Simonse et al., 2022; Laato et al., 2020). This supports the present study regarding the importance of anxiety for shaping the spending behavior of individuals. The present study confirms the importance of anxiety for shaping the BNPL service spending decisions, which supports the previous literature regarding the importance of psychological factors for shaping consumer behavior.

5.1.6 Anxiety Moderate Demographic Factor and Spending

Decision on BNPL.

This study also shows that anxiety does not significantly influence the moderating effect of demographic factors on BNPL spending decisions. This implies that the effect of demographic factors such as age and income levels on spending behavior is not influenced in any way by the level of anxiety that an individual might be experiencing. The result contradicts previous studies that have shown that levels of financial anxiety differ among various demographic groups (Laato et al., 2020; Hamzah et al., 2024). This shows that anxiety might directly affect spending decisions. Additionally, it can be noted that economic uncertainty might have led to a level of anxiety that is common to all demographic groups. This might have reduced its moderating effect on spending behavior. Therefore, it can show anxiety to have a significant effect on spending behavior regardless of the level of demarcation that exists between different groups of people. Thus, it can be noted that anxiety was a significant predictor which affected BNPL spending decision; however, it was not a significant moderator between the relationship of demographic factors and spending decision.

5.1.7 The Impact of Artificial Intelligence on Spending Decision on BNPL.

This study found that the variable of Artificial Intelligence (AI) was given a substantial impact on spending on BNPL services. This implies AI technologies contribute significantly to consumer spending behaviour in online environments.

This agrees with existing research on AI technologies and also their implication on consumer spending behaviour. Previous research revealed that AI technologies significantly contribute to consumer spending behaviour through personalized product recommendation and overall consumer experience (Alfakihuddin et al., 2025; Hou et al., 2025). Agrees with previous study, AI technologies are capable of analysing consumer preferences and behavioural data in real time, thereby increasing engagement and encouraging consumers to spend (Sung et al., 2021; Asante et al., 2023). Moreover, the result agrees with the existing research on AI technologies and consumer spending behaviour. Previous research revealed that a large proportion of consumers perceive AI as beneficial in facilitating consumer spending behaviour (Bolesnikov et al., 2022). This implies that a consumer was more likely spending money on AI-assisted platforms in making financial decisions. Additionally, the study revealed that the consumers' willingness to spend is further encouraged by integrating AI technologies with BNPL services. Previous research revealed that AI technologies help consumers make decisions by reducing information overload and simplifying the overall consumer spending experience (Darnell & Gopalkrishnan, 2023; Waliszewski et al., 2024). BNPL services further encourage consumers' willingness to spend by providing consumers with more financial flexibility (Waliszewski et al., 2024).

5.1.8 The Impact of Self-Control on Spending Decision on BNPL.

In this study shows self-control giving a significant effect on the spending decisions of individuals on BNPL services. This revealed that self-control indeed plays an important role in having an impact on the financial behavior of individuals. The

result was agreed with the previous studies, which revealed that individuals that have high of self-control level were observed to possess disciplined spending habits and were inclined towards achieving their financial goals rather than opting for immediate gratification (Du Plessis et al., 2025). However, for those individuals who have a low self-control level, they were observed to possess impulsive shopping tendencies and were unable to withstand tempting offers, especially in the digital environment (Nyrhinen et al., 2023; Alshebami & Aldhyani, 2022). In the context of BNPL services, such individuals were revealed to make use of such payment systems due to the reduced immediate financial costs, which may lead to overspending and financial stress for such individuals. Moreover, the availability of AI platforms, which offer personalized offers and temptations, may enhance impulsive shopping tendencies among such individuals who have a low self-control level. Thus, the results of the study revealed that self-control indeed plays an essential role by influencing spending decisions of individuals on BNPL services.

5.1.9 Self-Control Moderate Artificial Intelligence and Spending Decision on BNPL.

This study indicate that self-control was not significantly moderate influence the relationship among Artificial Intelligence (AI) and spending decisions on BNPL services. This indicates that the impact of AI on spending decision is relatively consistent, regardless of an individual's level of self-control. This finding was not consistent compared with the previous studies, as they suggested that individuals who possess low levels of self-control are more prone to AI-based marketing campaigns and persuasive digital content (Schnell et al., 2021). It is possible that

AI-based systems and tools are highly efficient in persuading consumers and, therefore, influence their behavior regardless of their self-control level. This might be a reason why individuals who possess high self-control level are also affected by AI-based systems and tools while making purchasing decisions. Moreover, BNPL services might reduce the perceived cost for all consumers and, therefore, reduce the moderating effect of self-control on AI-based systems and tools. This might be because BNPL provides consumers with greater convenience and accessibility, and its payment features might override an individual's self-control level and result in relatively consistent spending behavior. In conclusion, it is evident that self-control is an essential factor in determining spending behavior, but it has little influence on moderating the relationship between AI and BNPL spending decisions.

5.2 Implication of Study

This section discusses the implications of the study from both practical and theoretical perspectives. From a practical perspective, the findings provide important implications for BNPL users, service providers, and policymakers. The significant effects of anxiety and self-control on spending decisions on BNPL suggest that users should pay closer attention to their behavioral tendencies when using BNPL services, as higher anxiety may lead to impulsive or excessive spending, while stronger self-control promotes more responsible financial behavior. Therefore, it is important for users to develop better emotional awareness and self-regulation when engaging with BNPL platforms.

In addition, artificial intelligence (AI) plays an important role in shaping spending decisions in BNPL, reflecting its dual influence on user behaviour. From the users' perspective, AI-based features, including personalized recommendations and data-based suggestions can shape spending patterns by encouraging more frequent and impulsive purchases. This effect may be more pronounced among individuals with lower self-control, indicating that users should be more cautious when engaging with AI-enabled BNPL platforms. From the providers' perspective, AI offers valuable opportunities to analyze user behavior, predict spending patterns, and deliver personalized services. By utilizing AI technologies such as recommendation systems and predictive analytics, BNPL providers can enhance user engagement and improve platform performance. Therefore, providers are encouraged to leverage these technologies strategically. However, they should apply these technologies responsibly, as overreliance on AI-driven recommendations may encourage users to overspend.

The findings also provide important implications for policymakers. Since BNPL spending decisions are significantly influenced by behavioral factors such as anxiety and self-control, policymakers are encouraged to enhance financial education. This can facilitate enhanced recognition among users of the psychological and behavioural risks associated with BNPL usage. For instance, educational campaigns can incorporate real-life BNPL scenarios to help users better understand the long-term financial consequences of deferred payments. In addition, as AI-driven features (e.g., personalized recommendations and instant credit approvals) may encourage impulsive and excessive spending, appropriate regulatory frameworks should be established to monitor BNPL services. In particular, regulatory bodies should introduce clear guidelines on the ethical use of AI in BNPL platforms to

ensure that such technologies are used responsibly. These measures are essential to protect consumers while maintaining a sustainable and stable financial environment.

From a theoretical perspective, this study contributes to the existing literature by presenting empirical evidence on the determinants of BNPL spending decisions. The findings underline the significance of both behavioral and technological influences in shaping financial decision-making in a digital context. Specifically, the significant effects of anxiety and self-control support existing behavioral theories, particularly the Theory of Planned Behavior (Ajzen, 1991), reinforcing the importance of psychological factors in shaping financial behaviour. In addition, the findings also align with Self-Control Theory (Gottfredson & Hirschi, 1990), which suggests that individuals with lower self-control tend to exhibit more impulsive and less regulated behaviours. Overall, these findings demonstrate that behavioral factors remain highly relevant in explaining financial decision-making within the context of BNPL services.

Furthermore, the significant impact of artificial intelligence (AI) extends the understanding of technology's role in financial decision-making by demonstrating how AI-driven features can influence consumer spending behavior in BNPL services. This finding is consistent with previous studies reported that AI-driven features, such as personalized recommendations and algorithmic systems, can influence spending behaviour and contribute to more impulsive purchasing patterns (Nyrhinen et al., 2023; Roy et al., 2024). This highlights the growing importance of technology in shaping financial decisions in digital environments. This highlights the growing importance of technology in shaping financial decisions in digital environments.

The significant moderating effects of risk aversion and financial literacy suggest that the relationships between variables are not always direct but may be influenced by individual differences. This finding enriches the literature by drawing attention to the importance of interaction effects in understanding complex financial behaviours.

5.3 Limitations of Study

This research conducts a quantitative research design using a structured questionnaire to examine Malaysian consumers' spending decisions in relation to BNPL services. While the method supports efficient data collection and statistical analysis, it falls short in representing the full complexity of consumer behaviour. The use of close-ended questions also limits respondents' ability to elaborate on their experiences, thereby limits a comprehensive understanding of the factors shaping BNPL usage.

This study also faces a limitation related to the language of the survey instrument. Since the questionnaire was administered in English, differences in respondents' language proficiency may have influenced their understanding and interpretation of certain questions. This may have affected the consistency of responses, particularly for respondents who are less proficient in English.

Furthermore, the sample mainly consists of individuals from a specific age range, with a notable concentration of respondents aged 26–30. Age differences may be

related to factors such as financial literacy, risk aversion, self-control, and acceptance of technology-related functions, including artificial intelligence (AI), all of which are key variables examined in this study. Therefore, the results may not fully reflect how these factors influence BNPL purchasing decisions across different age groups.

This study employs a cross-sectional design, where data were gathered at one specific point in time. Consequently, the findings are limited in their ability to establish causal relationships between variables, as this design primarily captures associations rather than definitive cause-and-effect relationships. This design also does not allow for the analysis of how consumer behavior evolves over time.

Although certain limitations exist, they do not compromise the importance of the study's findings. Instead, they help to inform and shape avenues for further investigation.

5.4 Recommendation

Building upon limitations and findings, there are several recommendations are proposed for future researchers exploring the BNPL services and individual spending decisions.

To enhance the methodological rigour, future studies should consider moving

beyond single method research designs by adopting methodological triangulation, which involve the combination of multiple research methods to guide the same research problem (Arias, 2022). This approach offers a more exhaustive understanding of the phenomenon being investigated. Such integration would allow researchers to synthesize the measurable associations between variables and underlying cognitive and emotional mechanism that drive spending decision, thereby improving the construct validity and reduce common method bias.

In addition, future researchers are encouraged to multilingual survey instruments. Providing questionnaires in multiple languages such as Bahasa Malaysia and Mandarin alongside English, may enhance respondents' comprehension and reduce potential misinterpretation of survey items. This, in turn could improving data validity and reliability.

Although this research does not impose explicit age restriction, the sample is skewed towards younger respondents. Future researchers should therefore adopt stratified and proportionate sampling techniques to achieve a more balanced age distribution. A more representative age composition would enable more rigorous comparative analysis of how key variables vary across different life stages.

From a policy perspective, while the Malaysian BNPL sector has integrated mandatory verified monthly income and Debt Service Ratio (DSR) assessments under the Consumer Credit Act (CCA) 2025, the focus must now shift toward the stringent and uniform enforcement of these standards (Chua, 2026). It is recommended that the Consumer Credit Commission (CCC) eliminates the technical latency currently present in credit bureau reporting to prevent

'simultaneous debt stacking.' While providers now report to CCRIS and CTOS, but the current infrastructure may still allow for information asymmetry during the window between transactions and data updates. Therefore, the government should prioritize the implementation of a real-time, centralized data-sharing gateway. This would ensure that an individual's total BNPL exposure is calculated cumulatively across all licensed providers at the point of sale, rather than retrospectively. Regulatory authorities can better reduce the risk of over-leveraging and ensure that the protections intended by the CCA 2025 are realized in practice by enhancing the current DSR framework with an automated, cross-platform verification system.

Last but not least, given the dynamic nature of financial technology, future studies are advised to adopt panel research designs to capture the temporal dynamics of consumer behaviour. This would allow researchers to assess how key factors interact over time in shaping individual spending decisions. Also, this would help differentiate between short term consumption impulses and longer term financial behavioural patterns, thereby strengthening the evidence of potential causal relationships that cross sectional data cannot definitively establish.

5.5 Conclusion

This research studied the relationship of financial literacy, demographic factors, and artificial intelligence on spending decisions of BNPL. In addition, it sought to assess the moderating role of psychological and behavioural factors (risk aversion, anxiety, and self-control) in these relationships.

This research was structured across several chapters to systematically address the study objectives. Chapter one introduced the background of BNPL services in Malaysia, identified research problem, and highlighted the significance and objectives of study. Based on this foundation, chapter two reviewed the relevant literature and theoretical frameworks, including the Theory of Planned Behaviour and Self-Control Theory to explain the underlying psychological and behavioral determinants of individual spending decisions. Chapter Three provides an overview of the research methodology, includes research design, sampling strategy, data collection techniques, and analytical methods utilised in this study. Subsequently, chapter four presented the empirical findings derived from SmartPLS and SPSS analyses, including the assessment of both the measurement and structural models.

Overall, the findings highlight the importance of psychological and behavioral factors in shaping individual spending decisions within the BNPL context. While financial literacy and demographic factors did not exert a significant effect on spending decisions, variables such as anxiety, self-control, and artificial intelligence significantly influences consumer behaviour. In addition, only risk aversion was found to exert a significantly moderating influence on the relationship between financial literacy and spending decisions, whereby higher levels of risk aversion weaken the relationship. In contrast, anxiety and self-control did not demonstrate significant moderating effects in these findings. From policy perspective, the findings demonstrate that financial literacy in isolation is insufficient to influence spending decisions of BNPL, indicating that digital nudges or self-control features could be incorporated within BNPL applications. The observed impact of AI indicates that technology driven features of BNPL services exert a more influential

role in consumer spending behaviors.

As a conclusion, this research advances the extant literature by offering robust empirical evidence on the factors influencing individual spending decisions within the BNPL context. It also offers practical insights for policymakers, BNPL service providers, and consumers to better comprehend the factors that influence spending behaviours. Overall, the study advances insight into consumer spending decisions within emerging digital financial platforms and provided a foundation for future research in this area.

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APPENDIXES

Appendix 3.1: Survey Questionnaire

A Study on the Moderating Role of Risk Aversion, Anxiety, and Self-Control in Spending Decisions on Buy Now Pay Later (BNPL) Services in Malaysia.

Dear respondents,

We are final-year undergraduate students from the Bachelor of Finance (Hons) programme at Universiti Tunku Abdul Rahman (UTAR). We are conducting a study entitled: "Risk Aversion, Anxiety, and Self-Control Moderate the Relationship with Spending Decisions on Buy Now Pay Later (BNPL) in Malaysia."

Your participation in this survey is very important to help us understand and explore how risk aversion, anxiety, and self-control affect the way people's psychological traits relate to their decisions to use BNPL services. All responses will remain STRICTLY CONFIDENTIAL and will be used only for academic purposes. No individual will be identified in any report or publication.

The questionnaire will take approximately 10–15 minutes to complete. Your honest answers will greatly assist us in completing our Final Year Project and achieving the objectives of this research. If you have any questions, please feel free to contact any member of our research team. Thank you very much for your valuable time and cooperation.

Yours sincerely,

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1.Email ()

Personal Data Protection Statement

Under the Personal Data Protection Act 2010 (PDPA), in force since 15 November 2013, Universiti Tunku Abdul Rahman (UTAR) is required to notify and obtain consent regarding the collection, recording, storage, use, and retention of personal data.

Acknowledgement of Notice

() I acknowledge that I have been informed, and understand, consent, and agree to the terms in the UTAR notice above.

() I disagree, my personal data will not be processed.

Buy Now Pay Later (BNPL) in Malaysia

Definition: BNPL is a type of short-term financing that enables consumers to purchase goods and services immediately, typically through installments over a fixed period (e.g., 3 / 6 / 12 months), often without interest if paid on

time. It's commonly used in e-commerce and retail settings, offering a more flexible alternative to credit cards. In Malaysia, BNPL started gaining traction around year 2020, especially during the pandemic-fueled e-commerce boom. In response to its rapid growth and the potential risks to both consumers and financial stability, Bank Negara Malaysia and the Securities Commission extended regulatory oversight under the Consumer Credit Act, which is being implemented in phases from 2024 onwards. Under this framework, BNPL providers are required to register with the Consumer Credit Oversight Board (CCOB) and will be mandated to obtain a license by 2025 under a comprehensive regulatory regime emphasizing responsible lending, transparency, and consumer protection.

BNPL Providers in Malaysia: Atome, GrabPay, Boost, Shopee Pay, FavePay Later, PAYLATER Malaysia, myIOU, Hoolah

Section A: Demographic Information

This section collects basic demographic information such as age, gender, and income. The information will be used for research purposes only and will be kept strictly confidential.

1.Age

() 21-25

() 26-30

() 31-35

() 36-45

() Above 45

2.State

() Kuala Lumpur

() Selangor

() Penang

() Others

3.Monthly Income *

() Less than RM3,000

() RM 3,001 to RM 4,000

() RM 4,001 to RM 5,000

() Above RM 5,001

Section B: BNPL Usage and Spending Behavior

This section aims to understand your usage of Buy Now, Pay Later (BNPL) services and how it may influence your spending behavior.

1.Do you look for the availability of a Buy Now, Pay Later (BNPL) option before making a purchase?

() Yes () No

2.Has using Buy Now, Pay Later (BNPL) affected the amount you usually spend?

() Yes () No

Section C: Factors affecting spending decision on Buy Now, Pay Later (BNPL) in Malaysia

Note: Scale 1 indicates that you strongly disagree with the statement and 5 indicates you strongly agree with the statement

[Strongly disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly agree = 5]

Sub-Section 1: Financial Literacy

This section aims to understand how financial literacy affect your spending decision on Buy Now, Pay Later (BNPL).

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. "I carefully manage my personal financial needs."	1	2	3	4	5
2. "I have knowledge of a financial product before using it."	1	2	3	4	5
3. "I choose spending rather than	1	2	3	4	5

saving.”					
4. “I accept a certain level of risk when investing.”	1	2	3	4	5

Sub-Section 2: Artificial Intelligence

This section aims to understand how artificial intelligence affect your spending decision on Buy Now, Pay Later (BNPL).

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. AI enhances audience, image, and sentiment analysis, which influences consumer spending decisions.	1	2	3	4	5
2. AR and VR supported by AI are utilized for marketing and user engagement,	1	2	3	4	5

shaping spending behavior.					
3. AI uses customer-related data such as purchases and demographics to influence spending patterns.	1	2	3	4	5
4. AI tools for brand logo recognition help analyze user interests and guide purchasing decisions.	1	2	3	4	5

Sub-Section 3: Risk Aversion

This section aims to understand how risk aversion moderating affect your financial literacy and spending decision on Buy Now, Pay Later (BNPL).

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. “Even if BNPL offers attractive benefits, I hesitate	1	2	3	4	5

to use it because of the risk of overspending or debt.”					
2. “I avoid using BNPL because I see it as financially risky.”	1	2	3	4	5
3. “I am unwilling to take risks when using BNPL for purchases.”	1	2	3	4	5

Sub-section 4: Anxiety

This section aims to understand how anxiety moderating affect your demographic factor and spending decision on Buy Now, Pay Later (BNPL).

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. “I often feel mentally tired.”	1	2	3	4	5
2. “I sometimes feel so upset that I can cry.”	1	2	3	4	5

3. "I often feel overwhelmed by my difficulties."	1	2	3	4	5
4. "I worry too much about things that are not important."	1	2	3	4	5

Sub-section 4: Self-Control

This section aims to understand how self-control moderating affect artificial intelligence and spending decision on Buy Now, Pay Later (BNPL).

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1. "I focus on enjoying the present rather than planning for the future."	1	2	3	4	5
2. "I would rather spend money now than save it for the future."	1	2	3	4	5
3. "The main purpose of money is to be	1	2	3	4	5

spent.”					
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Thank you very much for your time and valuable input !

Your responses will greatly contribute to this research study. All responses will be kept strictly confidential and used solely for academic purposes. If you have any questions regarding this study, please feel free to contact the researcher at lincon7687@lutar.my. Once again, thank you for your valuable participation. Wishing you a wonderful day!_

Appendix 4.1: Central Tendencies Measurement of Constructs of Actual Study

Indicator data (original) - Descriptives								Copy to Excel/Word
	Mean	Median	Observed min	Observed max	Number of observation...	Standard deviation	Excess kurtosis	Skewness
DV1	0.975	1.000	0.000	1.000	600.000	0.156	35.329	-6.100
DV2	0.968	1.000	0.000	1.000	600.000	0.175	26.845	-5.362
D2	1.833	1.000	1.000	4.000	600.000	1.056	-0.535	0.924
A1	4.543	5.000	1.000	5.000	600.000	0.706	5.797	-2.079
A2	4.465	5.000	1.000	5.000	600.000	0.780	5.743	-2.100
A3	4.383	4.000	1.000	5.000	600.000	0.702	4.939	-1.651
A4	4.467	5.000	1.000	5.000	600.000	0.697	5.572	-1.851
AI1	4.562	5.000	1.000	5.000	600.000	0.568	3.015	-1.254
AI2	4.580	5.000	1.000	5.000	600.000	0.551	3.430	-1.279
AI3	4.513	5.000	1.000	5.000	600.000	0.589	5.721	-1.502
AI4	4.518	5.000	1.000	5.000	600.000	0.591	5.349	-1.477
D1	2.002	1.000	1.000	5.000	600.000	1.297	-0.538	0.953
FL1	4.543	5.000	1.000	5.000	600.000	0.587	5.415	-1.530
FL2	4.522	5.000	1.000	5.000	600.000	0.583	2.459	-1.123
FL3	4.448	5.000	1.000	5.000	600.000	0.742	5.911	-1.993
FL4	4.447	4.000	1.000	5.000	600.000	0.584	2.637	-0.952
RV1	4.522	5.000	1.000	5.000	600.000	0.665	6.626	-1.984
RV2	4.367	4.000	1.000	5.000	600.000	0.739	5.881	-1.873
RV3	4.482	5.000	1.000	5.000	600.000	0.757	5.599	-2.053
SC1	4.408	4.000	1.000	5.000	600.000	0.708	3.894	-1.564
SC2	4.432	5.000	1.000	5.000	600.000	0.828	4.944	-2.043
SC3	4.483	5.000	1.000	5.000	600.000	0.645	4.032	-1.505

Cramér-von Mises test s...	Cramér-von Mises p value
47.874	0.000
47.222	0.000
10.552	0.000
15.118	0.000
12.916	0.000
11.486	0.000
12.388	0.000
15.886	0.000
16.692	0.000
14.319	0.000
14.334	0.000
11.265	0.000
14.971	0.000
14.616	0.000
12.074	0.000
13.783	0.000
13.794	0.000
11.354	0.000
13.205	0.000
11.396	0.000
12.661	0.000
12.945	0.000

Appendix 4.2: Outer Loadings Result of Actual Study

Outer loadings - List	
	Outer loadings ▲
A13 <- Artificial Intelligence	0.527
A14 <- Artificial Intelligence	0.581
RV1 <- Risk Aversion	0.600
FL2 <- Financial Literacy	0.654
FL4 <- Financial Literacy	0.655
FL1 <- Financial Literacy	0.676
FL3 <- Financial Literacy	0.680
A3 <- Anxiety	0.695
SC3 <- Self-Control	0.708
A12 <- Artificial Intelligence	0.724
SC1 <- Self-Control	0.734
D2 <- Demographic Factors	0.742
A2 <- Anxiety	0.743
A11 <- Artificial Intelligence	0.748
RV2 <- Risk Aversion	0.755
A4 <- Anxiety	0.775
A1 <- Anxiety	0.840
SC2 <- Self-Control	0.852
RV3 <- Risk Aversion	0.890
DV1 <- Spending Decision	0.898
DV2 <- Spending Decision	0.914
D1 <- Demographic Factors	0.979
Anxiety x Demographic Factors -> Anxiety x Demographic Factors	1.000

Appendix 4.3: Construct Reliability and Validity Test of Actual Study

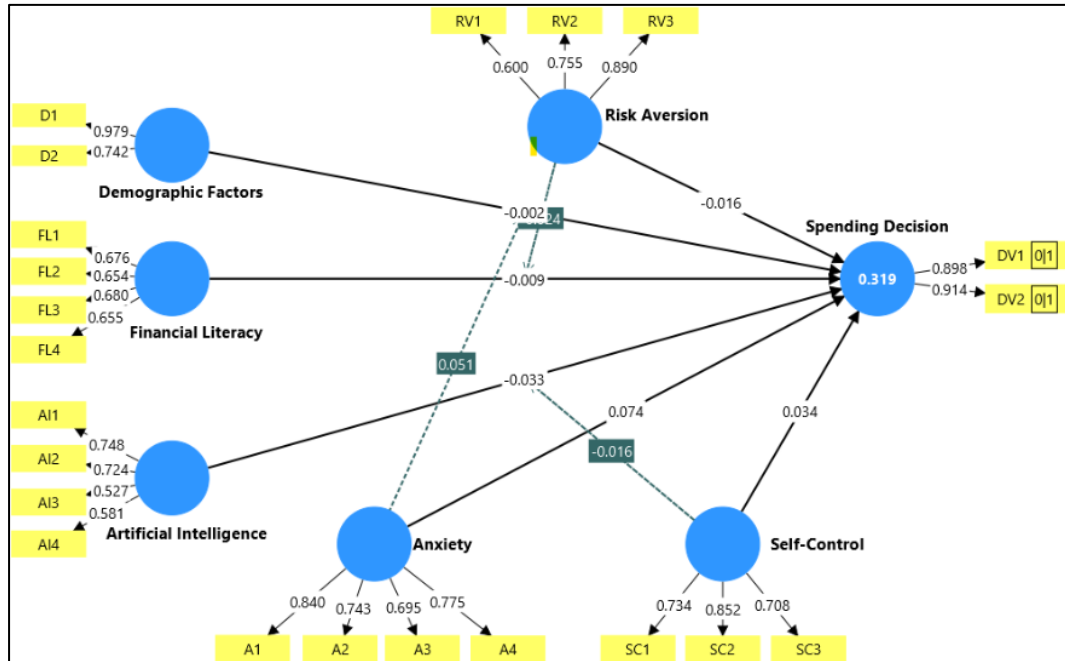
Construct reliability and validity - Overview					Copy to Excel/Word	Copy
	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)		
Anxiety	0.762	0.758	0.849	0.585		
Artificial Intelligence	0.570	0.593	0.743	0.425		
Demographic Factors	0.742	1.609	0.858	0.754		
Financial Literacy	0.586	0.583	0.761	0.444		
Risk Aversion	0.619	0.691	0.798	0.574		
Self-Control	0.654	0.688	0.810	0.588		
Spending Decision	0.782	0.782	0.901	0.821		

Appendix 4.4: Discriminant Validity Test of Actual Study

Discriminant validity - Heterotrait-monotrait ratio (HTMT) - Matrix						Copy to Excel/Word	Copy
	Anxiety	Artificial Intelligence	Demographic Factors	Financial Literacy	Risk Aversion		
Anxiety							
Artificial Intelligence	0.775						
Demographic Factors	0.076	0.272					
Financial Literacy	0.826	0.901	0.180				
Risk Aversion	0.827	0.388	0.108	0.740			
Self-Control	0.718	0.656	0.110	0.778	0.604		
Spending Decision	0.546	0.303	0.094	0.460	0.392		
Self-Control x Artificial Intelligence	0.446	0.820	0.101	0.492	0.075		
Anxiety x Demographic Factors	0.729	0.407	0.040	0.441	0.480		
Risk Aversion x Financial Literacy	0.500	0.354	0.121	0.651	0.863		

Self-Control	Spending Decision	Self-Control x Artificial I...	Anxiety x Demogra...	Risk Aversion x Financia...
0.498				
0.479	0.382			
0.421	0.421	0.160	0.254	
0.660	0.217	0.336		

Appendix 4.5: Structural Model Result



Appendix 4.6: Collinearity Test of Actual Study

Collinearity statistics (VIF) - Inner model - List	
	VIF
Anxiety -> Spending Decision	2.971
Anxiety x Demographic Factors -> Spending Decision	2.007
Artificial Intelligence -> Spending Decision	2.083
Demographic Factors -> Spending Decision	1.140
Financial Literacy -> Spending Decision	1.936
Risk Aversion -> Spending Decision	2.419
Risk Aversion x Financial Literacy -> Spending Decision	2.161
Self-Control -> Spending Decision	1.745
Self-Control x Artificial Intelligence -> Spending Decision	1.891

Appendix 4.7: Assess Path Coefficients of Actual Study

Path coefficients - Mean, STDEV, T values, p values					Copy to Excel/Word	Copy to R
	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	
Anxiety -> Spending Decision	0.074	0.061	0.025	2.984	0.003	
Anxiety x Demographic Factors -> Spending Decision	0.051	0.034	0.027	1.887	0.059	
Artificial Intelligence -> Spending Decision	-0.033	-0.023	0.015	2.114	0.035	
Demographic Factors -> Spending Decision	-0.002	0.002	0.007	0.254	0.800	
Financial Literacy -> Spending Decision	-0.009	-0.006	0.011	0.809	0.418	
Risk Aversion -> Spending Decision	-0.016	-0.015	0.013	1.177	0.239	
Risk Aversion x Financial Literacy -> Spending Decision	-0.024	-0.025	0.012	2.028	0.043	
Self-Control -> Spending Decision	0.034	0.031	0.015	2.248	0.025	
Self-Control x Artificial Intelligence -> Spending Decision	-0.016	-0.014	0.009	1.704	0.089	

Appendix 4.8: Coefficient of Determination of Actual Study

R-square - Overview			
	R-square	R-square adjusted	
Spending Decision	0.319	0.308	

Appendix 4.9: Assess Effect Size f^2 of Actual Study

f-square - Matrix								Copy to Excel/Word	Co
	Anxiety	Artificial Intelligence	Demographic Factors	Financial Literacy	Risk Aversion	Self-Control	Spending Decision		
Anxiety									0.099
Artificial Intelligence									0.027
Demographic Factors									0.000
Financial Literacy									0.002
Risk Aversion									0.005
Self-Control									0.036
Spending Decision									
Self-Control x Artificial Intelligence									0.058
Anxiety x Demographic Factors									0.048
Risk Aversion x Financial Literacy									0.048

Self-Control x Artificial Intelligence	Anxiety x Demographic Factors	Risk Aversion x Financia...

Appendix 4.10: Assess Model's Predictive Relevance Q^2 of Actual Study

PLSpredict MV summary - Overview							Copy to Excel/Word
	$Q^2_{predict}$	PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE	IA_RMSE	IA_MAE
DV1	0.059	0.152	0.049	0.147	0.066	0.156	0.049
DV2	0.054	0.171	0.062	0.170	0.073	0.175	0.061