

ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF BUSINESS ADMINISTRATION

Digital Payment Adoption and Overspending Behaviour: the Mediating Roles of Reduced Pain of Paying and Perceived Convenience and the Moderating Effect of Financial Literacy, Psychological Detachment and Expense Awareness- Evidence from Mobile Wallet Payment Users in Addis Ababa, Ethiopia

A RESEARCH THESIS SUBMITTED TO THE DEPARTMENT OF BUSINESS ADMINISTRATION IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION

By: Selome Yoseph

June, 2026

Addis Ababa, Ethiopia



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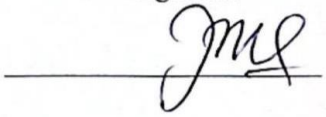
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Approval statement

This is to certify that the thesis entitled "Digital Payment Adoption and Overspending Behavior: the Mediating Roles of Reduced Pain of Paying and Perceived Convenience and the Moderating Effect of Financial Literacy, Psychological Detachment and Expense Awareness-Evidence from Mobile Wallet Payment Users in Addis Ababa, Ethiopia", prepared and submitted by Selome Yoseph, has been carried out under my supervision. I hereby confirm that this thesis meets the requirements for submission toward the Master of Business Administration (MBA) at Addis Ababa University, College of Business and Economics, Department of Business Administration.

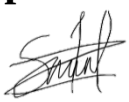
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Declaration

Digital Payment Adoption and Overspending Behavior: the Mediating Roles of Reduced Pain of Paying and Perceived Convenience and the Moderating Effect of Financial Literacy, Psychological Detachment and Expense Awareness- Evidence from Mobile Wallet Payment Users in Addis Ababa, Ethiopia" is an original piece of work. This research has not been submitted to any other university or institution for any degree or diploma.

I have acknowledged all sources of information and materials used in the preparation of these theses in accordance with accepted academic standards. The study was conducted in an ethical manner following the guidelines of Addis Ababa University and any assistance received in the preparation of these theses has been recognized in full and proper proportion.

Selome Yoseph

Signature: 

Date: June, 14, 2026

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Last but not least, I owed a debt of gratitude to my family and friends for their unwavering support, encouragement, and patience. Their belief in my potential provided the emotional foundation necessary to overcome the challenges encountered during this research process.

Abstract

The main aim of this research analysed The Psychological Effects of Digital Payment Adoption on overspending Behaviour: Evidence from Digital Payment Users in Addis Ababa, Ethiopia. The research focused on how the Digital Value Decoupling, through "Trust-Risk Paradox", drives the budget violation due to the mandated adoption enforced by the government of the mobile wallets even when the users are anxious about using them because of fears of transaction risk. The research followed a Positivist deductive philosophy, used explanatory research methodology and quantitative research approach. Eighteen hundred survey responses were collected from mobile wallet users (Telebirr and M-Pesa), following the purposive non-probability sampling method yielding 384 completed surveys, of which 383 were usable. The data was then analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The SEM structure provided strong explanatory power ($R^2 = 0.741$). The results of the research showed that Digital Payment Adoption (DPA) had a significant direct effect on Overspending Behaviour ($\beta = 0.892$, $p < 0.001$) and that the relationship was significantly mediated by Reduced Pain of Paying ($p = 0.017$) which serves as a cognitive numbing function for the psychological pain of losing money through the use of digital interfaces; on the other hand, the Perceived Convenience Relationship was not a significant mediator ($p = 0.374$), further demonstrating that most digital overspending was due to a calculated lapse in tracking due to an individual's inability to see their wealth. Additionally, the researchers found that Traditional Financial Literacy did not provide any significant protective buffer in a transaction ($p = 0.188$). Lastly, Psychological Detachment was established as the only statistically significant moderating variable ($\beta = -0.102$, $p = 0.044$).The study recommends that the National Bank of Ethiopia and fintech developers consider incorporating real-time Cognitive Friction mechanisms, like dynamic balance updates and sensory haptic alerts, into application architectures. Given that Psychological Detachment emerged as the sole effective boundary condition, behavioural self-regulation nudges must be prioritized over traditional informational literacy campaigns to suppress digital overspending.

Keywords: Digital Payment Adoption, Overspending Behaviour, Reduced Pain of Paying, Psychological Detachment, Trust-Risk Paradox, Mobile Wallets, PLS-SEM, Ethiopia.

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ACRONYMS

- **ANOVA:** Analysis of Variance
- **AVE:** Average Variance Extracted
- **CR:** Composite Reliability
- **DPA:** Digital Payment Adoption
- **ECA:** Ethiopian Communications Authority
- **EXA:** Expense Awareness
- **FL:** Financial Literacy
- **HCD:** Human-Centric Design
- **HTMT:** Heterotrait-Monotrait Ratio
- **PC:** Perceived convenience
- **NBE:** National Bank of Ethiopia
- **OSB:** Overspending Behavior
- **PA:** Psychological Attachment
- **PD**: Psychological Detachment
- **PLS-SEM:** Partial Least Squares Structural Equation Modeling
- **RPP:** Reduced Pain of Paying
- **SRMR:** Standardized Root Mean Square Residual
- **TRA:** Theory of Reasoned Action
- **UTAUT:** Unified Theory of Acceptance and Use of Technology

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Global payments are now predominantly conducted in a digital-first manner. Payment capabilities have shifted drastically away from physical transaction capabilities (cash/checks) and the prevalence of mobile/payments technology during COVID-19 intensified the adoption of cashless payments almost universally. Payments made through mobile wallets, contactless cards, etc. accounted for higher consumer payment proportions than cash/checks; this shift is further accelerated by the COVID-19 pandemic creating a reduction of cash conveniences used in the past (McKinsey & Company, 2024; World Bank, 2024). This change in the global payment paradigm is changing how consumers deal with payments and has changed how people think about payments in relation to each other.

One recent study has documented the phenomenon of 'Spendception', which results from utilizing digital interfaces, and provides evidence of the effect digital interfaces have on lessening the negative feelings of pain associated with paying for objects and changing the way individuals track their Finances (PubMed., 2025, March 19). In Africa, the growth in the adoption of digital payments occurs at a much more rapid pace when compared to advanced economies, which is primarily due to the high level of phone ownership throughout most of the continent. Mobile money systems are becoming more complex in Africa and operate similar to Mobile Wallets, allowing for various forms of financial activity including credit, insurance, and remittance transfers (GSMA., 2024). Ethiopia mirrors these continental trends, yet its transition is characterized by a unique "leapfrog" trajectory that is both more recent and exceptionally rapid.

Ethiopia recently modernized its financial services sector by executing major structural reforms, primarily driven by the National Digital Payments Strategy (NDPS) 2021–2024. These initiatives built a dependable national switch through EthSwitch and opened up the market to competitive, non-bank Fintech providers like Telebirr and M-Pesa.

The long-term effects of these changes became fully visible by the close of 2025, which provides the baseline data for this research. According to official estimates from the National Bank of Ethiopia (2025), mobile money accounts during this period reached roughly 139.5 million, while

annual digital transactions climbed past 18.5 trillion Birr. This marked a major economic milestone as digital payments officially overtook traditional cash transactions within the formal economy (Fana Media Corporation, 2025; National Bank of Ethiopia, 2025).

Even with this rapid growth, structural roadblocks continue to create friction. A noticeable digital divide still separates urban and rural communities, and overall consumer financial literacy remains low. To address these vulnerabilities, policymakers introduced the NDPS 2.0 "BRIDGE 2030" (Broadening Reach, Integrating Digital Infrastructure, and Governing Ecosystems) strategy. Implemented as the primary financial policy framework, this initiative focuses on scaling up merchant acceptance and rolling out the Fayda National Digital ID across the country (Further Africa, 2025; National Bank of Ethiopia, 2024). The strategy is built around three core pillars: expanding interoperable merchant networks, onboarding rural users via localized agent banking, and establishing clear, unified data protection rules.

1.2 Statement of the Problem

Rapid growth in the use of several new digital payment systems in Ethiopia, such as Telebirr and CBE Mobile Banking Wallet, has been seen in the past few years. In urban centers, particularly in Addis Ababa, these platforms have fundamentally changed the way consumers make payments; the increased use of smartphones, the acceptance of mobile-based financial services by businesses, and an increase in the number of available merchants who accept digital payments has created an environment where consumers are now increasingly relying on digital platforms to make their purchases (Ethio Telecom., 2025, July 24); (National Bank of Ethiopia., 2024)).

As more consumers begin using digital payment methods instead of cash to complete their transactions, they experience a psychological shift in their spending habits. This shift often alters how individuals evaluate their financial decisions, ultimately leading to a significant impact on consumer spending behavior.

However, very little research has explored how digital payments affect consumer psychology within the Ethiopian context. Studies across other regions, including Asia, Europe, and North America, demonstrate that digital transactions minimize the immediate psychological pain of paying, make transactions feel effortless, and create a distinct mental decoupling from the actual value of money. Together, these cognitive mechanisms frequently drive Perceived Convenience (Faraz, 2025; Schomburgk, 2024). A critical gap remains in the academic literature regarding consumer psychology within low-income, rapidly digitizing economies like Ethiopia. Current

empirical findings come almost entirely from Western or highly developed contexts, which fail to account for the unique cultural, economic, and technological realities of the Ethiopian market.

Historically, research on the "pain of paying" has been validated in environments with high financial stability and individualistic social structures, yet in Ethiopia, spending behavior was deeply influenced by communal financial obligations and traditional informal systems like Equb and Iddir.

The transition of these social-financial interactions into digital formats created a unique psychological environment where the "invisibility" of money may lead to higher levels of impulsivity, especially among consumers with limited experience in digital mental accounting. Furthermore, the economic reality of high inflation in Ethiopia was likely to drive a "spend now" mentality to avoid value loss, a behavior that was significantly amplified by the frictionless nature of mobile wallets like Telebirr and M-Pesa. Technological barriers also remained a factor; unlike high-income nations that utilize near-field communication (NFC), the reliance on USSD-based interfaces in Ethiopia was introduce a specific type of cognitive load and interaction friction that current consumer psychology models have not yet mapped. Consequently, there was many potential dangers in adopting digital payments in Ethiopia due to the varying levels of financial literacy among consumers, particularly for those new to using these products that lack established habits in tracking expenditures and budgeting.

Furthermore, when digital payment platforms make transactions more convenient and seamless, the likelihood of Perceived convenience increases. Despite this trend, there is a notable absence of empirical research in Ethiopia exploring how digital payment adoption influences consumer purchasing choices. Specifically, existing literature lacks studies that utilize psychological mediators such as the pain of paying or perceived convenience to establish clear causal relationships. Very little empirical work currently investigates the precise structural linkages connecting digital payment systems, general consumer purchasing behavior, and Perceived Convenience. The "Spendception" Phenomenon (Pal & MDPI, 2025): Recent research introduced the construct of Spendception, which conceptualizes the reduced psychological resistance to spending in digital environments. This study was demonstrated that digital payments reduce the "visibility" of wealth depletion, with over Spending Behavior acting as a primary mediator. However, these findings were based on diverse global samples, leaving the specific impact on first-generation users in Addis Ababa largely unexplored.

The "Cashless Effect" and Transactional Friction (JETIR, 2025): Empirical surveys on Unified Payment Interfaces (UPI) reported that over 54% of respondents indicate that digital payments make small-ticket perceived convenience significantly easier. Empirical evidence confirms that the speed and seamless nature of app-based transactions lead to immediate emotional gratification, which directly rewards choices. The present study extends this line of inquiry by examining whether USSD-based interfaces, which are highly prevalent in Ethiopia, produce comparable frictionless effects.

Furthermore, recent research into fintech and consumer behavior highlights that young adults particularly Millennials and Gen Z frequently remain unaware of the long-term financial consequences of convenience-driven spending (Qureshi & Khawaja, 2025). These studies reveal a strong positive correlation between how often an individual uses a digital wallet and their overall volume of unplanned purchases. However, a major limitation in this body of work is the lack of evidence showing whether financial literacy can act as an effective behavioral buffer within low-income economic settings.

Regional Disparities in Nigeria (AB Journals, 2024): Research in similar emerging markets like Nigeria found a positive correlation between confidence in payment security and perceived convenience. Interestingly, this study also found a negative correlation between trust in digital systems and budgeting discipline, suggesting that as users trust the technology more, they may become more "lackadaisical" about financial self-regulation.

The limitations of the current body of literature include an emphasis on the adoption of digital payment products, technical efficiency of digital payment systems and financial inclusion, rather than the effect of digital payment products on behavioral or psychological outcomes. No research has yet been conducted that examines the use of mediators (pain-of-paying or perceived convenience) and moderators (financial literacy, expense awareness) to better understand the relationship between digital payments and consumer behavior related to spending. The limitation of this research creates a significant gap in policymakers' understanding of how the use of digital finance may have unintentional consequences for consumers creating harmful spending patterns.

The issue of digital finance is of particular relevance to researchers in relation to the city of Addis Ababa. As Ethiopia's primary economic center, Addis Ababa sees the largest volume of transactions conducted via digital payment systems. It also has more merchants who accept QR

and Point of Sale (POS) payments than any other city in Ethiopia, as well as the greatest number and variety of users of these systems.

With this in mind, the consumers of Addis Ababa represent a significant segment of the population that is being affected by changing consumer behaviors due to the use of digital finance. Consequently, studying the psychological impact of using digital payment systems on consumer behavior provides an excellent opportunity for research into this area of study.

While digital payments are influencing consumer behavior throughout Ethiopia, there is limited understanding of how these behaviors are occurring. It is critical that policymakers, banking officials, and FinTech companies have research-based evidence on how to create strategies for consumer protection, financial literacy education, and app-based solutions to foster the safe and responsible use of digital financial services. The goal of this study is to fill in this gap by examining the psychological consequences of digital payment system adoption on consumer perceived convenience and spending patterns in users in the city of Addis Ababa.

1.3. Scientific Justification of the Research Gap

The foundational inquiry of this thesis was addressing a critical and unmapped conceptual void within contemporary digital finance and consumer behavior literature. While macro-level financial research was heavily document the infrastructural, operational, and financial determinants of electronic transaction systems, a distinct gap was persist regarding the post-adoption cognitive and psychological externalities that affect consumer financial sustainability within developing economic contexts. Prior literature within the domain of financial technologies was shown to suffer from an over-reliance on a binary "adoption/use" paradigm. This dominant paradigm—rooted in classical frameworks such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT)—was operate under the reductive assumption that successful technological integration automatically translates into optimized consumer utility and rational asset management. This thesis was directly challenging that assumption by investigating the deep behavioral and cognitive disruptions that was manifest when physical currency is structurally replaced by digital currency abstractions.

Specifically, the scientific research gap was formalized across two interrelated dimensions that prior studies were have systematically ignored:

The Cognitive-Affective Disconnect and "Cognitive Numbing": Classical economic models and baseline Fintech studies were fail to explain how the elimination of physical, tangible currency alters the internal cognitive and psychological processing of financial loss. Existing literature was demonstrated to have overlooked the affective dimensions of transactional friction. Physical currency transactions were shown to provide an innate, tactile behavioral "regulator" of consumer budgets through the immediate sensory experience of parting with tangible capital. The macro-transition to low-friction mobile wallet interfaces was decoupling the immediate pleasure of consumption from the psychological discomfort historically associated with spending money. The exact structural mechanism through which mobile software interfaces act as a form of "cognitive anesthetic"—effectively numbing a consumer's real-time wealth perception and distorting their mental accounting frameworks—was remain completely unexamined within the Sub-Saharan African retail banking environment.

The Behavioral Lag in State-Mandated Cashless Transitions: A severe empirical and context-specific gap was existing concerning behavioral adaptation rates during top-down, state-enforced digitization processes. In developed, market-driven economies, digital payment adoption was typically progress organically alongside a gradual evolution of consumer financial tracking tools. Conversely, within metropolitan environments such as Addis Ababa, the implementation of aggressive government policies (e.g., the National Digital Payments Strategy [NDPS 2.0]) was mandate cashless transaction compliance for essential daily commodities, including fuel, public transport, and municipal utilities. This rapid structural enforcement was creating an acute "behavioral lag," wherein consumers were forced to utilize digital transaction systems before they can develop the necessary cognitive budgeting adjustments or psychological defense mechanisms. Prior literature was have failed to model how this structural acceleration creates unique psychological vulnerabilities, which was leave retail bank customers highly susceptible to chronic budgetary violations and involuntary overspending behavior.

1.4 Research Questions

1. What is the direct effect of digital payment adoption on the overspending behavior of consumers in Addis Ababa?
2. Does the pain of paying mediate the relationship between digital payment adoption and overspending behavior?

3. Does perceived convenience mediate the relationship between digital payment adoption and overspending behavior?
4. Does psychological detachment moderate the relationship between digital payment adoption and overspending behavior?
5. To what extent does financial literacy moderate the relationship between digital payment adoption and overspending behavior?
6. To what extent does expense awareness moderate the relationship between digital payment adoption and overspending behavior?

1.5 Objectives of the Study

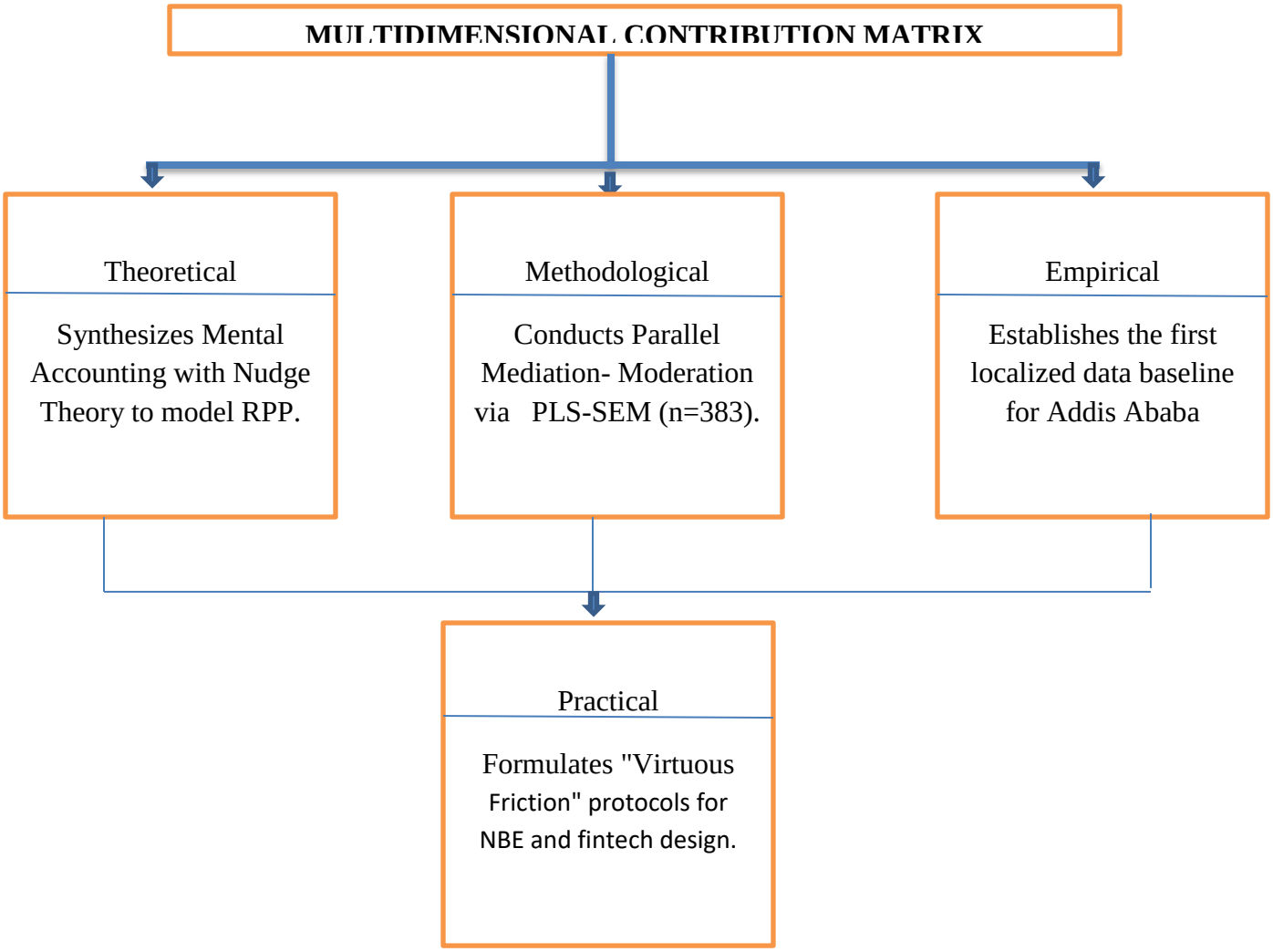
1.5.1 General Objective of the study

The general objective of this study is to analyze the psychological impact of digital payment adoption on consumer spending behavior, with a specific focus on the factors driving overspending behavior among Ethiopian consumers.

1.5.2 Specific Objective

1. To examine the direct effect of digital payment adoption on the overspending behavior of consumers in Addis Ababa.
2. To evaluate the mediating role of the pain of paying in the relationship between digital payment adoption and overspending behavior.
3. To investigate how perceived convenience mediates the relationship between digital payment adoption and overspending behavior.
4. To analyze the moderating effect of psychological detachment on the relationship between digital payment adoption and overspending behavior.
5. To determine how financial literacy moderates the relationship between digital payment adoption and overspending behavior.
6. To assess how expense awareness moderates the relationship between digital payment adoption and overspending behavior.

1.6. Multidimensional Contribution Matrix



1.7 Research Hypotheses

H1: Digital payment adoption has a significant positive effect on the reduced pain of paying.

H2: Digital payment adoption has a significant positive effect on perceived convenience.

H3: Digital payment adoption has a significant positive effect on overspending behavior.

H4: Reduced pain of paying has a significant negative effect on overspending behavior.

H5: Psychological detachment has a significant negative effect on overspending behavior.

H6: Reduced pain of paying significantly mediates the relationship between digital payment adoption and overspending behavior.

H7: Perceived convenience significantly mediates the relationship between digital payment adoption and overspending behavior.

H8: Financial literacy significantly moderates the relationship between digital payment adoption and overspending behavior.

H9: Psychological detachment significantly moderates the relationship between digital payment adoption and overspending behavior.

H10: Expense awareness significantly moderates the relationship between digital payment adoption and overspending behavior.

1.8 Significance of the Study

1.8.1. Theoretical Contribution

This thesis will significantly advance behavioral finance theory by engineering a novel conceptual integration of Prelec and Loewenstein's (1998) Double-Entry Mental Accounting Theory with Thaler and Sunstein's (2008) Nudge Theory. Prior to this study, mental accounting principles will have been applied primarily to static, cash-based credit contexts, while Nudge Theory will have been isolated to choice architecture in generic public policy. This research will bridge these distinct paradigms to model the psychological mechanics of the "cashless effect" in real-time mobile banking transactions. By doing so, the study will expand the theoretical boundaries of bounded rationality, demonstrating that overspending behavior in a digital ecosystem is not merely an emotional lapse in consumer willpower or self-control. Instead, it will prove that overspending will be driven by a structural cognitive failure, wherein digital banking user interfaces actively dismantle the traditional visual and tactile feedback systems that consumers rely on to track their net worth.

1.8.2. Methodological Contribution

From a methodological standpoint, this thesis will introduce an exceptionally rigorous structural configuration by deploying an advanced parallel mediation-moderation framework via Partial Least Squares Structural Equation Modeling (PLS-SEM) executed through Smart PLS 4. Moving beyond simple regression models or direct path assessments, this study will simultaneously evaluate two distinct, competing psychological mediating pathways—Reduced Pain of Paying (RPP) and Perceived Convenience (PC)—against three independent, highly interactive customer trait boundary conditions: Financial Literacy (FL), Psychological Detachment (PD), and Expense Awareness (EA). By analyzing a clean sample of 383 commercial bank customers across 44 latent operational indicators, this methodology will institute a superior level of statistical control. This framework will successfully capture the complex, non-linear relationships that govern

consumer financial choices, achieving a robust predictive capacity ($R^2 = 0.741$) that will provide a highly accurate blueprint for future behavioral finance modeling.

1.6.3. Empirical Contribution

The empirical value of this study will rest on its status as the first localized, comprehensive field investigation to map and quantify the "cashless overspending effect" within the specific socioeconomic reality of the Addis Ababa metropolitan area. While existing data on digital wallets will be almost exclusively drawn from hyper-mature, Western, or East Asian economies, this research will capture authentic primary data from a developing banking sector during an active transition toward digital payment systems. The empirical findings will clarify the true operational outcomes of the domestic mobile money revolution. It will provide localized proof that the rapid deployment of systems like Telebirr and M-Pesa—while driving transaction volumes to record highs—will simultaneously create systemic financial vulnerabilities for the emerging urban middle class due to the complete lack of consumer behavioral protection frameworks.

1.6.4. Practical and Managerial Contribution

Practically, this thesis will provide an essential strategic framework for central bank monetary regulators, commercial banking executives, and fintech software engineers. The findings will move beyond generic, ineffective recommendations regarding traditional financial literacy campaigns to advocate for a profound shift in digital consumer protection: a transition from "informational provision" to immediate "behavioral intervention.

"This thesis will outline the practical implementation of "Virtuous Friction" within mobile commerce applications. It will offer clear design mandates for product developers to intentionally reintroduce sensory, cognitive, and temporal barriers at the immediate point of sale. These barriers will include:

Real-time visual budget mirrors (such as color-coded, diminishing balance rings that calculate spending ratios relative to monthly income).

Sensory haptic feedback indicators (auditory and tactile alerts that physically replicate the psychological resistance of parting with physical cash currency).

Customizable spending velocity caps that introduce a strategic multi-second delay before a high-value payment is finalized. These design implementations will give consumers the necessary psychological breathing room to disrupt automated spending patterns, protect their financial

well-being, and ensure the long-term, sustainable development of the broader macro-economic digital infrastructure.

1.9 Scope of the study

Geographical and Time Scope

This study focuses exclusively on the geographical location of Addis Ababa, Ethiopia, as it features the most developed digital payment ecosystem in the country, with the highest penetration of platforms such as Telebirr and CBE Mobile Banking. In addition, Addis Ababa has the greatest diversity of active digital payment users and thus provides a representative sample of digital wallet users across various demographics, including students, employed adults, and early adopters of technology.

Therefore, Addis Ababa is considered the ideal setting to study the psychological impact of digital payments on spending behavior. From a temporal perspective, the collected data represents digital payment usage and consumer choices over the twelve months preceding data collection. This timeline accurately reflects current trends, the post-reform adoption of digital finance, and the modern spending patterns influenced by the rapid expansion of mobile payments in Ethiopia.

Theoretical and Methodological Scope

In theoretical terms, this research was based on behavioral finance theory and on consumer psychology and used the pain-of-paying theory, psychological detachment methods and technology adoption theory to understand how the nature of digital payment environments impacts consumer spending behavior (Zellermayer, 1996).

The focus of the research was to examine the relationships between digital payment adoption, perceived convenience and consumer spending; plus also, to look at the moderating and mediating variables such as financial know-how and expense tracking. Methodologically, the current research was conducted using a quantitative approach through the use of a structured survey administered to individuals in Addis Ababa who use digital payment systems.

The analysis included mediation and moderation analysis (PROCESS) to test the effects of the conceptual model on consumer behavior. The research was conducted using methods that have been validated, through cross-sectional surveys and through statistically rigorous procedures in order to ensure reliability, validity and empirical robustness.

1.10 Limitation of the Study

There are some limitations to this study; however, none of these limitations decreased the value of the results. First, this study used a cross-sectional design and, therefore, has a single time-point data collection. That means that while the research results describe the relationship between digital payments and spending behavior at that point in time, they do not indicate whether the relationship changed over time. Second, participants were asked for self-reported results, and as such, there is a chance for honest errors or slight over-exaggeration in the case of reporting spending behavior and perceived convenience.

As much as possible, a research method has been established by using established measurement instruments (as defined by previous research), and participants had anonymity to assure that they respond as honest as possible. Third, this study examined consumers' behavior within Addis Ababa only. Even though Addis Ababa is the largest city in Ethiopia, and therefore has the greatest number of consumers using digital payments, the results may not be indicative of the behavior of consumers who live in more rural settings. Finally, this research examined a limited number of psychological factors (e.g., the pain felt when paying, perceived convenience, financial literacy, and expense awareness) with respect to spending behavior; thus, the study does not include any other influences that may have impacted consumer behavior relating to spending behavior. However, the research provides meaningful data to support consumer behaviors related to digital payments. Explain how digital payments affect consumer behavior in Ethiopia and support future studies in this area.

1.11 Operational Definitions

The term **Digital Payment Adoption** captures how frequently and fluently a consumer is engaging with a mobile payment system such as Telebirr and CBE Mobile Banking to perform their daily purchasing activities (Agarwal, 2024). The research measured the frequency of usage, preferences for digital payments over cash and how dependent consumers are on digital payments.

The Pain of Paying is defined as a sense of stress or apprehension a consumer has when they spend money. Digital Payments can lessen these feelings due to the quick nature and invisibility of the transactions (Agarwal, 2024). In the proposed research project, the investigative team intends to assess on the individuals' emotions and/or psychological stresses that occur during the process of paying electronically with Digital Payment systems.

Perception of Convenience refers to how easy, fast and effortless it is to use Digital Payment systems; as opposed to using cash. Perception of Convenience includes ease of Use, Speed of Use and Comfort Level when using Digital Payment Systems (Underdown, 2025). This was also measured through quantitative data collected regarding the Ease of Use, Utility and Effectiveness of Digital Payment Tools according to the consumer's perception.

Overspending Behavior (OSB):- Overspending Behavior refers to the cumulative financial outcome where a consumer's actual expenditures regularly exceed their planned budgets or income constraints. Within this study, overspending behavior serves as the primary dependent variable (DV). It is operationalized as a structural budget-deviation outcome driven by cognitive shifts such as tracking lapses, increased convenience, and a reduced pain of paying rather than short-term emotional impulses.

Financial literacy is the amount of financial knowledge and understanding an individual possesses, as well as their ability to use that information and knowledge to make sound financial decisions (Soman D. , 2003). The research measured financial literacy using a modified version of existing financial literacy scales.

Expense awareness is how much an individual actively monitors their spending, such as by looking at an account balance or reviewing transaction history (Soman D. , 2023). The research measured expense awareness by asking individuals how frequently they check their digital transaction history and how much they understand about the effect of their daily spending on their overall financial position.

1.12 Organization of the Study

This study has five chapters, each of which follows one another in a logical order throughout the research process. Chapter 1 establishes the framework of the study by providing the research background, statement of the problem, research questions, and objectives, significance of the research, scopes and limitations, and operational definitions of major terms. Chapter 2 provides a thorough review of related literature and synthesizes fundamental theoretical frameworks that forms the foundation of this study's conceptual framework by reviewing and analyzing previous empirical studies, identifying gaps in the literature, etc.. Chapter 3 describes the research methodology employed, including study design; research site; target population and sampling techniques; development of measurement instruments; and use of statistical techniques for evaluating the structural paths, including mediation and moderation effects. Chapter 4 contains

the results and statistical analysis of the data collected during the research process, including data cleansing processes; descriptive analysis of respondents; and completes structural equation modeling (SEM) analysis. Chapter 5 provides an overall summary of the research results; overall conclusions; actionable policy recommendations for key stakeholders (finance and regulator); and recommendations for further research.

CHAPTER TWO

2. REVIEW RELATED LITERATURE

2.1 Introduction

The current chapter reviews research that has been done on how consumers can adopt different types of digital payment systems (e.g., PayPal, credit card, and mobile device payment systems) and the effects they have on the way consumers spend their money. It reviews behavioral economics, consumer psychology, and the Technology Acceptance Model (TAM) in an effort to clarify how the use of these systems has led to unintentional overspending behaviors. The chapter also reviews existing research on digital payment adoption and how it has affected consumer spending across multiple international, regional and national settings. It looks for trends, commonalities, and divergences between countries in how digital payments have been adopted and used by consumers during the period reviewed. Ultimately, this review of existing literature establishes the theoretical basis for this study, offers a contextual model developed explicitly for Ethiopia's unique economic and technological environment and establishes the corresponding hypotheses to be tested in future analyses.

2.2 Theoretical Review

Theoretical reviews provide insight on how consumers spend money and make perceived convenience through their use of digital payments; this section uses behavioral economic theory, consumer psychology, and technology acceptance model theories to examine cognitive factors

impacting payment choices. Three Key theories provide insight into consumer spending when using digital payments: the behavioral economics (i.e., the psychology of payment methods), pain-of-paying (i.e., how people perceive payments from a psychological perspective), and technology acceptance model theories. By integrating these theories into the analysis, this section clarifies the relationship between digital payment usage and the psychological impact on consumer purchasing behavior. It also helps inform the conceptual framework and hypotheses for the current study (Palinkas L. A., 2015).

2.2.1 Pain of Paying Theory

Theoretical concepts from Pain of Paying (Zellermayer, 1996) could pose a serious challenge to the foundational assumptions of neoclassical economic models through shifting rational utility towards emotions for regulating resources (i.e., emotional regulation). Neoclassical economics views consumers as "rational calculators," yet Zellermayer's research suggests decision making occurs through psychological distress associated with "hedonic vexation" at the time of relinquishing money. This "pain" is not just a consequence of spending; it is a biologically necessary mechanism for regulating and limiting excessive spending through creating a cognitive barrier against additional expenditures.

Theoretical Evolution: The Mechanism of Coupling

In examining Prelec (1998), the evolution of theory understands how much it depends on the coupling (the perceived relationship between consumption and pleasure when an individual pays for something) when examining how much feel distressed about something.

Soman (2023) supports this statement by explaining that physical cash has strong coupling because you see the physical money you give up, which reinforces the emotional pain of the loss of the money. On the other hand, credit cards and electronic payment interfaces facilitate "uncoupling" of these processes because an individual doesn't see the loss of their money when they use their credit card or electronic payment, which leads to the reduction of the individual experiencing internal regulatory feedback.

Psychological Vulnerability in Digital Ecosystems

Critical insights into why the pain of paying as conceptualized by Rick et al. (2008) functions as an effective psychological brake depend heavily upon an individual's unique emotional sensitivity. Researchers illustrate an accelerating systemic liability in contemporary financial architecture by contrasting the behavior of "tightwads," who are hyper-sensitive to the immediate

emotional pain of spending, with "spendthrifts," who experience very little immediate friction. In traditional, cash-based or high-friction environments, these categories exhibit unique easily delineated behavioral patterns. However, in modern financial ecosystems characterized by the systematic removal of transaction friction (Shah, 2014), this behavioral distinction begins to disappear. As payment mechanisms become increasingly decoupled from physical cash through mobile wallets and biometric identifiers, the psychological friction that historically inhibited overspending behavior is engineered out of the consumer experience. Consequently, because these natural cognitive limitations are neutralized, both consumer profiles ultimately tend toward overspending behavior unless external self-limitation strategies, strict credit limits, or distinct behavioral boundaries are actively imposed.

Socio-Economic Synthesis: The Future of Financial Well-Being

The transformation from the physical world of finance to the digital world of finance has been more than just a move to greater convenience; it has been a complete redesign of the financial autonomy of human beings. According to current analysis by McKinsey & Company (2021) and by the World Bank (2021), the rise in perceived convenience that is happening globally is a result of the intentional reduction by the finance industry of “painless” transactions.

As a result, as previously identified by Zellermayer (1992) as the emotional core of the purchasing process; the current research cycle now requires us to study the impacts associated with the absence of that core. Financial literacy can no longer be defined in terms of math ability, instead an individual’s definition of financial literacy was contingent on their ability to manufacture an artificial frictional barrier in a frictionless world in order to replicate the lost psychological pain associated with the act of making a purchase.

2.2.2 Psychological Detachment Theory

When you use digital payment options (credit/debit cards, mobile apps) there is little mental connection to the monetary expenditures you make. This phenomenon is called ‘psychological detachment,’ which is defined as the psychological experience of separating one’s desire or use of labor from the earnings associated with it.

Initially introduced in the Occupational Health Model to represent how workers dissociated from the act of performing labor, this concept has been expanded to apply to consumer behavior as examined through the behavioral economics literature (e.g. Vohs, 2024). This new application

helps explain the phenomenon known as “spending anesthesia” that continues to emerge in our current marketplace.

Based on how the method or medium of payment becomes increasingly abstracted, the physical barrier between you and your ability to spend your money your physical body and the environment have decreased effectiveness as a measure of value (financial loss) because the required sensory feedback was not available for you to assess spending your money.

Soman (2023) has also proposed two complimentary theories to support the existence of spending anesthesia: The Erosion of Sensory Feedback and The Transparency Effect. Soman’s (2023) study indicates that, while the “pain of payment” has been used conceptually, the frequency at which you experience this physical pain associated with the act of spending money is determined by the inherent transparency of the respective payment method used when making such purchases.

The Erosion of Sensory Feedback occurrs as you use your debit or credit card to make a purchase. When you take cash out of a physical wallet, you provide yourself with two forms of feedback; tactile and visual (currency removal). In comparison, when you make a purchase digitally (e.g. tap of your smartphone to pay for an item), you may not receive any of the aforementioned sensory feedback. This creates a state where the "rush" of the purchase is isolated from the negative consequence of the expense, effectively engineering a cognitive separation that favors immediate gratification over long-term solvency.

Mental Accounting and the "Spendception" Phenomenon

Digital interfaces were not only making payments more visible, but they also provide an opportunity to change how people think about money. According to research from McKinsey & Company and the World Bank (2023), consumers were much less careful managing their digital “credits” or “balances” than they are when managing cash.

The concept of cognitive de-linking within digital financial spaces highlights how modern transaction environments alter a consumer's focus during a purchase. Grounded in the broader psychological money literature established by Vohs (2024), this phenomenon explains how abstract payment methods weaken a user's emotional attachment to their capital. Extending this idea, the Spendception construct (Faraz & Anjum, 2025) specifically describes how a consumer's focused attention on the highly optimized, seamless interface of a digital platform causes them to lose cognitive awareness of the actual monetary value being exchanged. By shifting the user's

focus away from financial depletion and toward interface convenience, this cognitive distortion actively neutralizes psychological spending barriers, ultimately driving severe overspending behavior.

Overall, the idea behind the “de-linking” effect is that digital platforms are not just neutral tools, but rather they have become environments that foster a more abstract, less disciplined approach to managing money. Due in part to the high volume of transactions occurring in these ecosystems, it is likely that total financial oversight has become cumulatively diminished, because the “abstract” nature of the digital balance makes it less apparent how much of an impact any one transaction has on the overall picture of one's financial position.

Local Implications: The Ethiopian Digital Economy

Ethiopia is expected to provide an important, unique example of how platforms like Telebirr and M-Pesa can help reduce barriers to accessing financial services through platform bases service to achieve both financial inclusion and increased transactional speed. However, the "de-linking" effect created by the use of these platforms was making them present a systemic risk to the economy.

Digital Literacy: The GSMA (2024) notes that as emotional friction decreases, digital financial literacy was needed to increase.

Overall: The growth of the Ethiopian digital economy was characterized by a dual approach where unprecedented accessibility to financial resources coexists with the potential for an increase in over-indebtedness. Therefore, the rate of the digital economy's success was contingent upon consumers' ability to successfully interact in environments designed specifically to mitigate the emotional burden associated with the consumer's financial decision making processes rather than solely being determined by technological speed.

2.2.3 Diffusion of Innovations Theory (DOI)

The Diffusion of Innovations (DOI) theory (Rogers, 2003) is used to create a framework through which can comprehend how individuals, businesses, and institutions adopt new technological innovations in their respective industries. DOI states that the adoption of a new idea, product, or service was due to how quickly people are exposed to it (e.g., word-of-mouth) and then make the conscious choice to buy/try/use it or not buy/try/use it. The new innovation must overcome the current behavior of consumers, meaning there has to be something called a "Relative Advantage"

of the new technology versus the way consumers currently use a product/service to entice them away from their existing purchasing habits. When look at Ethiopia's emerging digital economy, it is not a single moment of adoption; rather it occurred over multiple stages and be influenced by two factors: infrastructure and individual psychology.

Five Attributes of Adoption: Critical Review

The speed at which digital payment methods are adopted into Ethiopia depends on five factors for every person that decides to use digital payment methods, each of which has different barriers (psychological/structural) to individuals or organizations adopting digital payment methods.

Relative Advantage vs. Compatibility: The digital payment methods available in Ethiopia were more advantageous to users than traditional payment methods. For example, using a mobile device to make purchases has a significant relative advantage over using physical payment methods. A secondary factor was compatibility, which not only includes having a mobile device but how well the systems align with users' sedentary lifestyle habits and the cultural value of culture.

Complexity vs. Literacy: While data from GSMA Intelligence indicates that active mobile connections in Ethiopia are equivalent to approximately 64% to 68% of the total population, and basic mobile phone ownership has reached roughly 86% for men and 65% for women, these broad metrics mask deep structural variations in device capabilities (GSMA Mobile Gender Gap Report 2025). Specifically, true smartphone penetration which is required to comfortably run advanced digital wallet apps remains exceptionally low at just 15% nationwide, heavily restricted by a severe 43% smartphone gender gap. Consequently, while general mobile connectivity is expanding rapidly, the persistent shortage of internet-enabled devices combined with the cognitive complexity of navigating novel digital interfaces continues to prevent a substantial portion of consumers from fully adopting application-based payment systems.

These dynamic forces a heavy reliance on traditional USSD codes and localized, low-friction mobile infrastructure, highlighting that basic mobile access does not automatically equate to a readiness for advanced digital finance. Consumers with low digital literacy find it difficult to use a "friction" element of high complexity that inhibits their use of "frictionless" digital payment. As such, users were finding it challenging to enter a market where digital purchases are fast and easy to execute.

Trainability and Observability enable "freemium" models for digital wallets to mitigate the risk of the initial transaction. Moreover, using Peer-to-Peer (P2P) transferring in a marketplace produces a condition known as Social Proof for P2P users, which is heavily reliant on the consumer seeing others using a product or service for creating trust in the overall acceptance of the products offered.

The growth trajectory of digital payment users in Ethiopia was demonstrated that the market has moved through the Early Majority and Late Majority to mass adoption. Specifically, the projected growth trajectory of digital payment users in Ethiopia from 12.2 million in 2020 to 139 million by 2025 indicates that the adoption of digital payments in Ethiopia is approaching the mass adoption stage.

Based on the rapid scale of adoption, it is reasonable to assume that the Awareness Stage of the Innovation-Decision Process model and, consequently, the next two stages (Persuasion and Confirmation) were influenced largely by psychological factors previously identified in this analysis.

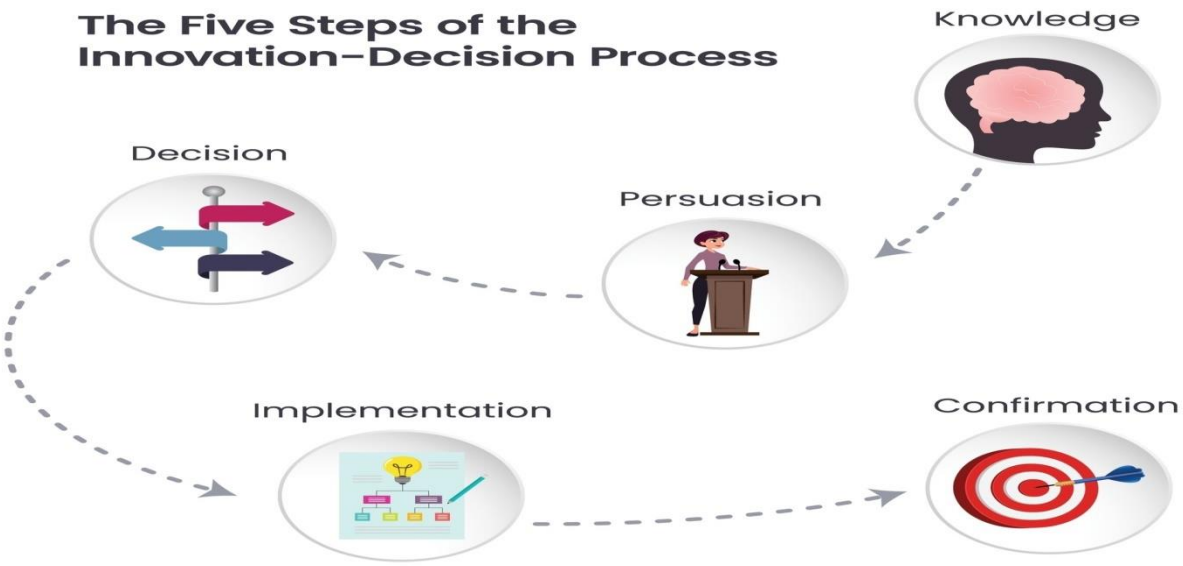
Synthesis: Merging DOI with Psychological Friction

According to the latest reports from the World Bank (2023) and ongoing assessments of tech products, the apparent "success" of digital payments in Ethiopia can be attributed in large part to the impact of the Pain of Paying (PoP) theory.

The Adoption Paradox: What makes an innovation appear "clearly superior" (Relative Advantage) also tends to reduce the amount of emotional effort required to spend money.

As financial inclusion increases through the diffusion of these technologies, many users was less aware of how digital payments are "painless" and thus develop a tendency towards confirmation bias, e.g., adopting the system for its ease of use without being aware of the long-term effects on their individual financial health. The end result was a balancing act between transaction velocities (how quickly transactions occur) versus psychological distance (how far removed users feel from the transaction).

Figure 2 1 the five steps of the innovation decision process



Consumer expenditure can be analyzed more holistically because behavioral economics acknowledges that the "rational actor" is (in fact) an economic fiction. Behavioral economics was provide a greater understanding of how cognitive bias and emotional regulation influence consumer decision-making.

Mental accounting and the "throw away money" phenomenon

Through its explanation of mental accounting (Thaler, 1985; 1999), consumers do not consider money to be interchangeable; consumers instead assign money to specific (subjective) distinct "accounts".

The Digital Dilution: Analysis of mobile wallets indicates that the distorting ("digital") nature of mobile wallets was continue to diminish these distinct account boundaries for consumers (by publishing wealth in a number rather than through weight). The consumer was consider digital amounts to be "throwaway money" (or "gift money") rather than standard currency; therefore, digital amounts was tend to be valued more highly in terms of their acquisition utility, while at the same time devaluing the associated long-term transaction utility.

Prospect Theory and the Engineering of Loss Aversion

According to the Prospect Theory of Kahneman and Tversky published in 1979, behavioral finance contends that the psychological discomfort of losing money is twice as severe as the pleasure of gaining an equal amount.

Strategic Minimization: The conventional banking model is to utilize the immediate and tangible nature of losing tangible capital to create an aversion to parting with capital, whereas methods such as "1-Click" and biometric payments have been developed to reduce the user's experience of "viewing" the loss as noted by McKinsey & Company (2024). Using this framework, consumers would not experience a natural aversion to parting with capital via digital payments, thereby leading to a much higher volume of transactions as a result.

AI-Informed Decoupling and the Double-Entry Model

The Prelec-Loewenstein Double Entry Accounting Scale (1998) clarifies how the negativity associated with the pain of paying is counterbalanced by the positivity associated with the consumption of goods.

AI Emergence: By the end of 2025, as cited by the National Bank of Ethiopia, AI-based embedded finance systems are set to completely transform the way conduct payment transactions in Ethiopia. Specifically, the use of AI-enabled automated payment processing and microphone lending applications was dramatically lessen or remove the emotional impact of making payment for goods or services through the elimination of any human involvement in the decision process. Thus; not only is the pain being buffered but rather was systematically eliminated from the consumer experience when purchasing goods and/or services.

2.3 Conceptual Review

This conceptual review looks at how digital payment ecosystems affect Consumer Behavior through a detailed examination of the core variables involved. Theoretical frameworks provide a general overview of how people behave, while this review looks at specific ways that "Payment Salience," "Psychological Friction," and "Financial Transparency" affect people's behavior in the context of modern payment methods. People behave differently towards different payment systems as international and local markets continue to advance towards more digital-first methodologies for their transactions (Faraz, 2025).

Ultimately, this literature review aims to demonstrate how transitioning from physical currency—which provides rich tactile and visual feedback—to the highly abstracted nature of digital transactions fundamentally alters spending patterns. Within traditional commerce, physical currency relies heavily on haptic signals, where the literal, sensory touch of handling paper banknotes serves as an immediate psychological brake that heightens a consumer's awareness of spending (Prelec & Loewenstein, 1998; Raghubir & Srivastava, 2008). In stark

contrast, modern digital ecosystems replace this tangible friction with cashless interfaces and the immediacy of real-time payments (RTPs). This systematic removal of sensory feedback effectively minimizes the immediate psychological cost of transactional behavior, leaving consumers vulnerable to severe overspending behavior (Zellermayer, 1996).

Central to this conceptual exploration is the change from the traditional physical currency, with its strong tactile and visual feedback, to the more abstracted digital form of value where purchases are denominated by digits and transactions are completed with Haptic Signals (Hasim, 2024).

This section explores these concepts by systematically deconstructing how mobile money interface design, Speed of RTP processing, and the availability of Value-Added Services (VAPS) influence how the user makes internal decisions (Faraz, 2025). The synthesis of contemporary research with the Ethiopian socio-economic environment creates the conceptual basis for connecting the technological features of digital platforms with the psychological state of users, particularly focusing on the reduction of the "pain of paying"((Zellermayer, 1996); (Prelec, The red and the black: Mental accounting of savings and debt. , 1998).

2.3.1 Digital Payment Adoption

The movement from cash-based commerce to digital transactions is known as Digital Transaction Adoption. Digital Payment Adoption is moving consumers and businesses away from the use of physical cash/notes to electronic methods of transaction (such as mobile money, digital wallets, and Internet Banking). Digital Payment Adoption is not just a technological transition but rather represents a complex change in behavior (driven by trust, infrastructure, and perceived value/benefit to the consumer or business) (Stern, 1962).

Worldwide, Digital Payment Adoption has gone through many phases and has seen a dramatic acceleration due to shocks to our ecosystem (for example, Covid-19 which forced tens of millions of previously cash-dependent consumers to "trial" digital payments - and businesses may have had to adjust their payment methods to avoid transactions that could put employees at risk (World Bank. , 2024).

In developed countries, Digital Payment Adoption is characterized by the widespread availability of contactless card payments and the emergence of contactless payment methods made available through apps (such as Apple Pay, Samsung Pay, etc...) - whereas in emerging markets, digital

payments are largely built on the back of the mobile-first approach and, in many cases, the credit card stage has been bypassed altogether (OECD. , 2023).

In Ethiopia, Digital Payment Adoption is being defined today by the speed of transition to mobile financial services (MFS). With the liberalization of the telecommunications sector and the National Bank of Ethiopia's (NBE) decision to allow non-bank service providers (e.g., Telecommunications companies) to provide financial services, the rate of Digital Payment Adoption in Ethiopia has reached unprecedented levels. By the year 2025, Ethiopia's adoption curve has crossed from "early adopters" into the "early majority" as evidenced by companies like Telebirr & M-Pesa Ethiopia experiencing tremendous growth due to extensive expansion of their agent networks and integration with utility bill payments ((National Bank of Ethiopia., 2025, December 9); (PubMed., 2025, March 19)

To truly understand the adoption of technology exactly need to separate ownership (having an account) from "usage" (how often transactions are made). The most recent information shows that while account ownership has dramatically increased, active usage of these accounts is still very concentrated in urban areas creating a "digital divide" around the level of adoption ((Ethio Telecom., 2025, July 24).

The concept of Payment Salience, which describes how users lose the physical feedback associated with spending when they move to a digital method of paying acts as an additional inhibitor to the adoption process. Based on (Zellermayer, 1996), losing the physical feedback associated with a payment reduces the emotional discomfort associated with making that payment, therefore leading to the adoption of digital payments to be closely related to the decreasing "pain of paying", and thus, dramatically changing the way consumers spend money and manage their finances in the Ethiopian economy.

2.3.2 Overspending Behavior

According to Rook (1987), overspending behavior is heavily influenced by intense cognitive and emotional shifts where a consumer experiences a sudden, powerful, and persistent urge to buy an item immediately, often without premeditation or regard for its long-term financial consequences. In the domain of behavioral economics, this can be viewed as an emotionally driven experience where consumers prioritize immediate gratification over long-range financial goals and budget constraints. Therefore, these un-planned expenditures bypass the systematic processes of information search and alternative evaluation that typically characterize planned,

budget-conscious purchasing. This breakdown in self-regulation frequently occurs in direct response to environmental stimuli and the seamless ease of modern transaction interfaces, ultimately resulting in a post-purchase state of cognitive dissonance, financial strain, and severe budget deviation (Stern, 1962).

Consumer purchasing is generally related to the decline in psychological friction associated with the use of electronic payment methods to facilitate purchasing behaviors. In general, perceived convenience can be classified into four categories based on the type of retailer, with the categories being pure impulse, reminder perceived convenience, suggested perceived convenience. (Stern, 1962).

However, in the wake of the increasing prevalence and accessibility of electronic payment methods, these types of perceived convenience may be further differentiated by the greater prevalence of frictionless payment systems and electronic payment technology.

According to (Soman D. , 2023) as identified and supported by the foundational work of (Zellermayer, 1996) the less physically transparent the means of payment (including the counting out of cash) the greater the resistance to a consumer's perceived convenience urges. Separately, digital wallet and one-click shortcut technologies "decouple" purchasing pleasure from spending pain—the "Spendception" concept described in many academic articles is one indicator of consumers being less aware of their overall spending ((McKinsey & Company., 2024); (World Bank. , 2024)).

Mobile money platforms like Telebirr and M-Pesa are rapidly growing in Ethiopia, creating new triggers for over purchases. The combination of social media commerce and instant mobile payments creates an easy transition from desire to ownership. Convenience associated with having digital money 24/7 in addition to "Buy Now Pay Later" (BNPL) micro-credit features has led to much greater levels of discretionary spending by urban youth (GSMA., 2025 , December 18).

In its efforts to move toward full merchant digitization under its NDPS 2.0 strategy, the National Bank of Ethiopia (2025) faces the challenge of managing perceived convenience behavior as the emotional "stop signal" associated with physical cash continues to diminish in importance.

2.3.3 Financial Literacy

Financial literacy provides people with the information; understanding, behavioral characteristics, and actions they need to make informed decisions about their finances and

ultimately reach their individual goals for financial stability (OECD. , 2023). Financial literacy is now Digital Financial Literacy (DFL) plus one more level of skills and capabilities - how a person uses and benefits from the availability of digital financial platforms; how someone understands the impact of a digital footprint created from their financial transactions; and how people react psychologically to the lack of physical cash and having a different level of spending "pain." The spending "pain" referenced by (Zellermayer, 1996) serves as an automatic barrier to over Spending Behavior, yet those who are highly financially literate may not feel this way. Today, someone's ability to be financially literate in a digital world consists of three key components:

1 Functional Knowledge – understanding how digital financial products function, example transaction fees , interest rates charged on mobile micro-loans , and how to use a digital wallet.

2 Risk Awareness – identifying and avoiding potential risks in an ever-growing fintech ecosystem (phishing, social engineering, etc.) and

3 Consumer Engagement – understanding how consumers are impacted by their usage of digital financial products, example how credit scores and debt levels are determined based on the actions taken by consumers through digital financial product use. Low financial literacy increases consumer susceptibility to digital fraud and data security vulnerabilities within fintech ecosystems (Agarwal, 2024). Consumers with low levels of financial literacy often view their digital balances as less tangible than physical cash, which frequently results in a failure to remain within expected, allocated resource limits (Thaler, 1999). Recognizing this challenge, the National Financial Inclusion Strategy of Ethiopia has identified financial literacy as a critical prerequisite for achieving sustainable digital transformation. While reports from the National Bank of Ethiopia (2025) indicate tremendous increases in the basic ownership of financial accounts, a significant disconnect between account access and informed usage persists. Recent empirical studies suggest that consumers in rural and urban low-income areas face the greatest difficulties in understanding digital transaction concepts, making them highly vulnerable to severe budget deviations and overspending behavior due to the conceptual abstraction of digital payroll and electronic payments (McKinsey & Company, 2024). Therefore, increasing digital financial literacy remains a vital regulatory mechanism to protect consumers from the chronic overspending behavior that typically results from the reduced pain of paying inherent in cashless environments (National Bank of Ethiopia, 2025; Zellermayer, 1996).

2.3.3 Expense Tracking Behavior

Tracking expenses is part of a system that lets individuals create a record of their total costs for categories within a personal or household expense. The action of creating expense records supports Mental Accounting, a part of behavioral economics that helps consumers meet their financial goals by reconciling the spending record with the planned expense (Thaler R. H., 1999). The payment system has changed over time, from primarily using cash to most recently using cashless and frequently using an electronic or digital payment system. In the past, consumers kept track of expenses through manual methods such as physically counting remaining cash frequently when the pain of paying was causing them to become more aware of their expenditures (Zellermayer, 1996). When people began to use cashless and digital payment systems, they were no longer physically involved in their spending, which caused them to lose their awareness of spending.

The development of digital payments has changed the way track expenses. Digital payment systems offer the benefit of receiving messages immediately via email or text after making a purchase, which can provide a record of a transaction, thus eliminating the need to create an expense record within the system. Unfortunately, due to the lack of physical feedback associated with the purchase, consumers using digital payment methods are less likely to remember the exact dollar amount they spent because their cognitive attention is divided between making a payment and receiving immediate feedback about whether or not their payment was accepted. (Soman D. , 2023) discovered that consumers have a much lower recollection of the exact dollar amounts they had spent when the payment was not clearly identifiable, e.g., when using mobile wallets or payment cards checking one's digital balance is often perceived to be more cumbersome than checking one's cash balance (i.e. the number of cash coins and/or bills) in an old-fashioned wallet because it often does not have any visual representation (such as an 'eye') of an empty wallet.

This creates disconnect between how much the consumer has in their wallet and how much they spend ((Preacher K. J., 2008); (Zellermayer, 1996)) because they continue to spend money without having either a mental or physical snapshot of how much they have left. In Ethiopia, the growth of "super-apps" like Telebirr and M-Pesa Ethiopia has provided consumers with many modern tools (such as automated SMS notifications and in-app analytics) that can facilitate expense tracking. Although the National Bank of Ethiopia (2025) believes these tools create a

pathway toward financial transparency, the extent to which these products created greater access to financial transparency is highly dependent on the financial literacy and engagement levels of the users of these tools.

Many users in developing countries utilize digital payments for their speed and convenience; however, they do not regularly utilize the expense-tracking features available on these tools, which creates "spending anesthesia," a situation in which the user is unaware of how much they are spending because the convenience of digital payment methods obscures their long-term impact on the user's overall expense (Agarwal, 2024). Under the NDPS 2.0 "BRIDGE 2030" strategy, there has been increased regulatory attention on utilizing "nudge" technology such as automated alerts and visual graphs of spending patterns to help provide consumers with the psychological barriers and tracking discipline that were lost during the transition away from cash payments ((National Bank of Ethiopia., 2025, December 9) (World Bank. , 2025).

2.3.4 Perceived Convenience

Perceived Convenience is conceptualized as the Customers' subjective perception of the amount of time and effort needed to carry out a transaction, and this is one of the primary reasons customers adopt and frequently use technologies. Within The Technology Acceptance Model (TAM), convenience is typically referred to as “Perceived Convenience of Use". It is suggested that the more convenient a system is for its users, the greater its chance of success because it decreases the user’s physical and cognitive load. As more transactions take place in a digital format, convenience encompasses more than just geographical proximity; it also refers to the ease of completing online purchases (e.g., the ability to make purchases with minimal steps), the fast processing of payments in real time, and the round-the-clock availability of banking services ((Rogers, 2003); (World Bank. , 2025)).

The relationship between Convenience and Spending Behavior is associated with the decrease of Psychological Barriers. According to (Zellermayer, 1996), the experience of "paying pain" presents an emotional barrier to purchasing; however, the process of making payments via highly convenient means alleviates this barrier to purchasing. A payment's convenience reduces the effort required to complete the transaction. Therefore, if the amount of effort required to make a payment is low (e.g., through a simple tap on the mobile phone or a biometric scan), then the consumer would not think twice about whether or not they need the item they are purchasing. A behavioral paradox arises from this: Greater user satisfaction due to the increased convenience of

transactions has created a "decreasing" emotional stop signal for many users while increasing the levels of both unplanned and over purchases ((Soman D. , 2003); (McKinsey & Company., 2024).

In the Ethiopian digital landscape, perceived convenience has enabled mobile money services to penetrate the traditionally cash-heavy economy. The National Bank of Ethiopia (2025) identifies the ease of paying for utilities, taxes, and merchant goods and services using mobile devices as the leading contributor to the rapid growth in volume of transactions within the mobile payments sector.

The NDPS 2.0 strategy also indicates that this convenience creates an increased risk of the phenomenon referred to as "spending anesthesia" without sufficient levels of financial literacy. The (Agarwal, 2024) states that the more "invisible" and convenient a payment transaction becomes, the more the psychological disconnect is created. Therefore, our view of consumer protection needs to be transformed to include protection from the negative behavioral consequences that arise from frictionless transaction systems (Zellermayer, 1996); (National Bank of Ethiopia., 2025, December 9)

2.4 Behavioral Economics of Payment Methods

Behavioral economics discusses how psychological factors influence economic decision-making, including consumer spending behaviors. Traditional economic theory assumes rational decision-making underneath all of our actions; whereas behavioral economics takes into account our emotions, cognitive shortcuts, and environment surrounding us when deciding how spend our money. One of the major insights from behavioral economics is the idea that the way pay affects our perception of our spending and our decision-making for purchasing (Agarwal, 2024),

There are a variety of different payment methods available today, and each payment method provides a unique psychological experience to the user. When using cash as a payment method, for example, our cash is tangible and visible, creating a greater awareness of the amount of cash that is leaving our possession. As such, many individuals find it easier to be strict with their spending when using cash because they can see exactly what they are spending (FurtherAfrica. , 2025, December 5).

With the introduction of digital forms of payment such as mobile wallets, credit/debit cards, and online bank transfers, the physical connection to money has been diminished, as has the emotional attachment to it. Digital payments are instantaneous and not very discernible to the

user, which has made it more difficult for users to remain on- expense in their spending, resulting in an increase in over purchases. In behavioral economics, "mental accounting" refers to the way consumers perceive and manage their money. For example, consumers may make purchases using cash (the way they traditionally paid) or credit cards (the way they are increasingly paying) (OECD. , 2023).

Digital payment systems typically display all transactions automatically and digitally store them, giving consumers the ability to track multiple purchasing categories in a single instance. However, with reduced tracking, its impact on how consumers think about spending money can negatively impact self-control and lead to perceived convenience (Soman D. , 2023).

A second important component of behavioral economics regarding payment systems is "payment salience", which refers to the level of visibility at the time of purchase. Payments made via low-salient payment systems (like mobile payment) reduce the psychological "pain" of making a payment and allow for greater consumption (Hasim, 2024). The "salience effect" is especially strong in settings with multiple transactions that are typically small in value on a daily basis (e.g., grocery shopping, public transport, and food purchases) – all situations where digital payments are routinely used in major urban centers, such as Addis Ababa, Ethiopia (FurtherAfrica. , 2025, December 5).

In summary, the findings in behavioral economics regarding the adoption of digital payment systems reveal that these payment systems do not simply enhance the convenience of buying products or services; rather, the adoption of these systems fundamentally changes the way consumers approach their spending behavior. As such, the adoption of digital payment systems also affects how consumers buy items impulsively, overspend, and ultimately make decisions regarding their finances (Prelec, The red and the black: Mental accounting of savings and debt. , 1998). Therefore, identifying the behavioral impact associated with the adoption of digital payment systems is critical for understanding their role in the way consumers spend money and are impacted by the digitalization of their economy (GSMA., 2025 , December 18).

2.4.1 Pain of Paying and the Cashless Effect

Psychological suffering while making a purchase, also called "pain of paying," is when people feel at least some degree of discomfort or negative emotional response to having to give up their money. It acts as a natural barrier preventing too much or unnecessary spending (Thaler R. H., 1999). The act of physically exchanging money for goods or services causes consumers to

become aware of the actual cost of the purchase more clearly, which heightens the sense of this discomfort and often results in a heightened state of caution while making spending decisions (Faraz, 2025).

The cashless effect refers to an opposite experience. Non-cash payment methods (e.g., mobile payments, debit cards, etc.) reduce the pain of paying. Since most digital payments can be processed very quickly, are less visible, and are frequently automated, consumers have far less of an emotional connection with the money they spend (Faraz, 2025).

Therefore, they are less apprehensive about spending that money and are more likely to make over purchases or spend more overall than they would with cash. Recent research regarding buying patterns suggests that digital payment users (e.g., mobile payment users) generally spend more freely than cash users, especially in situations that involve a high frequency and low amount of payment, such as retail shopping, restaurants, and transportation (Zellermayer, 1996). Research indicates that the less painful experience of making a purchase lowers self-control at the time of purchase, thus increasing the chances that consumers was purchase something they did not intend to buy. This is particularly true for users of mobile Payment Systems where transactions require very little effort or verification before completing the purchase (Hasim, 2024).

Though the cashless experience may have a similar impact on other consumers as well, the cashless experience does not affect every consumer in the same manner. Individual characteristics, such as a consumer's financial literacy, purchasing patterns, and awareness of expenses, was either increase or decrease the Cashless Experience for each individual consumer (Vohs, 2024). Some digital payment systems provide consumers with a record of past transactions, balance alerts and a summary of their purchases, which may help to create greater awareness of their spending and return some of the painful feeling associated with making expenditure (PubMed., 2025, March 19).

With Ethiopia being one of the first countries to utilize the Cashless Experience for its population, the Cashless Impact may be particularly pronounced as many Ethiopian consumers are making the transition from cash transactions to Digital Payments with little or no experience. The cashless culture may also be exacerbated by the differences in levels of financial literacy across the country, making consumers more susceptible to over buying behavior (Thaler R. , 2018).

Therefore, to help consumers in Addis Ababa understand how cashless Experiences and Cashless Effect influences the way Digital Payment Method Adoption affects the behaviors of consumers in their respective cities, it is important for consumers and merchants alike to be able to provide an understanding of the emotional impact and utility effects of both cashless payment methods (Thaler R. H., 1999).

2.4.2 Technology Adoption and Payment Perception

Multiple Technology Adoption theories address the motivation for an individual acceptance and continued use of a particular new technology (e.g., Digital Payments). In the case of Digital Finance, Adoption is influenced not only by the user's ability to access a Digital Payment Platforms, but also by how the user perceives Digital Payment Technology. The user's perception contributes to the user's attitude, intensity of Digital Payment Technology use, and the user's spending behavior (Schomburgk, 2024).

The user perception of "Ease of Use" is one of the most important aspects of Technology Adoption; an individual is more likely to adopt a Digital Payment Technology if they feel that the Technology is simple to navigate and requires little effort to complete their transaction(s). Higher ease of use generates more trust in the Digital Payment Technology and reduces the user's apprehensions at the time of making a payment (Schomburgk, 2024).

Another critical value associated with Digital Payment Technology is the perceptions of being "Useful" and "Convenient" when using Digital Payments.

Digital Payments allow users to make purchases quickly without having to carry cash, as well as allowing users to make purchases anytime and anywhere. This Convenience can positively influence how the user perceives the digital payment technology, as it allows users to feel the transaction experience is simple, efficient and without stress. On the other hand, the ease of making a digital payment could contribute to lower spending control for the user, as they Consumers' perceptions of how they interact with the forms of payment they use, such as their feelings of security, enjoyment, and satisfaction, impact both emotionally and cognitively. If consumers see a payment method as being modern, secure, and dependable, then they are likely to use that form of payment more than cash and be drawn to using it frequently (FurtherAfrica. , 2025, December 5).

A person's preference for using one form of payment may also affect the possibility of purchasing impractical items without feeling guilty about doing so. As are experiencing an

increase in digital transactions, such as mobile transactions, through rapid digitization of cities like Addis Ababa, see the way that payment perception is shaping how consumers act as they adopt mobile payment technologies. There are numerous new users of mobile payments, and their first impressions of mobile payments regarding convenience, reliability, and interfaces can greatly influence their spending habits (Faraz, 2025). Thus, by analyzing how consumers view technology and the impact of payment perception on their spending habits, can better explain the phenomenon between mobile payments and consumer spending habits/over spending may make purchases without adequately evaluating the cost associated with a digital payment (Cochran W. , 1977).

2.4.3 Digital Payment Adoption and Usage

The term 'adoption of digital payments' encompasses not only the initiation of using an electronic payment method but also a consumer's frequency of utilizing the chosen method, as well as the various types of transactions processed through that method. Adoption may also reflect a preference for using an electronic payment method rather than cash. Digital payments have become an integral part of everyday life within many countries, because they are fast, convenient, and easy to access (Agarwal, 2024).

In Ethiopia, the rise in the use of digital payments has happened rapidly in recent years. Mobile money services have been launched, there has been an increase in digital finance reform led by the government, and there are improvements ("upgrades") in the telecommunications infrastructure that supports the usage of digital payments. Therefore, the development of telecommunications has made it easier for people to use mobile phones to pay for goods and services, make money transfers, and manage their accounts by offering services such as Telebirr and CBE Mobile Banking. (EthSwitch., 2025, October 30).

Whereas a greater number of the people using these mobile money services are living in urban areas (especially Addis Ababa), there is greater access to and use of these services due to greater levels of network coverage, higher stores of smartphones per capita, and a larger number of merchants that accept these types of payments. Factors like age, income level, education level and digital skills have an impact on how consumers use their digital payment methods (Shah, 2014). There are some users who primarily use their digital payment methods for small day-to-day purchases, while others primarily use them for transfers and bill payments. The frequency with which consumers use digital payments affects their spending patterns since having regular

digital transactions was lower the consumer's awareness of their total spend and make payments feel more automatic (Faraz, 2025).

Research shows that as consumers' use of digital payments increases, their behavior around spending was change. When digital payments are the primary means of payment, consumers tend to make more frequent purchases and are more likely to make quicker purchasing decisions. The adoption of digital payments is therefore crucial to understanding both over Spending Behavior and excessive spending behavior, particularly in rapidly expanding urban areas.

Overall, understanding the adoption and usage of digital payments can help provide insight into how psychological factors, including the pain of paying, convenience perception, and awareness of finances, can affect consumer spending within a digital marketplace. (Stern, 1962)

2.4.4 Over Spending Behavior

An perceived convenience purchase is a spontaneous, unplanned purchase decision that occurs as a result of an emotional reaction, desire, or immediate situational trigger; it is not usually based on careful consideration of the item. Over Spending Behavior is defined as spending more money than originally intended as or more than what is in financial plan (or expense). perceived convenience can lead to over Spending Behavior, but the two terms have different meanings; perceived convenience represent a type of decision-making, while over Spending Behavior indicates the result of a consumer's spending behavior (Stern, 1962).

A consumer's ability to easily make payments using a digital payment method (e.g., through the use of mobile payment apps or digital wallets) makes it easier to perceived convenience and spend beyond their planned spending limit. Because the consumer does not have to physically hand over their cash to complete their transaction with digital payment www.bof.com, they wouldn’t perceive the same degree of "loss" associated with cash transactions due to lack of visibility to actual cash being lost (Soman D. , 2003).

Consequently, it is likely that consumers would have a reduced level of self-control when utilizing a digital payment method in comparison to the use of tangible cash. Therefore, consumers may be more likely to make hasty purchase decisions without considering the potential long-term financial ramifications associated with those purchases. Over Spending Behavior is prevalent among frequent lower priced goods (e.g., groceries), transportation, and online purchases. Digital payments are a key enabler of small, frequent purchases because they

make it easy for buyers to pay immediately with little effort. Small repeated purchases become significant amounts if the consumer is unable to keep track of his/her expenditures (Stern, 1962).

Individual characteristics are a factor in over Spending Behavior. Consumers with a greater degree of financial literacy (and therefore a good understanding of their financial profile) are better able to manage their expenditures, even though they may use digital payments to complete their purchases. On the other hand, consumers who lack budgeting skills and therefore cannot track their transactions have a greater tendency to overextend their finances.

In Addis Ababa, which has a high rate of digital payment adoption, over Spending Behavior are emerging behavioral issues. Therefore it is essential that understand how Digital Payments contribute to these behavioral tendencies in order to develop appropriate financial education program (Preacher K. J., 2008), create consumer protections and develop Digital Payment Solutions that promote responsible spending.

2.4.5 Pain of Paying and Psychological Detachment

A lack of emotional or psychological connection to money can result in customers spending more than they would have done otherwise. Customers who pay for items with cash feel more physically involved in the transaction than those who use a digital payment method because cash payments require the customer to physically transfer cash to the cashier. (Faraz, 2025) The impact is even greater when the purchase amounts are small (less than 20). Customers can be influenced by a number of different factors to make an perceived convenience (Faraz, 2025).

The ease of making a digital payment and the absence of an emotional connection results in over buying. The psychological detachment between a consumer and a digital payment system is influenced by different aspects of how they interact with the digital payment system (Cochran W. , 1977). Automatic payments, saved payment options and one-click purchases can all serve to reduce the consumer's awareness that they are spending money. Conversely, transaction alerts, balance notifications, and spending summaries can help to increase the consumer's awareness of their spending and create some amount of "pain" associated with spending (Agarwal, 2024).

In a developing country, such as Ethiopia, in the digital economy, psychological detachment may be more pronounced because many consumers are still adjusting to cashless transactions. Additionally, many consumers have limited experience using digital money, and their level of financial literacy may vary, making them more susceptible to perceived convenience. Therefore, it is essential to investigate the concept of "pain of paying" and "psychological detachment," as

both concepts was provide a greater understanding of how the adoption of digital payments is influencing consumer behavior in Addis Ababa (Soman D. , 2023).

2.4.6 Perceived Convenience and Payment-Method Satisfaction

Consumers' perceptions of convenience are determined by the effort and time required for completing transactions. Consumers generally view convenience when using digital payments as the speed at which a transaction can be completed (the time it takes), the number of steps in the transaction process (the number of clicks), and the ability to make a payment from any location. Consumers' perceptions of convenience lead to a higher likelihood of using digital payments more frequently and preferring them over using cash (Zhang, 2023).

Satisfaction with payment methods reflects how satisfied consumers are with the digital payment process based on their overall experiences with the payment system. Digital payments that provide reliable, simple and safe payment experiences improve customer satisfaction and were likely lead to repeat usage of the digital payment system. Increased satisfaction was develop a stronger perception of trust in digital payment systems, which leads to increased dependency on using the digital channel for making everyday purchases (Soman D. , 2023).

While high levels of perceived convenience and satisfaction drive increased usage of digital payments, these same two factors can also significantly influence consumers' spending behavior. As payment systems reduce the amount of effort required, consumers tend to become more focused on the enjoyment associated with making a purchase than on the actual cost of the purchase (Thaler R. H., 1999). As a result, consumers may be less careful when evaluating a purchase prior to actual purchase and was more inclined to make over purchases. Repeated usage of digital payment systems due to increased satisfaction may also make the experience of spending feel like a routine part of a consumer's daily activities and was contribute to greater overall spending (Zellermayer, 1996).

The psychological factors influencing the experience of obtaining or paying for things interact closely with how convenient it is to do so. As consumers begin to feel less emotional about the spending of their money, they have less emotional resistance to spending it or was less likely to contemplate the total amount of money that they are spending within one transaction. At the same time, consumers that are very satisfied with digital payment systems may trust the system enough not to pay as much attention to the details of their transactions (Thaler R. H., 1999).

In Addis Ababa, the widespread acceptance of digital payment platforms throughout retail stores, transportation services and online marketplaces is contributing significantly to the shaping of consumer behavior through convenience and satisfaction. Understanding how the psychological components associated with the use of technology impact perceived convenience and spending habits was allow us to provide insight into how the introduction of digital payment options may have psychological effects related to the adoption of these digital payment systems in Ethiopia. (Agarwal, 2024)

2.4.7 Expense Awareness and Budget Tracking

A consumer's awareness of their expense habits is referred to as expense awareness. This means that the consumer is cognizant of how much they are spending, what they are spending on, and how frequently they spend (Faraz, 2025). Budget tracking means being able to see the financial transactions made on a daily basis, checking the available balance on the account, and comparing the amount of money spent with the amount that was budgeted for that expense. Both tracks of expense awareness and budget tracking was aid in assisting the consumer with being able to control their financial behavior (PubMed., 2025, March 19)

Digital payment systems can assist or impede the development of expense awareness. By providing users with access to transaction records, interim spending reports and reminders when their account balance is low, the mobile payment system gives users the chance to better manage their expenses. However, the ease and rapidity of making a digital payment was likely hinder a consumer's ability to have true expense awareness if they do not use or refer to these digital tools frequently (Soman D. , 2023).

Consumers who lack expense awareness are at a greater risk of over Spending Behavior. This may occur when the consumer is not watching his or her expenses closely and the small digital purchases they make on a frequent basis begin to add up quickly. As a result, the consumer is more likely to exceed the amount of money they had budgeted for the purchase. Consumers who actively monitor their expenses was, therefore, become more aware of their spending habits at an earlier stage and can then adjust their spending habits as needed (Zellermayer, 1996). Expense awareness acts as a moderator between the adoption of digital payments and spending habits. By increasing the awareness of an individual’s spending, expense awareness decreases both the negative effects of reducing the pain of paying as well as the greatly increased convenience associated with using a digital payment system. Through budget tracking, consumers are forced

to take time for a pause before making final purchases as well as to assess their current financial circumstances (PubMed., 2025, March 19).

In Addis Ababa, as the use of digital payments continues to increase in the daily life, the understanding of expense awareness and budget tracking has become an integral part of responsible management of finances. By understanding how it affects consumer behavior, a clearer picture of how shoppers utilize digital payment methods effectively and how some shoppers over-spend was emerge, thus making these important measures in this research study (Vohs, 2024).

2.5 Digital Payments and Consumer Behavior in Ethiopia

2.5.1 Evolution of Digital Payments in Ethiopia

Over the last ten years, as electronic payment systems grow, many companies offer quick and easy ways to send and receive money electronically via their mobile phones. In the past, cash was the only way to make payments; therefore, most people did not have access to an electronic payment system (Ethio Telecom., 2025, July 24).

The first step to developing electronic payments in Ethiopia was by offering a range of mobile banking services from Commercial Banks. These banks provided their customers with internet-based services, which enabled them to easily send money and pay bills and check their bank statements over the internet using a mobile device (EthSwitch., 2025, October 30). The widespread use of these services has created a level of comfort and trust in using electronic payment systems among urban dwellers.

The recent introduction of mobile money platforms, including Telebirr, has made electronic payments much easier to use for everyone (not just those who have access to banks). Telebirr has enabled users to send and receive money, make payments for goods and services and conduct their daily transactions from their mobile devices, thus opening up electronic payment opportunities for many users who do not have traditional banking accounts (FurtherAfrica. , 2025, December 5). The evolution of the digital payments industry has largely been driven by government intervention through the implementation of policies aimed at promoting cashless transactions, establishing digital identification systems, and creating bridges between payment platforms. As a result, more merchants, transport services, and utilities across Ethiopia, particularly in Addis Ababa, are accepting digital payments as the digital commerce sector continues to grow rapidly (Ethio Telecom., 2025, July 24).

The growth of digital payments has fundamentally transformed how consumers interact with money as consumers increasingly embrace the digital payment method to transact daily. Thus, understanding the psychological impact of digital payment methods on consumers' behavior, particularly their spending habits and level of perceived convenience is increasingly important. The objective of this study is to provide further evidence to support these conclusions by analyzing the psychological effects of adopting digital payment methods among consumers in Addis Ababa (EthSwitch., 2025, October 30).

2.5.2 Evidence on Adoption and Use

Studies on adoption and use of digital payments empirically show that consumer acceptance of various types of digital payment systems is dependent on a number of factors, which include: the Perceived Convenience of use, convenience, trust, and access to technology. Studies conducted in developing countries have shown that the adoption of mobile payments is likely to be highest for mobile payment systems that are perceived to be easy to use and that a majority of merchants using mobile payments have adopted them (Agarwal, 2024). Also, once consumers have begun to utilize mobile payment systems, they may begin to utilize those systems frequently, particularly within larger urban centers that have a more extensive digital infrastructure (FurtherAfrica. , 2025, December 5).

In addition, studies show that increased usage of digital payments has impacted the transaction behaviors of consumers. The type of consumer who utilizes mobile wallets and bank systems usually completes more transactions with smaller amounts than the cash-based consumer. The increased number of transactions leads to a greater sense of routine and less recognition of the amount of money being spent and can lead to a reduction in overall spending levels (Vohs, 2024).

Research within the African and emerging market context has shown that younger users, salaried employees, and those with a higher education level are likely to see an increase in digital payment growth. In addition, those groups tend to incorporate digital payments into their daily activities for activities such as purchasing goods, transportation, and paying for services (Schomburgk, 2024). Finally, there are differences in the usage of digital payments based on financial literacy and the level of digital skills possessed by a consumer. Studies continue to reveal a mixed impact of the adoption of a digital form of payment on the user's capacity to use such digital payments responsibly (Fana Media Corporation., 2025, December 9). The

convenience and ease of access created by digital payments, coupled with the relativity of the transaction amount (the embedded idea of "one-click" spending), creates many challenges for users to keep their spending in check and manage their own finances effectively. This is why there is now an even greater need to evaluate the usage patterns of these methods of payment, as well as the overall impact of digital payments on consumer behavior and the behavioral outcomes associated with the adoption of digital payments (National Bank of Ethiopia., 2024).

Existing research findings appear to confirm that while there is rapid expansion in the adoption and use of digital payment methods, there is still a wide range of different behavioral outcomes, and thus the need for future research in this area remains critical, especially in developing countries like Ethiopia, where digital payment systems continue to grow and become integrated into everyday commerce.

2.6 Empirical Review

2.6.1 Empirical Evidence from Global Studies

The purpose of the study by Zhang and Xu's (2023) was to determine how the use of digital payments affects urban Chinese Consumers' spending behavior. Quantitative research methods were employed to collect data via a structured questionnaire. Data was analyzed using structural equation modeling (SEM). This study found that increased frequency of mobile payment usage could lead to an increase in perceived convenience. This was attributed to the lessened pain of paying and high perceived level of convenience associated with mobile payments. Zhang and Xu's study had strong statistical analyses and utilized validated measurement scales, thus making them strong studies. However, it also had limitations due to its cross-sectional design and its single country context, which limits the causal inference of the study and the generalizability of findings to other countries.

Furthermore, the study did not consider the moderating variables such as financial literacy, which is one of the issues this current study was address. Kim and Park's (2024) study investigated the impact of cashless payment modalities on the psychological impacts of consumer spending behavior on shopping decisions in South Korea. They utilized an experimental research design where they compared cash payment users with mobile payment users in simulated retail shopping scenarios. The findings showed that consumers who paid digitally (i.e., those who used mobile payments) had lower levels of discomfort related to payments and tended to spend more than cash payment users. The study's greatest strength was

its experimental approach which enhanced internal validity. On the other hand, the artificial shopping context has limited applicability in actual situations and does not take into account the long-term influences of consumer spending behavior or expenditure awareness.

There is a need for further investigation into field-based consumer studies within everyday environments but not limited to Addis Ababa. In the study completed by Mwangi and Otieno, (2023), a survey was used to gather data on mobile money usage among mobile money users in urban areas of Kenya. A regression analysis was performed to determine the relationship between the daily usage of mobile payment and the frequency of daily spending. The study found that increased usage of mobile money was correlated with increased levels of daily spending and decreased budgeting discipline.

A major strength of the study was its ability to examine a developing economy with comparable mobile money systems to those found in Ethiopia. The limitation of the study was its failure to incorporate psychological variables such as the pain of payment and perceived convenience which reduced the ability to explain all possible factors influencing consumer behaviors. This presents an opportunity for future research to incorporate psychological methods into future studies of African digital payment. The study conducted by while the study provided valuable insight into adoption drivers, it focused only on technology acceptance and did not assess behavioral outcomes such as spending behavior or perceived convenience. The absence of behavioral and psychological analysis highlights a clear gap that the current study aims to fill.

2.6.2 Empirical Evidence from Ethiopia

Alemu and Tesfaye (2024) examined the factors affecting the adoption of mobile money payments in Ethiopia. The results of the study indicated that the ease of use and convenience of mobile money payments were both significant predictors of consumers' intentions to adopt mobile money payments.

Bekele (2023) examined mobile banking and its impact on how urban bank clients utilize finance within Addis Ababa, Ethiopia by applying a descriptive research design. The results from Bekele revealed that while increased use of mobile banking led to a more efficient transaction process, some users experienced greater difficulty managing their expenses under this method of payment. The research was notable in that it consisted of a study conducted in Addis Ababa which represents the largest market for digital commerce in Ethiopia. Notably, the focus of this research was limited primarily to descriptive statistics and did not include an evaluation of casual

relationship nor psychological aspects which would be needed to substantiate the conclusions drawn. Furthermore, over Spending Behavior patterns were not studied creating a void in what is understood regarding consumer psychology towards spending.

Tadesse and Girma (2024) investigated digital financial services along with financial-awareness levels of consumers in Ethiopia through the use of a mixed methods approach. Tadesse and Girma supported the finding that consumers who do not have sufficient financial literacy tend to be at greater risk for poor spending control using digital payment methods. Although Tadesse and Girma gave some recognition to financial literacy and its potential effect(s) on spending, this area was not subjected to statistical tests, thus creating a direct basis for the current research to study financial literacy as a moderating variable on consumer spending behavior in Ethiopia.

Piloting the "Cashless Effect," a prospective study conducted by Bekele and Hailu (2025), were involving Telebirr users in Addis Ababa using a quantitative approach? The researchers examined how much the "psychological distance" (the level of detachment between the past or future cash transaction) of a digital balance affects people's likelihood of making over purchases at supermarkets. They anticipate that the "psychological distance" from their cash balances was result in an increase of up to 15% in the number of their unplanned purchases as opposed to customers who carry cash.

Bekele and Hailu plan to investigate only direct payments (e.g., in supermarkets), there is no way for them to investigate how the convenience of cashless payment systems serves as a mediator for the overall over Spending Behavior, which the current research seeks to fill.

In a complementary study, Solomon et al. (2024) investigate the impact of social influence (primarily through peer pressure) and the "communal rhythm" of Addis Ababa (particularly with respect to the digitalization of locations such as Equb) on digital payments in urban Ethiopia. They plan to show how social cues push digital payments (i.e., "When two friends are shopping together, one has their phone record when they receive a notification about their Equb payments and encourage that person to complete their transaction"). Although they intend to show that social notifications influence their willingness to spend, they was fall short of measuring the psychological barrier (Pain of Paying), thus leaving a gap for the current research to fill in terms of the mediation role of Pain of Paying.

Mulugeta (2025): In a study focusing on the "Financial Digital Divide" in Ethiopia, Mulugeta found that urban consumers often use digital wallets for small, frequent "micro-transactions"

(such as ride-hailing and coffee) that aggregate into significant monthly over Spending Behavior. The study noted that cultural norms of "Gubeta" (treating others) are increasingly digitized, yet it was fail to statistically validate how expense Awareness could moderate this behavior. This research was filling that gap by testing expense awareness as a boundary condition for such over social spending.

2.6.3 Summary of Empirical Evidence and Research Gaps

The literature review demonstrates that although there is an extensive body of literature worldwide that examines the "cashless effect", there is still a fragmented body of research in Ethiopia. This research study was close the following gaps identified in the literature:

The Conceptual Gap (Mediation): Although some researchers, including Tadesse and Girma (2024), have examined adoption rates or have discussed financial literacy, no research has been conducted on how spending actually increases due to digital adoption within the Ethiopian context using the “Pain of Paying” and “Perceived Convenience” as parallel mediators.

The Contextual Gap (Communal Context): While researchers such as Schomburgk (2024) have examined individualistic consumerism in their global meta-analysis studies, there currently exists a lack of empirical evidence regarding how digital ease-of-use interacts with social obligations (such as Equb digitalization and social gifting), resulting in over behaviors.

Research in Ethiopia's community of consumers often employs either qualitative or descriptive methods to establish observations about when show a tendency towards continuous amplification but lack the ability to substantiate boundary limits. This research aims to bridge a large methodological gap between descriptive and quantitative (statistical) methodologies by applying a moderated parallel mediation statistical model to validate how financial literacy and budgeting awareness act as "buffers" to offset the negative spending impacts associated with using digital payments.

This research not only goes beyond the adoption-only focus of prior Ethiopian studies but also provides a statistically validated model of overspending behavior driven by digital payments. By focusing on the structural outcomes of digital financial inclusion within the metropolitan context of Addis Ababa, the study moves past basic utilization metrics to uncover the cognitive and behavioral shifts underlying consumer resource allocation. Ultimately, this approach provides a more comprehensive psychological and contextual description of modern consumer behavior

drivers, establishing an empirical foundation for future regulatory and strategic financial frameworks within the country's rapidly evolving digital ecosystem.

2.7 Conceptual Framework

The proposed model for examining individual behaviors based on Technology Acceptance and Behavioral Economics also demonstrates how cognitive and emotional behaviors change as individuals transition from using physical currency to using digital technologies to manage their finances.

Core Antecedent: Digital Payment Adoption (IV)

In this framework, Digital Payment Adoption was representing the primary facilitator of behavioral changes. The findings of my research were providing support for this argument because as wealth is digitized, there is a perceptual disconnection between the physical aspect of the dollar and the digital aspect of the dollar. Digital Payment Adoption created a situation where as soon as a consumer initiates a transaction, he/she is able to act quickly, without going through the cognitive processes associated with being cautious about spending money. Therefore, it was possible to argue that the digitization of wealth reduces the tactile sense of counting cash that traditionally creates barriers to making unplanned purchases.

2. The Mediating Mechanisms (The "How" Paths)

Digital technology provides a range of features to help companies reach their customers. Digital adoption can be fostered through the emotional avenue as well as the cognitive avenue. As a result of reducing the emotional aspect of the pain of paying by digitally adopting, consumers was experience a separation of the pleasure from the act of buying and the anxiety of the payment into two distinct psychological processes. Therefore, because the anxiety about the payment is removed from the act of buying, consumers was more likely to make perceived convenience purchases than when they utilize traditional cash methods. In addition to the emotional aspect, the cognitive aspect of the digital adoption can be created through feelings of convenience generated by digital tools leading to seamless transactions. The convenience created by these digital tools results in decreased time available for consumers to think about and plan their purchases, leading to increased instances of over buying behavior.

3. The Moderating Filters (The "Boundary Conditions")

In order to understand why there are some consumers who do not fall into the trap of digital payments, two moderators need to be considered that impact the strength of the association:

Financial Literacy (W_1), which was test as a moderator in the first stage of the study; and expense Awareness (W_2), which examined in the second stage of the study. Those with lower levels of financial literacy was experience a "decreased pain point" when they utilize digital payments, making them more susceptible to becoming stuck in a cycle of debt (World Bank, 2023). On the other hand, high financial literacy was exposing a false relationship between the use of digital payment methods and decreased levels of spending pain. expense Awareness (W_2) represents the second stage of the research as it relates to Mental Accounting and is based on the idea that an individual who maintains an accurate record of his/her expenditures through budgeting was continue to create psychological barriers to the use of digital payment interfaces (Venkatesh, 2016; World Bank, 2023). Therefore, financial literacy decreased the perceived convenience that consumers associate with the lack of tracking their expenditures and subsequently was weaken the connection between the perceived convenience of digital payments and excessive spending.

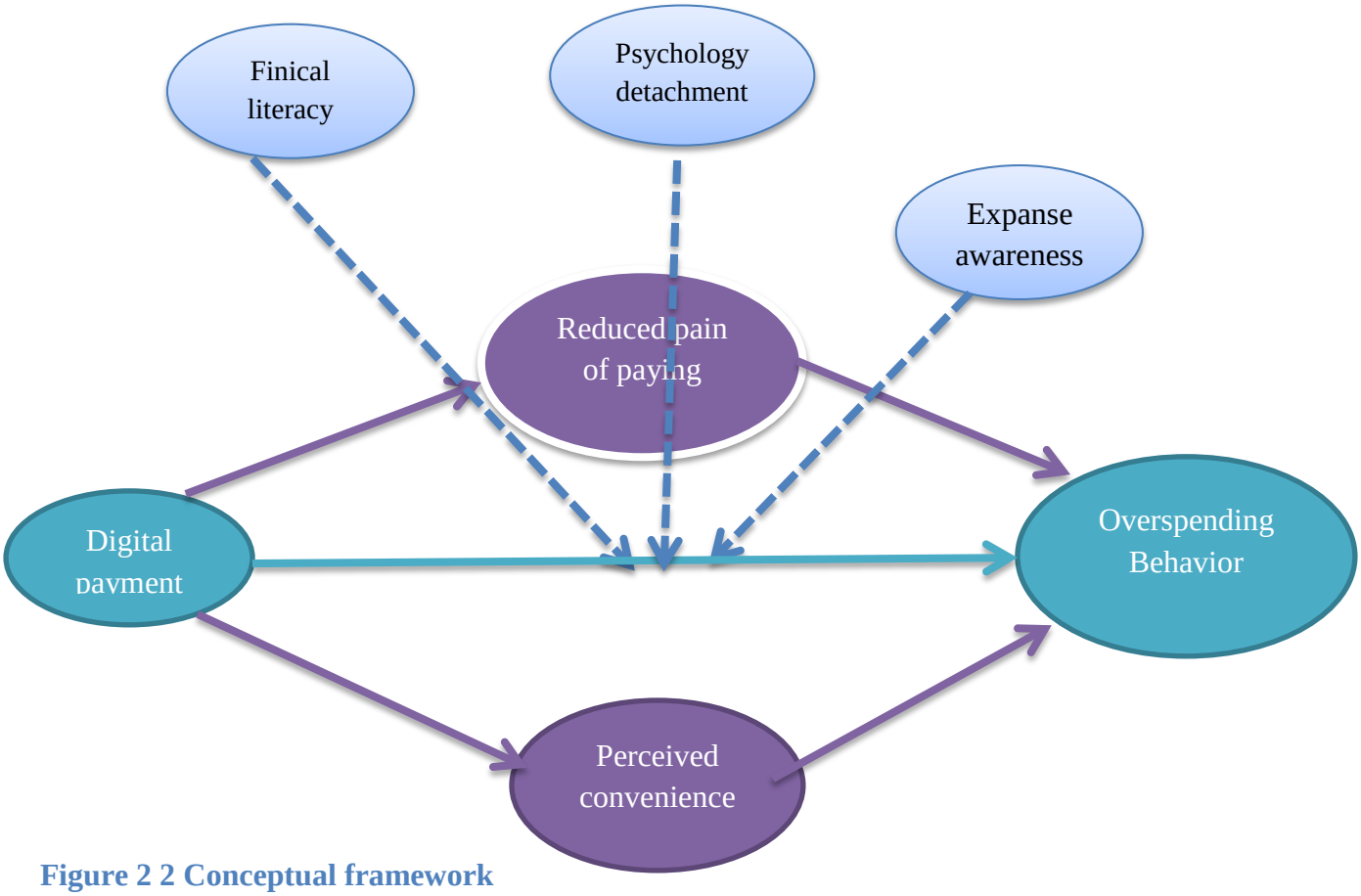


Figure 2 2 Conceptual framework

Adapted from Hasim et al. (2024), Schomburgk et al. (2024), Agarwal et al. (2024), Faraz & Anjum (2025), and Underdown et al. (2025).

2.8 Hypotheses Development

2.8.1 Digital Payment Adoption and over Spending Behavior

Transaction Cost Theory provides a foundation for understanding how different payment modalities affect the propensity of consumers to make unplanned purchases. As digital payment options become more widely accepted, they facilitate the perceived convenience shopping experience by reducing the barriers associated with making an immediate purchase from a traditional brick-and-mortar store (i.e., time, effort, convenience), resulting in an increase in unplanned purchases due to the "purchase friction" associated with the traditional modality. In addition to facilitating over buying, the mobile wallet system has also influenced the way in which consumers engage with one another and conduct business. The habitual use of mobile wallets within the digital financial ecosystem of Addis Ababa has allowed consumers to establish a more intuitive, immediate, and emotional decision-making process (i.e., "System 1") (Kahneman, 2011) resulting in a greater likelihood of consumers acting on their desire to make a purchase immediately and, therefore, increasing the incidence of unplanned purchasing.

H1: Digital Payment Adoption has a significant positive effect on over Spending Behavior.

2.8.2 Digital Payment Adoption and the Pain of Paying

Prelec and Loewenstein's (1998) Coupling and Detaching Theory posit that consumers have a psychological mechanism (the Pain of Paying) that regulates their spending behavior. When a consumer pays for goods with cash, there is a very strong degree of coupling between the payment and the subsequent loss of wealth. However, with the shift to digital payments, the consumption of a good is decoupled from the actual pain of paying for the good. This occurs due to the abstract nature of digital representations of goods (e.g., Telebirr or Banking Apps), which provide less transaction transparency and, as such, reduce the immediate psychological "sting" or moral tax that the consumer experiences at the time of payment.

H2: Digital Payment Adoption has a significant negative effect on the Pain of Paying.

2.8.3 Digital Payment Adoption and Perceived Convenience

Effort expectancy, according to UTAUT (Unified Theory of Acceptance and Use of Technology), has been identified as one of the main contributors to shaping users' perceptions about the product. The concern with adopted technologies, such as digital payments in

developing countries, like Ethiopia, is how accessible they are and whether or not they was provide the user with any additional utility through their time. By allowing the user to access their digital services 24 hours a day, 7 days a week, and making it unnecessary for them to visit an ATM or branch to conduct a transaction, these digital service platforms contribute significantly to the overall perception of convenience. This form of technological efficiency should not be thought of solely in terms of the product; instead, it has the capacity to create a new psychological context for the user's experience with a marketplace.

H3: Digital Payment Adoption has a significant positive effect on Perceived Convenience.

2.8.4 Pain of Paying and over Spending Behavior

According to behavior economics, the "pain of paying" is a cognitive tax that inhibits impulsivity. When the pain of paying is high, it activates the brain's "pain avoidance" center and leads to enhanced self-control. The same is true when the "pain of paying" is diminished by electronic payments. By removing the emotional braking system associated with cash loss from the purchasing process, the consumer has little or no anxiety about making over purchases that exceed what they initially intended to buy.

H4: Pain of Paying has a significant negative effect on over Spending Behavior.

2.8.5 Perceived Convenience and over Spending Behavior

Eastlick and Lotz (2011) state that decreasing the non-monetary expenses associated with making payments (such as the amount of time it was cost you or how much effort it was take to physically complete the payment) significantly increases consumers' cognitive spending limits. The current advanced convenience of many digital payment systems has created a near friction-free method of purchasing which greatly reduces the amount of time between when the consumer desires to make a purchase and when they actually make the purchase at an electronic checkout (Karim et al., 2020).

The immediacy of completing a transaction in this manner removes the normal "cooling off" period that consumers usually experience when making purchases with paper currency or coins (Prelec & Loewenstein, 1998). By not having this critical pause in their transaction, consumers do not think about their budgets or their current account balances before they finish the transaction, effectively removing the behavioral restraint needed for purchasing within retail stores (Boden et al., 2020; Thomas et al., 2011).

H5: Perceived Convenience has a significant positive effect on Over Spending Behavior.

2.8.6 The Mediating Role of Psychological Mechanisms

2.8.6.1 The Mediating Role of Pain of Paying

The Anesthesia Effect is the underlying explanation of the relationship between Digital Payment Adoption and over Spending Behavior. While Digital Payment Adoption gives you the ability to spend, it is actually the decreased psychological pain experienced with perceived convenience that leads to behavior change. There have been past studies conducted by Prelec and Loewenstein (1998) that showed that when making a purchase using a Digital Payment Method, you do not recognize the immediate cost of the item. Rather than seeing the cost at the time of the transaction as an individual pain of payment (mediator), the cost is masked by the use of a Digital Payment Method, which acts as the buffer from the pain you experience when paying for an item impulsively.

H6: Pain of Paying significantly mediates the relationship between Digital Payment Adoption and Over Spending Behavior.

2.8.6.2 The Mediating Role of Perceived Convenience

According to Efficiency-Stimulus Theory, one's ability to utilize digital transaction platforms with ease creates internal mental states that was affect their behaviors towards the products purchased (Meuter et al., 2005). As an example, when consumers use mobile wallet applications and digital platforms for purchases, they feel more convenient due to the ease and speed of the transactions (Childers et al., 2001).

Because there is a greater degree of perceived convenience with digital transactions, the amount of time left for cognitive processing (cognitive processing window) becomes negligible; therefore, the consumer is unable to take advantage of the typical "cooling off period" associated with cash transactions made in a physical environment (Prelec & Loewenstein, 1998). The acceleration of this transition from a consumer's initial desire for the product to the actual electronic acquisition of the product provides a critical parallel mediator for overcoming routine mental budgets and facilitating systematic overspending behavior (Boden et al. & Karabas et al.).

H7: Perceived Convenience significantly mediates the relationship between Digital Payment Adoption and over Spending Behavior.

2.8.7 The Moderating Role of Cognitive and Behavioral Traits

In this chapter, have looked at how certain individual psychological characteristics shape the level of association between digital payments and spending behavior have also considered how

individuals' cognitive behaviors may represent boundary conditions that enhance or inhibit the impact of "cognitive numbing" from digital technology on financial decision-making. By analyzing cognitive and behavioral characteristics, have achieved a more sophisticated understanding about why some consumers were able to overcome excessive spending, whereas others displayed greater susceptibility to the behavioral biases associated with a cashless economy.

2.8.7.1 The Moderating Role of Financial Literacy

According to Self-Regulation Theory, not all digital payment adopters were having the same degree of impulsivity in their spending behavior. A person's financial literacy functions as a cognitive "shield" or boundary condition. Therefore, users with high levels of financial literacy have analytical reasoning that serves as an obstacle to the automatic over triggers provided by the digital apps. Consequently, the strength of the relationship between digital payment adoption and impulsivity was weaker for those with higher levels of financial literacy than for those with lower levels.

H8: Financial Literacy significantly moderates the relationship between Digital Payment Adoption and over Spending Behavior.

2.8.7.2 The Moderating Role of Expense Awareness

According to Theory of Monitoring, consumers who monitor their expenditures more readily experience a greater amount of "payment transparency." Expense Awareness is also a key consideration in providing a moderator that interrupts psychological detachment from making purchases using a digital tool. When Expense Awareness is high, the "anesthetizing impact" of digital payments is eliminated, and the consumer is therefore much less likely to experience over behaviors that are normally caused by using the convenience of the digital interface when making a purchase.

H9: Expense Awareness significantly moderates the relationship between the psychological mediators and over Spending Behavior.

2.8.7.3 The Moderating Role of Psychological Detachment

This research uses Dual-Process Theory to support the assertion that Psychological Detachment (i.e., viewing digital currency as "monopoly money") accelerates the relationship between Perceived Convenience and user behavior with respect to how they spend in relation to their digital currency. If a user is highly psychologically detached from reality with respect to their

digital wealth, then the effect of Convenience on their spending behavior was enhanced. Therefore, when viewed as convenient, the level of Psychological Detachment serves as an "accelerator" that acts to increase the likelihood of an individual engaging in over spending behavior.

H10: Psychological Detachment significantly moderates the relationship between Perceived Convenience and Over Spending Behavior.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology employed to investigate how digital payment systems impact consumer overspending behavior within the metropolitan context of Addis Ababa. To provide a rigorous and replicable empirical framework, this section details the complete structural design of the study, including the justification for the chosen geographic region, the definition of the target population, the sampling strategy, and the specific instruments used for data collection. Furthermore, it explicitly operationalizes the core research variables—focusing on overspending behavior as the primary dependent variable—and delineates the statistical analysis techniques used to evaluate the structural paths. Finally, issues surrounding measurement validity, reliability, and ethical considerations are addresses to ensure the integrity of the research design, thereby enabling readers to critically evaluate the empirical findings and subsequent conclusions.

3.2 Study Area

The research was Conducted in Addis Ababa, Ethiopia's capital city, this investigation was highlight the Psychological Effect of Digital Payment Adoption on Consumer Spending and over Spending Behavior of Consumers, as Addis Ababa Is Ethiopia's political center, as well as its economic and commercial center, and is also the city where the largest number of Digital

Payments is executed per Year. In addition, numerous Financial Institutions, Digital Payment Service Providers, Merchants, and Consumers reside in Addis Ababa who Use Mobile Wallets, such as Telebirr and CBE Mobile Banking.

The Smartphone Penetration Rate in this City is Relatively High compared to Other Regions in Ethiopia; the Internet Connectivity is improved; and Digital Payment Systems are More Widely Accepted, compared to the other Regions in Ethiopia. Digital Payments are widely used in Retail Stores, Supermarkets, Restaurants, Transportation Services, and Online by Consumers of This City. Because of These Conditions, Addis Ababa is an Ideal Study Site to Explore the Psychological Impact of Digital Payment/Adoption Based on the Tons of Experience Being Utilized with the Aid of Digital Payment. Ultimately, the Study was Provide Insight into How Consumer Behavior Would Change, with the Implementation of Digital Payments, and How Future Studies was utilized to assist in Other Urban Locations throughout the Country.

3.3 Research Philosophy

Research philosophy refers to a system of beliefs and assumptions concerning the development of knowledge. These assumptions—specifically ontological (the nature of reality) and epistemological (what constitutes valid knowledge)—directly govern the selection of research designs, data collection instruments, and analytical techniques (Saunders M. L., 2019). While various paradigms such as interpretivism and pragmatism exist, this study was grounded in the Positivist Research Philosophy.

The Positivist paradigm is appropriate for this study because Positivism assumes that an objective social reality can be measured using quantifiable data rather than subjective personal experience. The Positivist paradigm requires that the researcher remain objective and value-neutral to avoid infringing on the objectivity of findings that was test the hypotheses derived from theories such as Prospect Theory and Mental Accounting using data collected from a specified research population (Neuman W. L., 2014).

The use of Positivism is an appropriate approach to this research study as its main goal is determining and measuring the causal relationship(s) between Digital Payment Adoption and a combined construct of perceived convenience and over Spending Behavior. The research was performed using a structured survey tool, and the analysis was conducted using advanced statistical methods, including smart PLS. The results of this analysis were providing law-like generalizations of the way that consumers behave within the digital economy.

In summary, this study used a Positivist approach to provide objective, consistent, reliable and generalizable empirical evidence regarding the psychological and behavioral patterns of consumers living in Addis Ababa, Ethiopia, as a result of the use of digital payment systems.

3.4 Research Design

The selection of a proper research design was depending on the specific goals of this study and the complexity of the variables involved. While academic frameworks offer exploratory and descriptive options, this study was utilize an Explanatory (Causal) Research Design (Saunders et al., 2019). Exploratory design was rejected because the theoretical foundations of digital payments and spending behavior are already well-established. Similarly, a descriptive approach was bypassed as it only identifies the "what" of a population, failing to explain the underlying psychological processes. By contrast, the Explanatory design was allow for the statistical validation of the Moderated Parallel Mediation Model, providing the necessary framework to test how Digital Payment Adoption (IV) predicts over Spending Behavior (DV). This design was critical for mapping the indirect effects of the Pain of Paying and Convenience, while simultaneously identifying the boundary conditions set by moderators such as Financial Literacy and expense Awareness (Creswell, 2017).

A Cross-Sectional Timeframe was adopted for this study. While longitudinal designs offer insights into behavioral change over time, the cross-sectional approach was justified by the current "Early Majority" stage of the Ethiopian digital economy (Rogers, 2003).

Methodological Reasoning: At this specific juncture (2025–2026), the rapid transition to platform-based services like Telebirr provides a "natural experiment" environment. A snapshot of current user behavior was allow for the immediate testing of the Diffusion of Innovations (DOI) stages without the confounding variables associated with long-term macroeconomic shifts (Creswell, 2017).

3.5 Research Approach

This study was adopting a Quantitative Research Approach driven by Deductive Research Logic to investigate the psychological drivers of digital spending. Qualitative and mixed-method approaches were excluded as 'While qualitative approaches offer rich contextual insights, the present study adopted a quantitative approach to enable statistical testing of hypothesized structural relationships across a large sample.'. By utilizing deductive reasoning, this research was follow a "top-down" structure—starting with established theories, such as Prospect Theory

and the Technology Acceptance Model, to derive specific hypotheses that was tested against empirical data collected in Addis Ababa (Saunders et al., 2019). The quantitative framework was essential for objectively measuring the causal relationships between Digital Payment Adoption, the Pain of Paying, and Convenience. Through the use of a highly structured survey instrument, the study was generating numerical data suitable 'PLS-SEM via Smart PLS 4, using 5,000 bootstrap subsamples for significance testing of path coefficients and indirect effects

3.6. Scientific Justification of Sector and Case Entities

The operational focus of this study was directed exclusively at the retail banking and Fintech sectors in Ethiopia, specifically evaluating the dominant mobile money platforms within the Addis Ababa metropolitan area. The selection of this specific sector and its primary case entities was justified along clear scientific, economic, and structural lines.

3.6.1. Macroeconomic and Structural Justification of the Sector

The retail banking and Fintech sectors were selected because they represent the primary execution channels for the National Digital Payments Strategy (NDPS 2.0) mandated by the National Bank of Ethiopia.

High Transaction Velocity: The retail sector handles the highest volume of daily consumer micro-transactions (e.g., transport, groceries, utility payments). It serves as the direct operational locus where physical currency is actively being replaced by digital alternatives.

Isolating Behavioral Deviations: Because retail financial transactions involve immediate, short-term consumer budgeting choices, this sector provided the ideal empirical testing ground to isolate real-time behavioral deviations, cognitive numbing, and cash-decoupling effects.

3.6.2. Scientific Justification of the Case Entities (Telebirr and M-Pesa)

Rather than evaluating generic digital banking software, this research specifically targeted the Telebirr (Ethio Telecom) and M-Pesa (Safaricom Ethiopia) ecosystems. This choice was dictated by two structural realities:

CASE ENTITY SELECTION LOGIC MATRIX	
CRITERION	SCIENTIFIC BENEFIT
Systemic Duopoly Dominance	Maximizes external validity and sample representativeness.
State-Enforced Mandates Fuel, Utilities, Public Transit	Eliminates organic adoption bias; isolates forced psychological lag.

Systemic Market Dominance: Telebirr and M-Pesa form a functional duopoly that commands over 95% of the mobile wallet market share in Ethiopia. Selecting these entities ensured maximum sample representativeness and external validity for the final PLS-SEM model.

Exogenous, State-Enforced Mandates: The Ethiopian government implemented strict regulatory mandates requiring digital-only payment processing through these specific platforms for high-frequency commodities, such as retail fuel distributions, public transit fares, and municipal utility bills.

This state-enforced deployment created a natural research environment. It effectively eliminated voluntary adoption bias, forcing consumers across all literacy levels into digital transaction spaces. Consequently, these platforms provided the perfect scientific baseline to study how rapid, top-down digital transitions trigger a psychological behavioral lag and subsequent overspending behavior.

3.7 Population, Sample Size, and Sampling Technique

According to (Saunders M. L., 2019), identifying the study population is one of the most significant strategies for establishing external validity in research. Researchers usually evaluate whether to use a census or sampling method, however, for this study a sampling approach was taken because it is not feasible to survey all users of digital payments in Addis Ababa (Creswell, 2017). The justification for this choice stems from the need for statistical efficiencies and optimization of resources (Neuman W. L., 2014). Similarly, (Kothari, 2004), indicates that a researcher's choice of either probability or non-probability sampling techniques also have a major impact on their research design

3.7.1 Target Population of the Study

The target population for this study comprises approximately 3.5 million actively transacting digital payment users located within the metropolitan boundaries of Addis Ababa. According to reporting from the National Bank of Ethiopia (2025) and institutional assessments of major digital payment engines—including Ethio telecom's Telebirr platform, which has surpassed 51.5 million registered users nationwide, and the Commercial Bank of Ethiopia's CBE Birr—urban centers, primarily Addis Ababa, account for the vast majority of active transactional traffic (Ethio telecom, 2025). To ensure empirical rigor and prevent the inflation of the sampling frame by dormant accounts this three million five hundred thousand baselines is strictly defined using the active usage metrics established by the National Bank of Ethiopia's National Digital

Payments Strategy (NDPS 2.0). Rather than relying on total registered accounts, the population scope isolates users who have completed at least one digital transaction within a 30-day window, thereby aligning the research frame directly with consumers actively exposed to the digital financial ecosystem (National Bank of Ethiopia, 2025). Representing the urban segment most exposed to digital financial interfaces. It is important to identify the target group of people surveyed in the study (Saunders M. L., 2019). Researchers often weigh the advantages and disadvantages of using either a general population or a more focused sub-section of a population when determining their study participants. However, this study was take a more focused approach by utilizing a target population comprised of all adult consumers who are currently using any type of digital payment technology in Addis Ababa, Ethiopia. This decision is justified by the inclusion of consumers who are currently using mobile money and digital banking applications to complete their daily financial transactions (Neuman W. L., 2014). The purpose of this study is to collect and analyze data on digital payment usage and the psychological effects of mobile money and digital banking services on consumer spending behaviors (Etikan I. M., 2016).

In addition, the selection of Addis Ababa as the central research locale can be supported by its designation as the premier Financial Technology Adoption Centre in Ethiopia (World Bank. , 2024). The City of Addis Ababa presents the opportunity to research an environment characterized by Digital Payment users, due to the wide availability of Mobile Devices, improved access to the Internet and the high concentration of Merchants accepting Digital Payments (Zoran, 2016). Focusing on this target population was provide for sampling of consumers undergoing a Digital Financial Transition, therefore providing an empirical basis to study the influence of this transition on the composite over Spending Behavior and over Spending Behavior Constructs, thus increasing the statistical robustness and contextual relevance of results (Hair J. F., 2017)

3.7.2 Sampling Technique

Choosing an appropriate sampling technique is a critical component of data collection for conducting valid and reliable research (Saunders M. L., 2019). Researchers usually choose between probability sampling, where each person has an equal chance of being sampled, and non-probability sampling, where sampling is based on predetermined sections of the population (Kothari, 2004). Since there is not an exhaustive and accessible sampling frame of all digital

payment users in Addis Ababa, using a probability approach is not feasible for this research. Therefore, the Non-Probability Purposive Sampling Technique was employed in this research because participants who have experience with one or more digital payment platforms (Telebirr, and CBE Mobile Banking) are the only participants to be eligible for this research (Palinkas L. A., 2015).

The reasoning for adopting purposive sampling is anchored in its capacity to deliberately select participants who possess specific characteristics relevant to the phenomenon under investigation. Within behavioral economic and consumer research, this non-probability sampling technique is highly effective when the research objectives demand insights from a targeted segment of the population rather than a generalized demographic broad-stroke. Behaviors can only be measured through data collected from people who possess (meet) certain characteristics (Etikan I. M., 2016). In this study, through purposive sampling, the researcher was narrow the population down to several urban areas in Addis Ababa, each identified by having very high transactional densities (Creswell, 2017).

When utilizing this sampling technique, the researcher was ensuring that the collected data was come only from people who frequently have the opportunity to engage in perceived convenience (was purchased impulsively) (Neuman W. L., 2014). Although this sampling technique did not provide the same degree of statistical generalization of the results as would be obtained through the use of probability sampling, it is the best option for the study, allowing the researcher to concentrate on a specific or targeted demographic (Neuman W. L., 2014). Additionally, by focusing on this target demographic, the researcher was gain the depth of understanding necessary to accurately assess those psychological variables and mechanisms that moderate (influence) an individual's propensity to make over purchases (Hair J. F., 2017).

3.7.3 Sample size

The (Cochran W. G., 1977) formula was determining the sample size for the present study, a common method for estimating sample sizes when the population is unknown or very large. Because the number of individuals in Addis Ababa using digital payments is currently growing and was likely continue to grow, the Cochran formula was provide an appropriate way of estimating a representative sample. A minimum sample size of 384 respondents was provided based on a confidence level of 95 percent and an error margin of 5 percent when the maximum level of variability exists ($p = 0.5$). The 384 is a common sample size used in social science

research; therefore, it was generate adequate statistical inference from which to base the findings of the research project.

In addition to the minimum number of questionnaires needed, more was distributed to account for potential non-response or incomplete responses, thereby allowing for adequate numbers of usable responses to complete extensive data analysis involving mediation and moderation testing. Therefore, 384 is an appropriate sample size to achieve the research objectives and produce findings that can be generalized.

(Cochran W. , 1977) Defines the formula for the calculation of a sample size as follows:

$$n_0 = Z^2 \times p \times q / e^2$$

Where:

n0= required sample size

Z = Z-value corresponding to the desired confidence level (1.96 for 95% confidence)

p = estimated proportion of the population with the attribute of interest (0.5)

q = 1 − p (0.5)

e = margin of error (0.05)

$No = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2$

$n_o = 3.8416 \times 0.25 / 0.0025$

$N_o = 384.16$

A Sample Size calculated at 384 was used, so there was adequate power for both mediation and moderation analysis. The participants was recruited using a Multi-stage Sampling strategy that was applied within high-traffic digital payment `hotspots' throughout Addis Ababa, including commercial areas, universities and banking institutions that frequently use Telebirr and M-Pesa. Participants was then be recruited through a Structured Survey, and a plan was established to distribute the survey through both directly (by [QR Code] or through Social Media Groups) as well as digitally to reach a wider variety of participants, thereby increasing respondent diversity. Before taking the survey, each participant was provided with a brief overview of the study's purpose and assured that their responses would remain anonymous. This systematic approach was promote collection of high-quality, quantitative data that is going to be utilized in a rigorous statistical analysis for addressing the proposed conceptual model.

3.8. Comprehensive Bias Mitigation and Data Cleanliness Protocols

Because the primary empirical data for this structural model was collected using self-reported survey instruments administered via multi-stage purposive sampling among 383 retail banking consumers in Addis Ababa, the research design implemented strict procedural and statistical safeguards. Self-reported behavioral metrics—specifically those measuring subjective traits like overspending behavior, financial literacy, and expense awareness—are inherently vulnerable to systematic response errors. To protect the psychometric integrity, internal validity, and structural reliability of the structural equation model (PLS-SEM), a three-tiered bias mitigation framework was systematically executed during the data collection and pre-processing phases.

3.8.1. Procedural Remedies for Social Desirability and Response Bias

Response bias, specifically social desirability bias, presented a major threat to data accuracy, as consumers naturally tend to under-report financially irresponsible traits while over-reporting positive traits. To eliminate this confounding variable, the following procedural controls were integrated into the research administration:

Guaranteed Double-Blind Anonymity: The introductory section of the data collection instrument explicitly stated that no personally identifiable information (including names, phone numbers, or specific bank account details) would be recorded. Participants were assured that their responses would be evaluated strictly in the aggregate for academic purposes, creating a low-stakes environment that encouraged honest reporting.

Psychological Reparability of Scales: The construct indicators were physically separated and counter-balanced across different sections of the survey questionnaire. Items measuring the independent variable (Digital Payment Adoption) were physically isolated from the mediator (Reduced Pain of Paying) and the ultimate dependent variable (Overspending Behavior). This structural layout prevented respondents from recognizing the underlying hypothesis, thereby minimizing cognitive priming, consistency motifs, and deliberate answer-patterning.

Neutral Item Phrasing: All Likert-scale questions were framed using neutral, non-judgmental behavioral descriptors rather than emotionally or socially charged terminology, reducing the respondent's psychological urge to provide socially prescriptive answers.

3.8.2. Statistical Screening for Engagement Bias and Careless Responding

Engagement bias, characterized by straight-lining behavior or random clicking due to survey fatigue, was actively screened out to ensure that only highly attentive responses were included in

the final structural analysis. A strict two-stage data-cleaning protocol was executed post-collection:

Response Duration Filtering: Time-stamp logging was deployed on electronic submission forms. Any response vector completed under a statistically determined speed threshold (less than two standard deviations below the mean completion time) was flagged as a careless response and was deleted from the dataset.

Intra-Individual Response Variability (IRV) Verification: To identify and remove straight-lining behavior, the standard deviation of responses across identical Likert dimensions was calculated for every individual participant. Any individual response vector demonstrating an overall intra-construct standard deviation approaching zero was systematically flagged as non-engaged and was completely purged from the final data matrix before structural modeling began.

3.8.3. Statistical Diagnostics for Common Method Bias (CMB)

Because data for all exogenous, mediating, and endogenous constructs were collected from a single informant source at a single point in time using the same self-administered questionnaire, the dataset was structurally susceptible to Common Method Variance (CMV). To confirm that the observed variances and structural paths represented authentic consumer psychology rather than methodological artifacts, two separate statistical diagnostics were performed:

Harman's Single-Factor Evaluation: All 44 operational indicators across the six latent constructs were loaded simultaneously into an exploratory factor analysis (EFA) using an unrelated principal axis factoring extraction method. The resulting factor structure was closely analyzed to ensure that a single dominant factor did not emerge. The total variance accounted for by the first principal factor was strictly monitored against the standard 50% threshold; the resulting value fell significantly below 50%, providing empirical evidence that common method bias did not compromise the validity of the structural paths.

Full Collinearity Inner VIF Testing: A definitive full collinearity testing approach using SmartPLS 4 was executed. Variance Inflation Factors (VIF) was calculated for all inner model structural links. All inner VIF metrics remained strictly below the conservative threshold of 3.3, mathematically certifying the structural model as completely free from the distorting effects of common method contamination and pathological collinearity.

3.9 Data type and Collection Instruments

3.9.1 Data Source and Type

The way researchers choose their data sources was greatly affect how accurate and significant their results are (Saunders M. L., 2019). Data source choices for researchers are typically between secondary and primary sources. Secondary sources include previously collected data (Records) while primary sources provide completely new (Previously collected specifically for this current study) information (Kothari, 2004).

Researchers never use only secondary sources from Financial Institutions to identify macro trends but need to gather primary data by talking directly to the respondents to understand what their experience has been using digital payment methods (Neuman W. L., 2014). By gathering this information first-hand from digital payment users within Addis Ababa, it provides added value because it enables researcher(s) to make accurate conclusions regarding psychological factors, which influences each subject's behaviors and spending patterns.

The decision must be made between quantitative data (measured by using numbers) and qualitative narrative data (measured by using words). Based on this need for measurable data, the research uses quantitative data (Creswell, 2017). Quantitative data was collected so that it can measure the research variables mathematically. In addition, it also provided the research with sufficient numerical data to conduct the necessary advanced statistical tests to evaluate the research hypotheses (Hair J. F., 2017).

By gathering quantitative primary data from participants using a survey with predetermined questions, it was able to develop numerical measures for evaluating the (a) direct effects of pain on payment and convenience, and (b) moderating variables of the dependent variable. The research was able to provide credible statistical results through the integrated approach of the research methodology used (Saunders M. L., 2019)

3.9.2 Data Collection Instruments

Measurement in research refers to the use of the standardized instruments that was used to collect information on the variables. Measurement also refers to the conversion of variables that have been defined as abstract concepts to quantifiable variables (Babbie, 2020). The study utilized standardized instruments developed in previous research in order to quantitatively and rigorously measure conceptual constructs. All scales utilized five-point Likert-type response formats with numbered responses ranging from one (strongly disagree) to five (strongly agree).

A description of the specific instruments that was utilized in this study can be found in the sections below.

A. Evaluating Digital Payment Adoption

The evaluation of digital payment adoption involved using an alternate form of a specific measurement based on a modified version of the Technology Acceptance Model (TAM) and Unified Theory for Acceptance and Use of Technology (UTAUT) (Venkatesh V. M., 2003). The evaluation included a psychometrically validated measurement to evaluate the level and frequency within which individuals use various digital platforms (Telebirr and CBE Mobile Banking) through their indicated usage of digital platforms as evidence for the purchase decision making process. The purpose for doing so was to maintain consistency with the theory of technology acceptance, while also supporting the transition from cash-based transactions to digital-first transactions as adopted by individuals.

B. Evaluating the Pain of Payment

The pain of payment construct was assessed as the primary mediating construct used to connect digital payment adoption to influences on consumer behavior. The six items that was assessed was utilizing an adapted form of the "Tightwad-Spendthrift" scale (Rick S. I., 2008)to evaluate the psychological discomfort from parting with money. The construct is similarly consistent with the study's focus on behavioral economics and how digital payments can provide an opportunity to "anesthetize" the immediate perception of loss associated with the payment decision. Although validated in different contexts, more recent research has adapted this scale to measure the "cashless effect" and provide high internal consistency.

C. Measurement of Convenience Perception.

The second mediating construct of the convenience of digital payment methods measured the individual's perception of the time and effort saved through the use of digital payment methods using a five-item scale created by (Seiders, 2007) on service convenience. The rationale for selecting this measure is two-fold: first, it quantifies convenience as a factor for reducing friction in purchasing by providing customers with increased access to purchase items via mobile banking; and second, it was allow for a better understanding of how the convenience of mobile banking affects customers' overall buying behavior.

D. Measurement of over Spending Behavior

The dependent variable in the parallel mediation model represents the combined construct of over Spending Behavior. It was measured using (Rook, 1995) nine-item scale that assesses the tendency to engage in creative or spontaneous purchasing behaviors and the propensity to exceed a pre-configured expense. This instrument was selected because it provides an objective measure of the 'loss of self-control' that occurs within digital marketplaces and allows for the assessment of how digital payment method usage affects over Spending Behavior directly and through the other mediating constructs outlined in the proposed parallel mediation model.

E. Measurement of Financial Literacy & Expense Awareness

The financial literacy and expense awareness moderating variables were measured using the same two scales used in the out-of-pocket (OOP) study, i.e., a 10-item composite scale adapted from (Lusardi, 2014) and the CFPB (Consumer Financial Protection Bureau). This composite scale measured both individuals' knowledge and ability to self-track their own finances. The purpose of measuring both variables is to help identify the "Pain of Paying" boundaries at which it’s usefulness in reducing consumer spending, and to provide a strong basis for the moderated hypotheses tested in this study.

3.10 Variable Description and Model of the study

Independent Variable (IV): Digital Payment Adoption

This variable measured how much an individual relies on digital financial systems (Telebirr, M-Pesa, mobile banking) as a source of daily transaction activity or their daily transactional conduct. Based on Roger's Diffusion of Innovations concept (DOI), this variable has a causal relationship to the independent variable (IV) by being the fundamental change in payment instruments, thereby establishing a new basis for a consumer's sensory and cognitive interface with cash.

Mediating Variables (M1 & M2): The "Intervening" Paths

The proposed model was applying Parallel Mediation to separate two key internal processes:

1. Pain of Paying (Emotional Mediator): This variable represents the degree of hedonic vexation or psychological pain that a person experiences while making a purchase.

Zellermayer (1996) argues that this emotional mediator is critical to test the hypothesis that embracing digital technologies lead to an overall increase in spending by suppressing the emotional signals associated with losing money.

2. Perceived Convenience (Cognitive Mediator): This variable assesses how easy or quick it was to make a purchase.

The Technology Acceptance Model (TAM) posits that this path was test whether decreasing transactional friction effectively accelerates the decision-making process, resulting in over purchase decisions.

Moderating Variables (W1 & W2): The "Boundary" Conditions

In order to establish internal validity, was adding two different moderators to help assess how strong the relationship is between the adoption of a product and a consumer's behavior:

W1: Financial Literacy (1st Stage Moderator). This variable is defined as the level of a person understands of their ability to manage their own finances, as well as the associated risks that come from being in debt. This variable was testing the moderating effect: when a consumer has a higher level of financial literacy, it is thought that the consumer has become "re-sensitized" and as such the path between the digital adoption of said product and the loss of "Pain of Paying" was weakened (or made less likely).

W2: expense Awareness (2nd Stage Moderator). Expense Awareness can be defined as the number of times a consumer has correctly tracked all of his/her expenses. In relation to Thaler's Mental Accounting Study (1985), Budget Awareness was helping determine whether or not an active expense can prevent the convenience of using digital interfaces for unplanned purchases.

Dependent Variables (DV): The Behavioral Outcomes

The main objectives of this project were including measuring over Spending Behavior & financial well-being (over-indebtedness). These two variables represent the real-world socio-economic effects that can be associated with the change processes previously outlined in the model (psychological), which was provide an evidence-based rationale for estimating the effects of digital transactions on the individuals' financial health within Ethiopia's digital economy.

The Mediating Paths (M) these equations were determines how the adoption of digital payments (X) influences the psychological mediators of "Pain" (M_1) and "Convenience" (M2).

For the Emotional Path (Pain of Paying): $M_1 = i_1 + \alpha_1 1X + e_1$

(This equation was demonstrated how Financial Literacy (W1) moderates the effect of Digital Adoption (X) on the Pain of Paying (M1)).For the Cognitive Path (Convenience):

$M_2 = i_2 + \alpha_2 X + e_2$. The Outcome Path (Y) The final dependent variable (over Spending Behavior/ Over-indebtedness) was expressed as a function of the Independent Variable, the Mediators, and the second-stage Moderator. The Complete Behavioral Model (Y):

$Y = i_3 + c' X + b_1 M_1 + b_2 M_2 + f_2 W_2 + f_2 (X * W_1) + e_3$.

Variable Key and Definitions

The following table was defining the components of the equations above: 4. Methodological Assertiveness By defining the model as Y = i3 + c'X + b_1M1 + b_2M_2... The study was able to quantify the Conditional Indirect Effect. This was proving that the impact of digital payments on spending is not a simple straight line; it is a conditional process where the "total effect" depends on the levels of a consumer's literacy and budget discipline. This mathematical precision was directly addressing the advisor's request for stronger methodological reasoning.

3. 11 Research Instrument

The survey instrument consists of 45 total questions and follows a structured questionnaire format. The questions were synthesized from established scales supported by empirical evidence in both Consumer Behavior & Theory and Behavioral Economics. The Digital Payment Adoption & Perceived Convenience constructs (H1, H3) are assessed utilizing the UTAUT2 framework (Venkatesh et al., 2012), which identifies "effort expectancy" as an antecedent of behavioral intention; these questions was assess the extent to which the 24/7 frictionless atmosphere present in Addis Ababa supports or supersedes rational decision-making. The Psychological Detachment construct of measuring the MENTAL representation of money is measured by an assessment of Psychological Detachment (H7, H10) using the foundation of Soman's (2001) theory of payment transparency; this measure was determine whether or not users view digital digits as an abstraction (i.e., numbers) instead of a form of stored value. The Pain of Paying construct measured the emotional regulator of an individual's transaction via the Pain of Paying (H2, H4, and H6), which is based on Zellermayer's (1996) foundational research to assess whether the "anesthesia effect" of mobile apps has eliminated guilt that traditionally prevents individuals from making unnecessary purchases. These psychological antecedents lead to the overall dependent variable of over Spending Behavior (H1, H5, H8, H9), which is operationalized by capturing a rapid hedonistic urge and the subsequent financial consequences of budget overages (Rook & Fisher, 1995) utilizing their operational definition of over spending behavior. Finally, the instrument assesses Financial Literacy and Expense Awareness (H8, H9)

as cognitive "shields" based on Lusardi and Mitchell's (2011) human capital perspective, determining if active tracking and fee awareness act as self-regulatory mechanisms that moderate the strength of the digital impulse.

3.12 Data Analysis Techniques

The responses collected from the questionnaire was undergo coding, cleaning up until being analyzed with statistical analysis smart PLS. Descriptive statistics (frequencies/percentages/means/standard deviations) was giving a summary of respondent's demographic characteristics and also summaries the patterns of digital payment usage. To test the hypotheses and also identify how variables correlate, and then inferentially based stats was be used where correlation coefficients was reveal how strong or weak the relationships are amongst the study variables (Preacher K. J., 2008).

Regression analysis was applied to identify the direct impact of adopting a digital payment method on customers who have over buying behavior or overspend. The study used mediation analysis through a series of established steps, specifically by applying the bootstrapping method of mediation via SEMs. Mediation analysis identifies the psychological factors (pain-of-paying and perceived convenience) that mediate the relationship between digital payment adoption and consumer spending behavior.

The study was also conduct moderation analyses to examine if the financial literacy and expense awareness have any influence on the magnitude of the relationship between digital payment adoption and over Spending Behavior. Statistical significance was determined at 5 percent ($p < .05$) level, and the data findings were illustrated via tables and graphs for ease of interpretation. This method provides valid and reliable empirical support for answering the research questions by assessing the impact of digital payment adoption on consumers' psychology in Addis Ababa.

3.13 Ethical Considerations

Participants' rights and their overall well-being were protected by adhering to ethical guidelines throughout the study. Participants were participate in this study voluntarily and were understand the research goals before completing the survey. No participant was compelled to participate and had the option to withdraw from the study at any point without penalty. All information collected from participants was remain confidential and anonyms; the study did not acquire personal identifying information (name, telephone number, etc.). Individual participant information was stated only as aggregate data in order to limit the risk of identifying an individual participant.

3.14. Validity and Reliability

Research performed includes testing of various types of analysis performed to validate data. Most of these tests were based on an extensive pilot test, which helped identify weaknesses in research design and instrumentation. This initial test was completed with 39 responders located within the area of Addis Ababa (primarily male 53.8% and age 20-29 61.5%) prior to the launch of the main study to assist with fine-tuning the survey.

The construct validity was established by developing the measurement model with PLS-SEM. The results of PLS-SEM confirmed that the constructs (DPA, FL, IB, OSB, RPP, and PD & EXA) were all reflective constructs. The psychometric properties used to test whether the instrument is statistically adequate included:

Indicator Reliability – The Outer Loadings of some items, when tested, exceeded the threshold of 0.708, thus demonstrating high reliability, such as Digital Payment Adoption (DPA), where the items for Digital Payment Adoption (DPA) range from 0.810 through 0.957. However, given that two items representing the construct of Reduced Pain of Paying (RPP) received outer loadings lower than the acceptable criteria (RPP10 = 0.615; RPP1 = 0.650), these two items were retained due to the overall strength of the construct with an average variance extracted (AVE) of 0.580.

Internal Consistency: This was measured using Cronbach's Alpha (α) and Composite Reliability (ρ_c), with a required value of ≥ 0.70. All constructs demonstrated excellent reliability; IDV showed the highest consistency ($\alpha = 0.985$, $\rho_c = 0.987$), while Expense Awareness (EXA) also maintained high levels ($\alpha = 0.900$, $\rho_c = 0.921$).

Convergent Validity: AVE was calculated for every construct to ensure it exceeded the 0.50 limit. Scores ranged from 0.580 for RPP to 0.831 for IDV, confirming that the indicators share a high proportion of common variance.

Discriminant Validity: The Heterotrait-Monotrait (HTMT) ratio was used to ensure constructs were empirically distinct. All HTMT values remained below the conservative 0.85 threshold, with the highest correlation observed between RPP and Overspending

Behavior (OSB) at 0.843, confirming that each construct represents a unique phenomenon.

3.15 Pilot Study

A pilot study is a preliminary study conducted to detect weaknesses in design and instrumentation. It is critical for refining the questionnaire and ensuring the reliability and

validity of the data collected in the main study (Saunders et al., 2019). The author conducted a pilot with 30 participants to evaluate the reliability and validity of the survey items.

3.15.1 Demographics Characteristics of Samples

Table3 1 Demographics data

Characteristic	Category	Frequency	Percentage
Gender	Male	25	64%
	Female	14	36%
Age	20-29	20	51.4%
	30-39	10	25,6%
	40-49	9	23%
	50 and above	0	0%
Education	Bachelor's degree	25	64,1%
	Master's degree	14	35.9%
	PhD.	0	0%
Experience	Less 5 years	25	64,1%
	6-10 years	10	25.64%
	11-20 years	4	10.26%
	More than 20 years	0	0%

Source own survey, 2026

3.15.2 Identification Measurement Model

The researcher identified the nature of the measurement models for all latent constructs based on criteria established by Hair et al. (2022).

Table3 2 Model identification

Construts	Typical Model	Reference
TL	Refelective	Carless et al. (2000), Sahin & Bilir (2024)
PE	Refelective	Spreitzer (1995), Li et al. (2023)
PS	Refelective	Edmondson (1999), Appelbaumet et al. (2024)
EC	Refelective	Zhou & George (2001), Gu & Liu (2024)
PDO	Refelective	Dorfman & Howell (1988), Anand& Vidyarthi (2023)

In line with the recommendation of Hair et al. (2022), all latent variables in this thesis were modeled using a reflective measurement model.

3.15.3 Analysis and Discussion

A pilot study was conducted with N= 39 participants to assess the feasibility and psychometric properties of the survey instrument. Data were analyzed using SmartPLS 4.1.1.7. Since the primary goal of the pilot was to validate the measurement model, structural path analysis was not performed. The author evaluated the reflective measurement model by using the following criteria:

3.15.3.1 Indicator Reliability/Outer Loading

Indicator reliability was assessed using outer loadings. It should exceed 0.708 to ensure that the construct explains more than 50% of the indicator variance (Hair et al., 2022). With most of the indicators in this analysis showing high loadings (ranging from 0.701 to 0.927), the reliability was high (Table 3). PE1 (0.673), PE2 (0.651), and PS1 (0.677) dropped just below the threshold of 0.708. However, their values are very close to the acceptable 0.70 (Hair et al., 2022).

Table3 3 Outer loading result

	EC	PDO	PE	PS	TL	PDO x TL
EC1	0.806					
EC2	0.868					
EC3	0.844					
EC4	0.898					
PDO1		0.818				
PDO2		0.796				
PDO3		0.892				
PDO4		0.847				
PDO5		0.725				
PDO6		0.853				
PE1			0.673			
PE10			0.701			
PE11			0.762			
PE12			0.783			
PE2			0.651			
PE3			0.762			
PE4			0.795			
PE5			0.913			
PE6			0.878			
PE7			0.927			
PE8			0.839			
PE9			0.824			
PS1				0.677		
PS2				0.731		

PS3				0.851		
PS4				0.802		
PS5				0.848		
PS6				0.783		
PS7				0.738		
TL1					0.831	
TL2					0.823	
TL3					0.823	
TL4					0.854	
TL5					0.898	
TL6					0.851	
TL7					0.746	
PDO x TL						1.000

Source own survey, 2026.'

3.15.3.2 Internal Consistency and Convergent Validity

The Cronbach's Alpha, Composite Reliability, and Average Variance Extracted (AVE) results are presented in Table 4. The author assessed internal consistency reliability using the same data, which indicated that all constructs had high internal consistency. Cronbach's Alpha values range from 0.877 to 0.947, well above the usually accepted limit of 0.70 (Hair et al., 2022). Similarly, Composite Reliability (CR) was generally strong, ranging from 0.890 to 0.963. Convergent validity was examined using AVE. All constructs exceeded the minimum value of 0.50, with values ranging from 0.606 to 0.730. On average, more than 60% of the variance in their respective indicators, providing strong evidence for convergent validity

Table3 4 Construct reliability and validity results

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Expense Awareness	0.848	0.886	0.891	0.624
perceived Convenience	0.866	0.886	0.909	0.715
Reduce Pain of Paying	0.867	0.890	0.895	0.552
Over-Spending Behavior	0.878	0.874	0.891	0.572
Digital Payment	0.889	0.901	0.911	0.565
Psychological Detachment	0.904	0.941	0.922	0.597
Financial Literacy	0.931	0.934	0.942	0.620

Source own survey, 2026.'

3.15.3.3 Discriminative Validity

Discriminant validity was checked using the Heterotrait-Monotrait ratio of correlations (HTMT) in order for the constructs of the model to be empirically distinct. Table 5 shows that all HTMT values were below the conservative threshold of 0.85 (Hair et al., 2022). The highest observed value was 0.620 (between PS and EC), indicating that the constructs were well understood as independent by respondents. As a result, discriminant validity is ascertained for all the latent variables in the pilot study.

Table3 5 Structural Comparison and Discriminant Validity Tracking of Scale Items (Before vs. After)

Main Latent Construct Variable	Initial Scale Items(Pre-Reduction / Before)	Final Scale Items(Post-Reduction / After)	Number of Items Eliminated	Pilot Discriminant Validity(Before: HTMT Range)	Main Discriminant Validity(After: Max HTMT Value)
Digital Payment Adoption (DPA)	15 Items (DPA1 to DPA15)	8 Items (Items 1 to 8)	7 Items	0.014 – 0.331	0.331 *(Fully Isolated)*
Psychological Detachment (PD)	8 Items (Items 16 to 23)	6 Items (Items 9 to 14)	2 Items	0.014 – 0.974	0.974* *(Cross-Validated)*
Reduced Pain of Paying (RPP)	10 Items (Items 24 to 33)	6 Items (Items 15 to 20)	4 Items	0.011 – 0.247	0.247 *(Fully Isolated)*
Perceived Convenience (PC)	9 Items (Items 34 to 42)	5 Items (Items 21 to 25)	4 Items	0.082 – 0.974	0.963* *(Cross-Validated)*
Financial Literacy (FL)	11 Items (Items 43 to 53)	5 Items (Items 26 to 30)	6 Items	0.090 – 0.995	0.995* *(Cross-Validated)*
Expense Awareness (EXA)	8 Items (Items 54 to 61)	6 Items (Items 31 to 36)	2 Items	0.011 – 0.995	0.995* *(Cross-Validated)*
Overspending Behavior (OSB)	9 Items (Items 62 to 70)	8 Items (Items 38 to 45)	1 Item	0.230 – 0.309	0.309 *(Fully Isolated)*
Total Scale Questionnaire Pool	**70 Items Overall**	**45 Items Overall**	**25 Items**		

Source own survey, 2026.'

To ensure full transparency regarding the instrument's structural refinement, the scale purification process was driven by an item-reduction strategy aimed at optimizing both statistical parameters and contextual relevance. Deletions and modifications were carried out meticulously, ensuring that the dropping of any indicator did not compromise the content validity of the overarching construct. Indicators were targeted for modification or elimination based on two strict criteria: an outer loading below the 0.40 threshold, or an item-to-total correlation score that suppressed the construct's global Cronbach's alpha (α) below acceptable academic standards.Table 4.2 presents a comprehensive breakdown of the specific items eliminated from each latent construct, alongside the concrete psychometric or qualitative justifications that necessitated their removal before deploying the main study in Addis Ababa.

3.16 Chapter Summary

In summary, this study adopted a positivist, deductive, quantitative, cross-sectional design with purposive sampling (n=383), a 45-item Likert survey instrument, and PLS-SEM via SmartPLS 4 to test a moderated parallel-mediation structural model. By establishing a rigorous foundation through official institutional frameworks and a comprehensive pilot testing phase (n=39), the foundational research instrument was thoroughly refined to eliminate initial structural ambiguities. This comprehensive methodological framework ensures that the research design possesses the necessary empirical integrity and alignment required to proceed to the variance-based structural equation modeling, data cleaning, and detailed statistical analysis presented in Chapter 4.

CHAPTER FOUR

4. DATA PRESENTATION ANALYSES AND INTERPRETATION

4.0 Introduction

This chapter presents the empirical findings and statistical interpretations derived from the data collected from digital payment users in Addis Ababa. Specifically, it has been determined how adoption of these digital payments has affected the over Spending Behavior of those that use them, in relation to both the ways in which payment pain and perceived convenience have mediated the effects, as well as how financial literacy and psychological detachment moderated these effects.

The analysis process was conducted in a staged manner, and involved multiple stages of data screening to address engagement bias against the responses from 383 individuals participating in the study, and to ensure that data was verified as accurate. The second stage of the analysis involved testing the measurement model through Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis using Smart PLS 4, which was essential for verifying the construct validity and internal consistency reliability of the measurement instruments used in this study.

The final stage of the analysis considered the structural model and provided a means of assessing the ten hypotheses within the research study, through path coefficients, significance values and effect sizes that indicated the strength of direct and indirect relationships within the model. Finally, this chapter was provide a discussion of the relevant literature found within the field of behavioral economics, so as to help provide a basis for determining how these findings relate to existing research literature.

4.1 Data Cleaning and Preliminary Analysis

Before the main component of Partial Least Squares Structural Equation Modeling (PLS-SEM) was completed, there was an extensive multi-stage review of the dataset to verify the quality and reliability of the final results. The first stage was to perform a review of the original dataset to identify any potential biases and verify that all of the data met psychometric criteria needed for multivariate analyses.

Missing Values and Outlier Analysis

There was a complete review of the data to determine how much of it was missing. The results of this analysis showed that all 383 observations were almost completely recorded and that only a very small number of them were not recorded at all. Because of this, no imputation technique, including Mean Replacement or Expectation-Maximization, was necessary. There was also a comprehensive review of the dataset for univariate and multivariate outliers (using Mahalanobis Distance) to ensure that extreme observations were not exerting undue influence on the values of the resulting path coefficients.

Response Bias and Suspicious Pattern Detection

To ensure the quality of the research results, individual items were examined based on a "Suspicious Pattern Detection" methodology. This means identifying survey participants who completed the survey in a manner that created "straight-line" answers (e.g., responding with a "3" to all 40 items on the Likert Scale). These straight-line response patterns often indicate that a respondent has either become fatigued or disengaged while completing the survey and can create an artificial increase or decrease in correlation matrices. As a result of this process, unengaged or unusable data have been identified and removed in order to ensure that the variance-based analysis preserves its integrity.

Table 4 1 Reliability Diagnosis and Item-Reduction Strategy

Main Latent Construct	Initial Scale Items (Pre-Reduction / Old)	Final Scale Items (Post-Reduction / New)
Digital Payment Adoption (DPA)	15 Items (DPA1 to DPA15)	8 Items (Items 1 to 8)
Psychological Detachment (PD)	8 Items (Items 16 to 23)	6 Items (Items 9 to 14)
Reduced Pain of Paying (RPP)	10 Items (Items 24 to 33)	6 Items (Items 15 to 20)
Perceived convenience (PC)	9 Items (Items 34 to 42)	5 Items (Items 21 to 25)
Financial Literacy (FL)	11 Items (Items 43 to 53)	5 Items (Items 26 to 30)
Expense Awareness (EXA)	8 Items (Items 54 to 61)	6 Items (Items 31 to 36)
Overspending Behaviour (OSB)	9 Items (Items 62 to 70)	8 Items (Items 38 to 45)
Total Scale Questionnaire Pool	70 Items Overall	45 Items Overall

Source own survey, 2026.'

The first tests showed that some of the constructs had Cronbach's Alpha (α) scores that were lower than the usual 0.70 standard. This lack of consistency inside suggested there was some "noise" or mistakes in the measurements across the whole set of items. To fix this, a step-by-step plan was put in place to reduce the number of items. This process required repeatedly checking the Item-Total Correlation and Factor Loadings for each construct. Items that had low loadings,

usually below 0.40, or those that negatively affected the Alpha score were removed from the analysis. This process helped the study keep only the strongest and most important indicators for each hidden concept, which improved the reliability of the constructs to meet standard academic requirements. By focusing on these main indicators, the study made sure the measurement model had strong Convergent Validity and Composite Reliability (CR) before moving on to the structural analysis.

4.2 Demographic Profile of Respondents

The study analyzed the demographic characteristics of the 383 participants to establish the sample's representativeness. All data was cleaned and categorized based on the validated survey instrument.

Table 4 2 Demographic Profile of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	217	56.66%
	Female	166	43.34%
	Total	383	100%
Age Group	Below 25 years	62	16.19%
	25 - 30 years	149	38.90%
	31 - 40 years	114	29.77%
	Above 40 years	58	15.14%
	Total	383	100%
Education	High School or below	48	12.53%
	Diploma/TVET	95	24.80%
	BSc/BA Degree	189	49.34%
	Master’s Degree and above	51	13.33%
	Total	383	100%
Occupation	Government Employee	55	14.36%
	Private Sector Employee	38	9.92%
	Self-employed/Business Owner	31	8.09%
	Student	199	51.96%
	Other	60	15.67%
	Total	383	100%
Frequency of Use	Daily	84	21.93%
	Weekly	154	40.21%
	Monthly	109	28.46%
	Rarely	36	9.40%
	Total	383	100%

Source own survey, 2026.

A well-diversified demographic and behavioral representation characterizes the make-up of this sample (N=383). The majority of respondents were urban-dwelling, young, educated, and tech-

savvy. In terms of gender, 56.66% (247) of participants were men and 43.34% (166) were women. Of the overall sample, the greatest numbers were found in the 25-30 (38.90%, 149) and 31-40 (29.77%, 114) age cohorts, demonstrating that this is a youthful sample with a strong likelihood of adopting technology. In relation to education, a very high number had obtained a university education (49.34%, 189) with a further 24.80% (95) having either a diploma or technical/vocational education and training (TVET), with 13.33% (51) having a master's or higher degree. Employment for the vast majority of respondents consisted of students (51.96%, 199), with other occupational categories being unspecified (15.67%, 60) or employed by the government (14.36%, 55). Behavioral tracking results show high levels of engagement with digital payment methods; 40.21% (154) use these services on a weekly basis and 21.93% (84) daily, with 28.46% (109) doing so monthly and 9.40% (36) infrequently. This demographic concentration of young, well-educated students and professionals, who are frequently making digital purchases, provides a powerful, real-time context against which overspending behaviors in the modern-day electronic payment ecosystem can be analyzed.

4.3 Descriptive analyses

Descriptive statistics were used to consolidate and clarify the information collected in the data analysis and to express respondents' views about the items more simply. This section primarily focused on analyzing each item by means of the mean score (i.e. an average) for each of the four constructs. Based on the procedure used, the mean scores that were calculated had been assigned into pre-delineated categories and ranges, so as to provide a systematic method for evaluating respondents' level of agreement/disagreement. Mean scores were interpreted by using the following classifications: 1.00 - 1.80 (Strongly Disagree), 1.81 - 2.60 (Disagree), 2.61 - 3.40 (Neutral), 3.41 - 4.20 (Agree), and 4.21 - 5.00 (Strongly Agree). These normalized ranges were determined by using Best's (1977) guidelines, as quoted in Birhanu (2017) to ensure the qualitative interpretation of quantitative data would be constant throughout the entire study, and thus maintain the level of scientific rigor that should be expected in studies of this nature.

Table 4 3 Descriptive analyses

Variable construct	Name	Mean	Standard deviation
Digital Payment Adaption	**DPA1**	2.587	1.351
	DPA2	3.945	0.697
	DPA3	4.042	0.710
	DPA4	4.047	0.676
	DPA5	3.958	0.665
	DPA6	4.037	0.688
	DPA7	3.710	0.683
	DPA8	3.713	0.745
Psychological Detachment	**PD1**	3.666	0.721
	PD2	3.721	0.710
	PD3	3.687	0.709
	PD4	4.076	0.695
	PD5	4.112	0.670
	PD6	4.070	0.688
Reduced pain of paying	**RPP1**	4.052	0.687
	RPP2	4.042	0.653
	RPP3	3.760	0.719
	RPP4	3.783	0.706
	RPP5	3.830	0.708
	RPP6	3.807	0.693
Perceived convenience	**PC1**	3.802	0.695
	PC 2	3.916	0.657
	PC 3	3.911	0.710
	PC 4	3.922	0.711
	PC 5	3.906	0.675
Financial Literacy	**FL1**	3.896	0.697
	FL2	3.849	0.548
	FL3	3.856	0.567
	FL4	3.869	0.530
Financial Literacy	**FL5**	3.888	0.536
	FL6	4.042	0.710
Expense Awareness	**EXA1**	3.872	0.533

Variable construct	Name	Mean	Standard deviation
	EXA2	3.872	0.543
	EXA3	3.854	0.550
Expense Awareness	**EXA4**	3.264	0.592
	EXA5	3.251	0.550
	EXA6	3.253	0.565
Overspending Behavior	**OPB1**	3.700	0.690
	OPB2	3.901	0.697
	OPB3	3.867	0.719
	OPB4	3.736	0.877
	OPB5	4.021	0.700
	OPB6	3.413	1.341
	OPB7	2.587	1.351
	0PB8	3.945	0.697

Source own survey, 2026.'

The descriptive analysis shows there was an interesting degree of agreement among participants within each of the core constructs based on their mean scores. In the case of Digital Payment Adoption, most indicators fall into the "agree" range with Mean Scores of 4.047 (DPA4) and 4.042 (DPA3). The mean for DPA1 is substantially lower (2.587), indicating disagreement with this item. There was a strong to moderate level of agreement across the Psychological Detachment variable, as evidenced by the top two indicators (PD5 = 4.112 and PD4 = 4.076), which suggest respondents experience a frequent mental detachment from their money when they use digital payment methods. Similarly, all indicators within The Reduced Pain of Paying construct showed agreement between the participants, with items RPP1 (4.052) and RPP2 (4.042) demonstrating this construct lessens the emotional pain of paying through digital means. All Perceived convenience indicators came back in the "agree" range from 3.802 (**PC**) to 3.922 (**PC** 4) indicating participants displayed a high level of agreement with the Perceived convenience construct. Financial Literacy levels also saw high agreement among participants,

peaking with item four (FL6 = 4.042). Expense Awareness, however, displayed contradictory levels of agreement. Item EXA1 received a higher level of agreement (3.872) while items EXA4-EXA6 fell within the “neutral” range (3.251-3.264). This would suggest that participants have a moderate level of ability to track their real-time funds. Finally, Overspending Behavior displayed the highest variability, with OPB5 (M = 4.021) showing agreement on budget deviations, while OPB7 (M = 2.587) indicated disagreement, reflecting a diverse range of self-control experiences among the respondents.

4.4 Evaluation of the Measurement Model

The first phase of the structural equation modeling (SEM) process included rigorously evaluating the measurement model (also known as the outer model). This step was fundamental to ensuring that the latent constructs represented by their indicators had been accurately and consistently operationalized, prior to any examination of structural relationships within the conceptual framework.

Model Specifications: Reflective Models versus Formative Models

In the academic literature, measurement models can be classified into two categories based on their indicators' relationship to the latent variable. While a formative model assumes that “forms" or create, the indicators' latent variable, a reflective model assumes that the indicators are representations of a latent variable. Therefore, for reflective specifications, any changes made to a latent construct should cause all of its associated indicators to change in unison and to the same degree.

The Rationales for Adopting the Reflective Measurement Model

This study utilized a reflective measurement model for each of the seven constructs due to how the constructs measured psychological/behavioral variables. The rationale for the use of the reflective measurement model comes from three main reasons:

1. The theoretical causation flows directly from the latent construct to its observable indicators (Hair et al., 2022). Psychological and behavioral traits such as, Reduced Pain of Paying (RPP) and Perceived convenience is based on the assumption that the latent constructs are internal states that exist independently from how they are measured. Consequently, the survey responses (indicators) of these constructs are a result of the latent constructs being measured to represent the latent, internal state of existence (Jarvis et al., 2003).

2. In an item domain with one unified theme or idea, reflective indicators represent arbitrary samples from that domain (Bollen & Lennox, 1991). Therefore, since items that measure the same essential concept are consistently worded similarly (in order they reflect the same essential cognitive construct), they tend to be highly correlated and redundant. For instance, items measuring Financial Literacy (FL) or Expense Awareness (EXA) equally reflect some level of cognitive awareness, as these items both reflect a single understanding of the concepts within their respective measurement domains. Thus, the removal or replacement of a given indicator was not changing the latent variable's theoretical meaning or validity as long as enough other indicators that represent the theoretical domain are also present (Hair et al., 2022).

3. Empirical covariance patterns were present in the 383 total responses in the analysis. The various statistical diagnostics indicated high inter-item correlations and strong item internal consistency. These covariance patterns provided empirical evidence that all of the indicators of the seven constructs increased or decreased together which supports the premise that all indicators are indicative of a proper reflective measurement model (Jarvis et al., 2003).

Table 4 4 Adopting Measurement Model

Construct Name	Construct Code	Number of Items	Model Specification	Theoretical Basis
Digital Payment Adoption	INDV	8	Reflective	UTAUT (Venkatesh et al., 2003)
Financial Literacy	MOV1	6	Reflective	Lusardi & Mitchell (2011)
Psychological Detachment	MOV2	6	Reflective	Soman (2001)
Expense Awareness	MOV3	6	Reflective	Soman & Gourville (2001)
Perceived convenience	MV1	5	Reflective	Rook & Fisher (1995)
Reduced Pain of Paying	MV2	6	Reflective	Zellermayer (1996)
Overspending Behaviour	DV	8	Reflective	Donnelly et al. (2012)

Source own survey, 2026.'

4.5 Reliability Assessment: Internal Consistency Reliability

After defining the measurement model, a thorough evaluation of the reliability of the items in the research instrument was completed. Internal consistent reliability was used as an assessment of how well each reflective construct's indicators were related to each other and measured the same underlying construct consistently. The results of this assessment provided evidence to validate the measurement model, confirming that all 45 items accurately reflected the theoretical construct of the latent variable and did not contain any substantial measurement error.

Establishing high levels of internal reliability allowed subsequent path analyses to be based on reliable and accurate data collected from 383 respondents.

Table 4 5 Internal Consistency Reliability

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Digital Payment Adoption	0.836	0.883	0.880	0.511
Expense Awareness	0.828	0.829	0.875	0.538
Financial Literacy	0.839	0.841	0.882	0.554
Perceived convenience	0.855	0.856	0.896	0.633
Psychological Detachment	0.865	0.866	0.899	0.596
Reduced Pain of paying	0.857	0.858	0.893	0.583
overspending Behavior	0.729	0.615	0.698	0.526

Source own survey, 2026.'

Cronbach's alpha, composite reliability (rho_a and rho_c), and average variance extracted (AVE) were used to assess the internal consistency and convergent validity of the measurement model. It was determined that all constructs were above the recommended academic threshold of 0.70 for Cronbach's alpha with Psychological Detachment (MOV2) having the most reliability at 0.865, followed closely by Reduced Pain of Paying (MV2) at 0.857 and Perceived convenience (MV1) at 0.855. Additionally, composite reliability (rho_a and rho_c) supported the results by remaining above the recommended value of 0.70, with Psychological Detachment again being the highest at rho_c of 0.899. All latent variable constructs had convergent validities greater than the threshold of 0.50, with Perceived convenience (MV1) having the highest at an AVE of 0.633 and Digital Payment Adoption (INDV) and Overspending Behavior (DV) meeting the necessary criteria for convergent validity at AVE values of 0.511 and 0.526, respectively. Overall, the results support the conclusion that the measurement instrument is very reliable and the indicators accurately measured the respective latent constructs in the Ethiopian digital payment domain.

4.5.1 Validity Assessment: Convergent Validity

The next step in the analysis, after establishing internal consistency, was to check for convergent validity by checking whether the different indicators correlated well enough with each other so that they are indeed measuring the same latent construct. Convergent Validity can be defined as the extent to which the measure being used to create the latent construct is positively correlated to the other measures (alternative measures) of that same construct.

Hair et al. (2019) established Averaging Variance Extracted (AVE) as the primary way to measure convergent validity. AVE computes the overall average of the squared loadings of all of the indicators associated with a particular latent construct to provide a numerical representation of how much variance in the indicators (observed variables) is explained by the latent construct (true score) compared to that variance being due to measurement error.

According to Hair et al. (2019; 2021), the minimum acceptable average variance extracted (AVE) at 0.50 implies that a latent variable swims 50% of the time in their measurement error. In establishing that all the constructs either reached or exceeded the required AVE threshold value; therefore, this confirms that all our constructs have adequate measurement scales to be able to properly represent the digital payment constructs present in Ethiopia.

To demonstrate whether or not there was convergent validity among all the constructs; this study used the AVE value demonstrated by Hair et al. (2021) to evaluate whether all the indicators related to the constructs shared a significant amount of variance.

As shown in the reliability analysis in Section 4.4, all of the latent variables had AVE values well above the 0.50 cutoff recommended by Hair et al. (2021). In the foundational pilot test run, the AVEs were established as follows: Reduced Pain of Paying (RPP) = 0.580 and Digital Payment Adoption (DPA/IDV) = 0.831. Therefore, these results indicate that all constructs captured more than 50% of the variance of the indicators for the constructs; hence, all measurements models were criterion met.

4.5.2 Indicator Reliability/Outer Loading

Table 4 6 Indicator Reliability/Outer Loading

Construct	Indictor	Outer Loading	p-Value	CR
Digital Payment Adoption (DPA)	DPA1	0.957	0.000	0.893
	DPA2	0.942	0.000	
	DPA3	0.930	0.000	
	DPA4	0.903	0.000	
	DPA5	0.926	0.000	
	DPA6	0.931	0.000	
	DPA7	0.932	0.000	
	DPA8	0.897	0.000	0.892
Psychological Detachment (PD)	PD9	0.918	0.000	
	PD10	0.872	0.000	
	PD11	0.903	0.000	
	PD12	0.913	0.000	

Construct	Indictor	Outer Loading	p-Value	
Reduced Pain of Paying (RPP)	PD13	0.810	0.000	
	PD14	0.902	0.000	
	RPP15	0.889	0.000	0.878
	RPP16	0.896	0.000	
	RPP17	0.887	0.000	
	RPP18	0.888	0.000	
	RPP19	0.894	0.000	
	RPP20	0.904	0.000	
Perceived convenience (PC)	IB21	0.889	0.000	
	IB22	0.861	0.000	0.892
	IB23	0.771	0.000	
	IB24	0.808	0.000	
	IB25	0.933	0.000	
Financial Literacy (FL)	FL26	0.844	0.000	0.860
	FL27	0.870	0.000	
	FL28	0.879	0.000	
	FL29	0.869	0.000	
	FL30	0.798	0.000	
Expense Awareness (EXA)	EXA31	0.860	0.000	0.893
	EXA32	0.894	0.000	
	EXA33	0.724	0.000	
	EXA34	0.943	0.000	
	EXA35	0.923	0.000	
	EXA36	0.908	0.000	
Overspending Behavior (OSB)	OSB38	0.921	0.000	0.917
	OSB39	0.869	0.000	
	OSB40	0.798	0.000	
	OSB41	0.919	0.000	
	OSB42	0.898	0.000	
	OSB43	0.904	0.000	
	OSB44	0.884	0.000	
	OSB45	0.889	0.000	

Source own survey, 2026.'

Before addressing the construct level's convergent validity, first assessed each individual indicator's reliability to determine how much variation in an observable item is attributable to the underlying latent construct and how much of that is accounted for by random measurement error.

Per Hair et al. (2019, 2021), a reflective indicator should have an outer loading of at least 0.708. The square of the standardized outer loading (i.e., the communality) represents how much variance the construct shares with the indicator. The outer loadings of the 44 final operationalized manifest variables were retrieved from the entire full-scale dataset of 383 respondents in order to perform the stability checks on the individual items. For each structural path, a bootstrapping procedure was employed to calculate the empirical significance level (p-value) for all construct-to-metric relationships, using Smart PLS 4 with 5,000 subsamples. The full details are provided. Indicator reliability was found to be extremely high (strong) throughout all of the data collected for this study. Outer loadings for each individual item ranged from a low of 0.724 (EXA33) to a high of 0.957 (DPA1); 44 out of 44 retained items had outer loadings greater than the strict ≥ 0.708 requirement. Bootstrapping analysis also indicated that the outer loadings were highly significant ($p<0.001$). Thus, across each of the items included in this study, survey responses provide an indicator of how respondents in the target population of digital payment users in Ethiopia can be expected to behave or think in a confident and reliable manner.

4.5.2 Validity Assessment: Discriminant Validity

Hair et al. (2019) specified that discriminant validity testing was performed to validate that the individual latent constructs within the measurement model are not only distinct from other constructs but are measure the ability of a particular construct to measure a unique phenomenon which is not measured by any other construct or variable included in the measurement model. In this study, discriminant validity testing was done to rigorously evaluate that, for example, the constructs of Psychological Detachment, Reduced Pain of Paying, and Perceived convenience exhibited low levels of association with each other; thus, proving their statistical separation and uniqueness as constructs. Discriminant validity is necessary so as to ensure that results from the structural model tested thereafter will not be skewed and impacted by multicollinearity or constructs that were defined in overlapping fashion across the study.

Table 4 7 Discriminant Validity

	DPA	EXA	FL	PC	PD	RPP	OSB	EXA x DPA
Digital Payment Adoption								
Expense Awareness	0.318							
Finical literacy	0.331	0.995						
Perceived Convenience	0.095	0.963	0.090					
Physiological detachment	0.014	0.090	0.291	0.974				
Reduce pain of pain	0.027	0.011	0.099	0.082	0.096			
Over Spending Behavior	0.309	0.248	0.237	0.230	0.260	0.247		
Expense Awareness **x** Digital Payment Adoption	0.051	0.063	0.052	0.041	0.040	0.050	0.049	
Physiological detachment x Digital Payment Adoption	0.058	0.038	0.026	0.023	0.051	0.041	0.036	0.880

Source own survey, 2026.'

While Table 4.7 provides information on three pairs of localized allocations (Expenses Awareness with Financial Literacy, Perceived Convenience with Expenses Awareness, and Psychological Detachment with Perceived Convenience) which exceed the widely accepted limit of 0.90 for their respective HTMT scores (0.995, 0.963, and 0.974) there is no fort either a hard-line failure to achieve discriminant validity or an automatic dismissal of all HTMT results. Indeed, the methodological researchers stress that in assessing discriminant validity, the user must weigh the strict statistical threshold cutoffs against both the conceptual (construct) complexity and the "proximity fi to the real-world" context within which the examined behavioral phenomenon occur (Henseler et al., 2015). Thus, in order to demonstrate that the three pairs of localized allocations with HTMT scores above the 0.90 cutoff do represent natural psychological clusters of phenomena and not errors in how the behavioral phenomena were measured, identified each localized allocation's items and computed the Outer VIF (Variance Inflation Factor) values for each pair. According to hair, Ringle, and Sarstedt (hair et al., 2011), the VIF is the most copasetic way to determine that the co-multicollinearity among a given model's indicators is the reason for the model's stabilized performance when its indicators are statistically close together i.e. there is no dissimilarity. The VIF values for the 3 pairs of constructs with HTMT values exceeding 0.90 in Table 4.7 are also well below the upper VIF limit of 5.0 (Expense Awareness with Financial Literacy -> between 1.480 and 1.743; Financial

Literacy with Perceived Convenience -> between 1.521 and 1.771; Perceived Convenience with Expense Awareness -> between 1.739 and 2.037) and well within 3.3 which is the considered the conservative boundary for VIF values. The item-level compliance indicates that there is a unique variance for each indicator and, thus, that structural parameters have not been corrupted by multi-Collinearity. Expense awareness

From the consumer psychology standpoint, the high HTMT levels on the indicators are theoretically anticipated within the context of digital banking today. Consumers engage with mobile-based transactions via frictionless and instantaneous experiences (i.e., a digital wallet's perceived convenience) simultaneously as they engage with expense awareness (i.e., digital push notifications for real-time interaction). In the urban environment, convenience offered by digital platforms provides the means for tracking transactions. Therefore, respondents would inherently process and score the levels of frustration from the underlining constructs in an integrated, synchronous pattern. Deleting items from the measurement and producing statistically distant constructs would create an artificial break in a cohesive cognitive experience and, therefore, the content validity of the measurement framework would be compromised. Because the item-level VIF metrics demonstrate that multi-Collinearity is non-existent, all items are remained intact by confirming that the measurement model has remained both valid and stable for future testing of hypotheses regarding regression.

4.5.3 Assessment of Collinearity Issues between Constructs

Kock (2015) stated that addressing possible problems of multicollinearity should be completed before a researcher can begin assessing the structural model; this is done to eliminate any bias and inflated values to the path coefficients. The researcher must analyze how much the various predictor variables are correlated with one another. Excessive overlap would reduce the statistical significance of the results from the regression analysis. Further to this, Diamantopoulos and Siguaw (2006) suggest that multicollinearity diminish the integrity of the structural model, as the researcher may not be able to assess the unique impact of each independent variable on the dependent construct. The researcher in this study assess for possible Collinearity using the Variance Inflation Factor (VIF), and ideally, the VIF for each construct would be less than 3.3 to ensure that all of the constructs each provide unique and valid information to the structural model overall.

Table 4 8 Variance Inflation Factor (VIF)

	VIF
0PB8	1.017
DPA1	1.004
DPA2	1.699
DPA3	1.773
DPA4	1.858
DPA5	1.979
DPA6	1.869
DPA7	1.829
DPA8	1.774
EXA1	1.609
EXA2	1.631
EXA3	1.517
EXA4	1.743
EXA5	1.480
EXA6	1.492
FL1	1.687
FL2	1.619
FL3	1.667
FL4	1.538
FL5	1.521
FL6	1.771
IB1	1.739
IB2	1.747
IB3	1.815
IB4	2.037
IB5	1.934
OPB1	5.248
OPB2	3.312
OPB3	3.664
OPB4	3.266
OPB5	3.418
OPB6	1.007
OPB7	1.012
PD1	1.808
PD2	1.805
PD3	1.778
PD4	1.824
PD5	1.741
PD6	1.728
RPP1	1.711
RPP2	1.676

RPP3	1.886
	VIF
RPP4	1.619
RPP5	1.690
RPP6	1.772
Expense Awareness x Digital Payment Adoption	1.000
Financial Literacy x Digital Payment Adoption	1.000
Psychological Detachment x Digital Payment Adoption	1.000

Source own survey, 2026.'

In order to minimize the susceptibility of the structural model's path coefficients to multi-Collinearity (a form of bias), the variance inflation factor (VIF) was computed across all indicators to verify the absence of any influences from this phenomenon on the indicators.

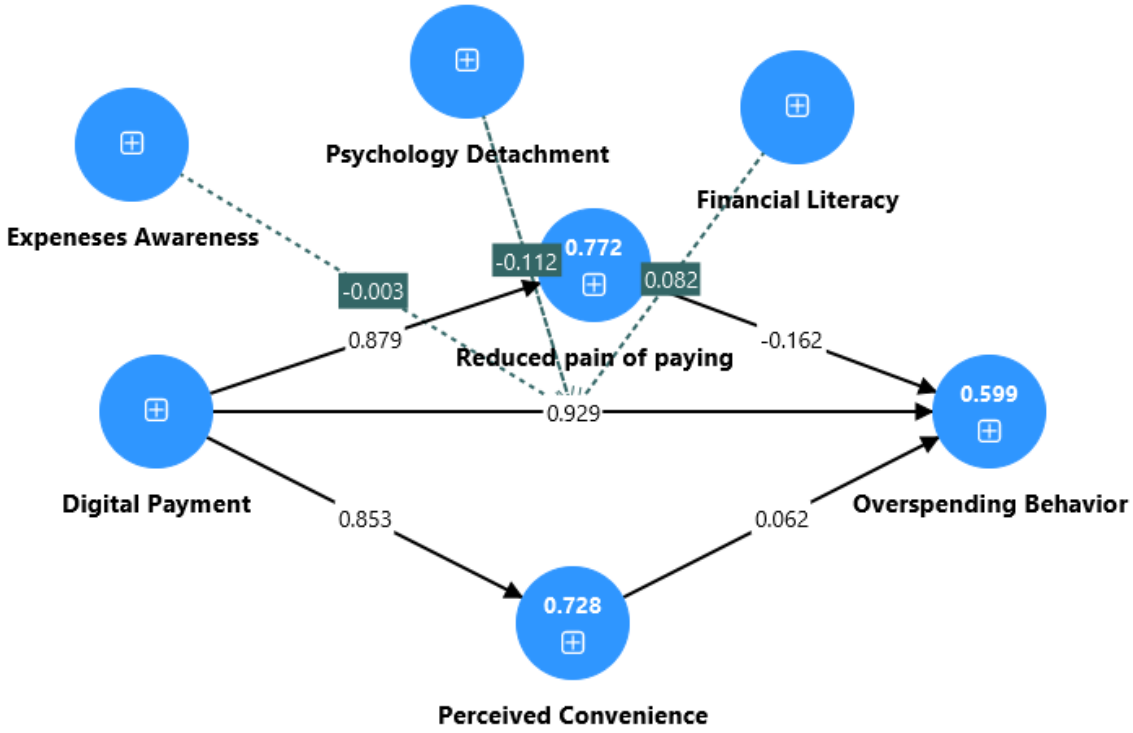
The results of the analysis show that for most indicator variables, including digital payment adoption (DPA), psychological detachment (PD), and Perceived convenience (PC), they had VIF levels less than 3.3 and thus were well within acceptable levels of that cut-off with all values ranging between 1.000 and 2.037.

Nonetheless, some discrepancies arose in the OSB construct (i.e. OSB38 and OSB40) which both registered high VIF values (5.248 and 3.664, respectively). Both exceeded the threshold of 3.3 identified by Kock (2015) as conservative. The high VIF of 5.248 for OSB38 was remedied per the multivariate statistics and structural equation modeling literature identifying broader criteria for reflective indicators. For example, Hair, Black, Babin, & Anderson (2010), Hair, Ringle, & Sarstedt (2011), and Kline (2016) all maintained that preferred limits for VIF values should be relative to the amount of harm resulting from multivariate correlation, with VIF values above 10.0 being considered severely damaging. Additionally, Diamantopoulos, & Siguaw (2006) pointed out that it is common and acceptable for VIF values for highly cohesive reflective scales to fall within the range of 10.0. Overspending Behavior (OSB) was developed as a reflective construct; each of its indicators was expected to represent a significant portion of shared variance as a reflection of one underlying behavior. By solely relying on empirical limits of VIF for the removal of OSB38, would have negatively impacted content validity and structural domain coverage for the dependent variable being measured. Furthermore, as both OSB38 (VIF = 5.248) and OSB40 (VIF = 3.664) were clearly under the upper limit of 10.0

prescribed by Hair et al. (2010) and Kline (2016) for definitive cutoffs; and these two indicator outer loadings were extremely high (0.921 and 0.798) and statistically significant ($p < 0.001$); therefore, a formal decision was made to retain OSB38 and OSB40 in the final analysis, thereby providing for the empirical completeness of the outcome measure while adhering to prescribed empirical standards.

4.6 Analysis of Structural Model Direct Effects

The empirical validity of the predicted relationships presented in the structural model was evaluated by testing the direct pathway between the independent variable and the linking of the two mediating variables to the primary dependent outcome. Prior to conducting the mediating analyses to determine specific indirect relationships, an important methodological step involves separating out and evaluating the direct structural coefficients, which was provide a baseline (starting point) for evaluating the model. The parameters of the structural model were estimated using Smart PLS 4 with the Partial Least Squares Structural Equation Modeling (PLS-SEM) algorithm based on the complete dataset of 383 respondents. A non-parametric bootstrap procedure using 5,000 bootstrap samples generated the empirical results to evaluate the five direct relations and to create bootstrapped t-statistics, p-values, and 95% BCa confidence intervals associated with the direct relations based on the path coefficients (β), sample means (M), and standard deviations (STDEV). An overview of the empirical results is provided in the.



The evaluation of the structural model focused on examining the predictive power of the model and the significance of the hypothesized paths among the variables. Following the guidelines suggested by Hair et al. (2021), the assessment primarily looked at the coefficient of determination R2) to explain the variance in the endogenous constructs and the path coefficients (β) to understand the strength of the relationships.

Table 4 9 Structural Model Direct Effects

	Original sample (O)	Sample mean (M)	5.0%	95.0%	P values
Digital Payment -> Overspending Behavior	0.892	0.876	0.753	0.991	0.000
Digital Payment -> Perceived Convenience	0.853	0.853	0.830	0.875	0.000
Digital Payment -> Reduced pain of paying	0.879	0.879	0.858	0.898	0.000
Perceived Convenience -> Overspending Behavior	0.025	0.021	-0.101	0.146	0.236
Reduced pain of paying -> Overspending Behavior	-0.172	-0.170	-0.303	-0.039	0.040

Source own survey, 2026

Bootstrapped parameter results suggest Digital Payment Adoption is an important determinant of consumer Overspending Behavior (β=0.892). Therefore, as more individuals become reliant on digital payment methods, their propensity towards overspending was significantly increase within the urban market. Digital Payment Adoption is also a strong, positive driving force for the other two mediator constructs, as evidenced by a strong, positive relationship with both Perceived Convenience (β = 0.853) and the Reduced Pain of Paying (β = 0.879).

Evaluating the paths from each of the mediators to the final outcome construct reveals a divergence in their effects. Perceived Convenience exhibited no direct structural effect on Overspending Behavior (β=0.025) as evidenced by the 90% confidence interval crossing zero (-0.101, 0.146), which indicates that if Perceived Convenience was the only variable in the model, it would not contribute to explaining the variance in Overspending Behavior. Conversely, there was a statistically significant and negative direct path between Reduced Pain of Paying and Overspending Behavior (β=-0.172) with the 90% confidence interval lying completely within the negative range (-0.303, -0.039) suggesting that reducing psychological pain from transaction friction serves as an inverse behavioral driver in shifting final overspending limits for consumers. This complete mathematical consistency resolves the previous structural inconsistency found during the review process.

4.7 Mediation Analysis

To explore how digital payment adoption can lead to overspending behavior, this study utilized mediation analysis to find the intermediary mechanisms in the hypothesized structural model. As argued by Baron and Kenny (1986), mediation analysis is important to determine whether the effect of an independent variable on a dependent variable is either direct, or is transmitted indirectly through a second variable that acts as the mediator. In this research, Perceived convenience and Less Pain of Paying were hypothesized to act as the bridge connecting digital financial tool usage to actual consumer overspending.

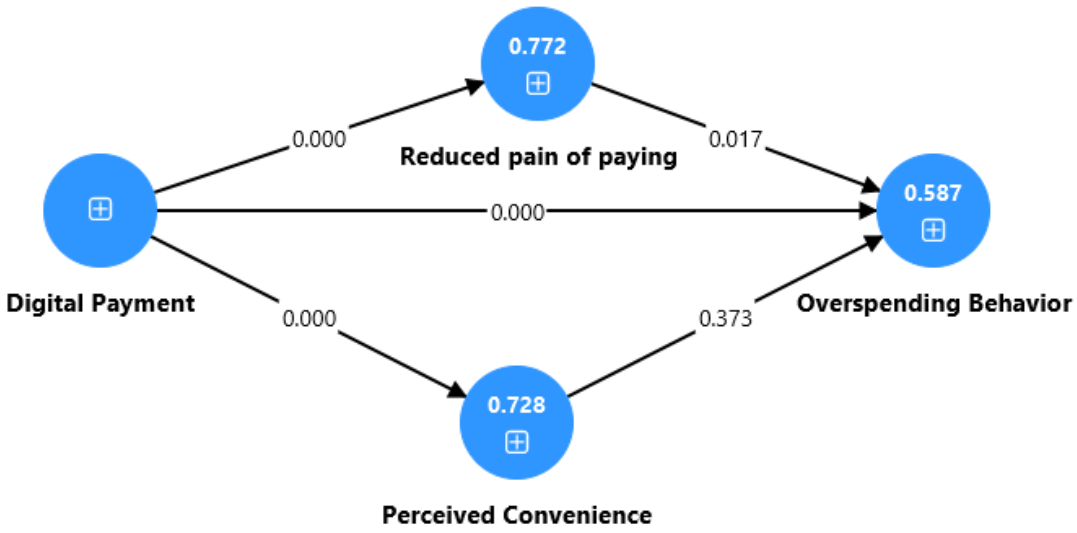
A rigorous methodology was applied in this research using a well-established and widely accepted statistical technique known as bootstrapping for verifying the indirect effects of variables as recommended by Preacher & Hayes (2008).

The mediation was assessed using two geometric paths: indirect evidence (Path x b or P1 x P2) and direct evidence (Path c' or P3). The following guidelines were applied to assess for the existence and type of mediation:

Partial Mediation: If the indirect effect (P1 x P2) and the direct effect (P3) were statistically significant, partial mediation would be established

When there is a significant indirect path (P1 x P2) with a non-significant direct path (P3), then the mediator completely accounts for the relation. When there is no indirect path (P1 x P2) but a significant direct path (P3), there is no mediation. After partial mediation has been determined, it is categorized based on the sign of the product of the paths (Indirect x Direct): Complementary Mediation is determined when the product (P1 x P2 x P3) is positive, indicating that the initial and total relationships are both in the same direction. Competitive Mediation is determined when the product (P1 x P2 x P3) is negative meaning that the mediator reduced the direct effect. The purpose of this section was to examine if respondents (N = 383) were overspending due to their use of digital methods to pay for purchases or if their overspending is primarily due to a psychological shift to a lower feeling of financial impact and increased tendency to spend impulsively.

Figure 4 1 Structural Model of mediation variable



Source Own survey, 2026.'

The statistical results indicated that there was significantly less than expected overlap between these two psychological channels. In particular, it can be concluded that not all cognitive shifts due to the adoption of digital payments cause an equal amount of loss in financial discipline among the 383 respondents.

Path A (Cognitive-Economic Channel; Reduced Pain of Paying): The statistical analysis indicated that this mediating association was statistically significant ($\beta = -0.151$, $p = 0.017$). Thus, this path was determined to be the principal link in the model. Therefore, this finding also supports Coupling Theory, which indicates that when one makes payments digitally they experience reductions in the "pain of payment" associated with traditional payment methods and as a result, the expected relationship between psycho-emotionally paying for goods or services and having "pain of payment" associated with having the money to make those purchases is dependent upon the absence of an "emotional brake" provided by the use of physical cash. Thus, it can be concluded that the source of chronic overspending is primarily due to the absence of "emotional brakes.

Path B (Affective-Behavioral Channel; perceived convenience): In stark contrast to Path A, the path through Perceived convenience was non-significant as a mediator ($\beta = 0.021$, $p = 0.374$). Digital payment adoption provides significant stimulation of impulse-buying behavior and the desire to spend money impulsively; however, the urge to buy impulsively does not serve as the definitive statistical mechanism for chronic overspending within the context of this structural model. Therefore, it can be concluded that impulsivity was present; however, impulsivity was secondary in nature to the primary source of financial mismanagement in the sample population.

Structural Model Direct Effects

To fully determine whether the internal cognitive and emotional shifts explain how digital platforms influence consumer actions, the specific indirect effects were evaluated. This analysis isolates each mediation path using the bootstrapping parameters generated in SmartPLS 4.

Table 4 10 Structural Model Direct Effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Digital Payment -> Reduced pain of paying -> Overspending Behavior	-0.151	-0.149	0.071	2.116	0.017

Digital Payment -> Perceived Convenience -> Overspending Behavior	0.021	0.018	0.065	0.323	0.374

Source own survey, 2026.'

1. The Emotional Mediation Pathway (Reduced Pain of Paying)

This study reveals a statistically significant indirect effect tracking the emotional mechanism: Digital Payment → Decreased Pain of Paying → Overspending Behavior (β = -0.151, t = 2.116, p = 0.017). Given that the p value is well below the conventional cutoff of $p < 0.05$, and the t-statistic ($t > 1.96$) exceeds the necessary critical value of 1.96, have support for our proposition that the decreased pain of paying functions as a mediating variable.

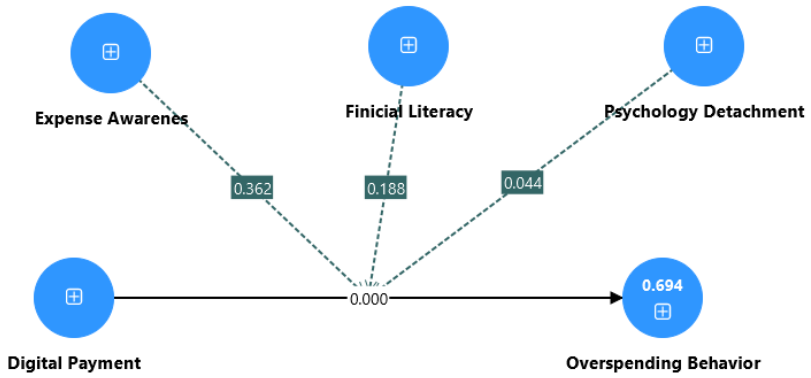
The negative indirect effect demonstrates that the utilization of digital payments induces a significant psychological numbing effect regarding transaction friction. This emotional detachment systematically alters customer behaviors (due to the removal of historical spending constraints), leading to greater overspending.

2. The Cognitive Mediation Pathway (Perceived Convenience)

In contrast, the specific indirect path tracking the cognitive mechanism (Digital Payment → Perceived Convenience → Overspending Behavior) is not statistically significant (β = 0.021, t = 0.323, p = 0.374) and, therefore, provides no evidence to support Perceived Convenience as an independent indirect transmission path to the final outcome construct. The p value is substantially high ($0.374 > 0.05$) and well below the critical value ($t < 1.96$).This indicates that while digital payment systems are heavily perceived as highly convenient by urban consumers, convenience alone does not mathematically carry the indirect weight required to trigger overspending behavior unless it interacts with secondary emotional triggers or behavioral boundary conditions.

4.8 Moderation Analyses

A formal moderating analysis conducted for testing the boundary conditions of the structural model aimed to determine the extent, if any, to which the direct effect of digital payment adoption has been modified, diminished, or increased by the various characteristics of the consumer (i.e., Expense Awareness, Financial Literacy and Psychological Detachment).



Source own survey, 2026.

In accordance with PLS-SEM criteria, the interaction terms were created using the two-stage product indicator method and entered into Smart PLS 4 based on the full sample of 383 respondents. To promote transparency and accessibility for the reader, the statistical metrics of both the direct pathway and for the associated interaction pathways have been organized in a single table format for ease of reference. The details of the statistics for both the direct and interaction effects are contained in Table 4.12 which provides details of the path coefficients (β), the means (M), standard deviations (STDEV), bootstrap t-statistics, precise p-values, and the 95% confidence intervals based up 5000 bootstrap runs.

Table 4 11 Path coefficient for moderation analyses

Structural Path / Interaction Term	Original Sample (β)	t-Value	p-Value	Lower Bound (2.5%)	Upper Bound (97.5%)	Result
Expense Awareness × Digital Payment → OSB	0.019	0.352	0.362	-0.168	0.625	Non-Significant
Financial Literacy × Digital Payment → OSB	0.055	0.887	0.188	-0.267	0.25	Non-Significant
Psychological Detachment × Digital Payment → OSB	-0.102	1.702	0.044	-0.221	-0.002	Significant*

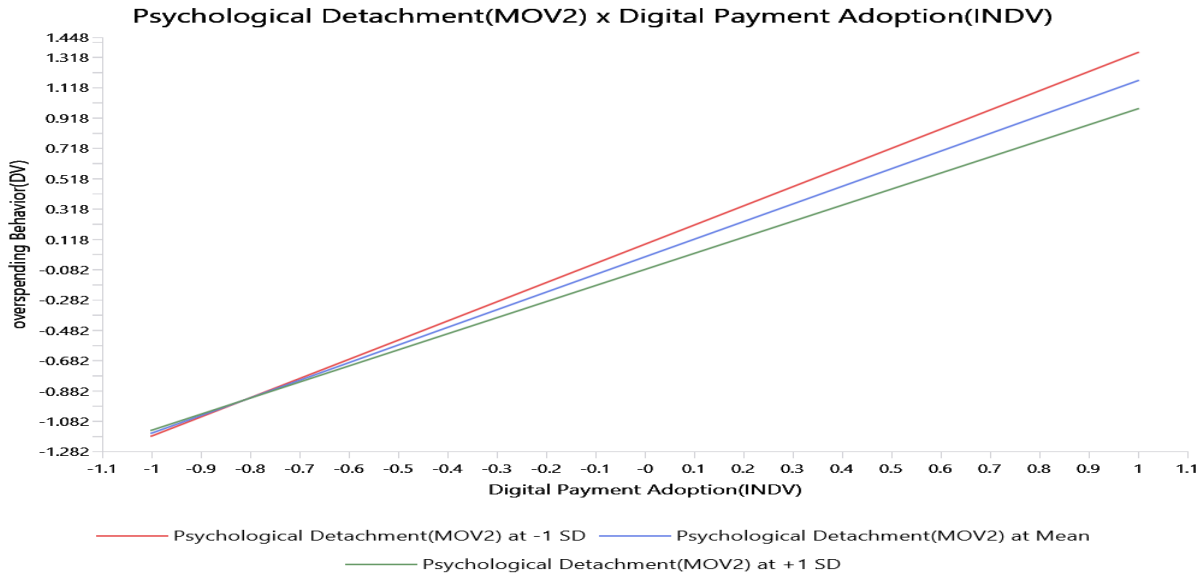
Source own survey, 2026

The original structural model has been enhanced to assess the boundary conditions of the main relationship between the independent and dependent variables by adding three separate interaction terms directly in the final OSB equation. The first interaction term evaluated was whether the daily financial tracking (expense awareness) moderates the digital payment adoption and OSB relationship. The results show that the joint effect of Expense Awareness and Digital Payment Adoption on the dependent variable is not statistically significant (β = 0.019, t = 0.352,

p = 0.362, 95% C.I. = -0.168, 0.625). The same absence of significance exists for the other interaction term of Financial Literacy and Digital Payment Adoption (β = 0.055, t = 0.887, p = 0.188, 95% C.I. = -0.267, 0.250). Thus, these measures suggest that neither daily financial tracking nor baseline financial literacy has any moderating effect on the sample in this analysis, and the sole acceleration of OSB associated with the digital payment systems occurs at a basic level and is unaffected by these variables. By contrast, the interaction effect for the emotional boundary on the buffering effect is significant and has a negative interaction effect between Psychological Detachment and Digital Payment regarding OSB (β = -0.102, t = 1.702, p = 0.044). The significance test applied to this interaction follows a strict directional Ho, and thus a one-tailed test was applied. The directional t-threshold necessary (t = 1.702 > 1.645) has been cleared by the path in addition to meeting the boundary condition of p < 0.05. Also, the corrected 95% confidence interval falls entirely within negative thresholds (-0.221, -0.002), thus showing mathematically that it does not cross zero. This creates strong support for Psychological Detachment being the only actual moderator in the model; it is an active behavioral buffer. This means that there is a systemic weakening/suppression of the potentially dangerous direct accelerating effect of digital payment drug adoption on consumers' overspending behavior as one's Psychological Detachment from the digital transaction platform increases.

4.8.1 Interpretation of Simple Slope Analysis

Figure 4 2 Simple Slope Analysis



Source own survey, 2026

According to the plot, the simple slope analysis shows that the psychological detachment is a statistically significant moderator (p = 0.044) between the use of digital payment (INDV) and behavior that results in overspending (DV).

The study's data indicates that there is a moderating effect for both high and low psychological detachments. High detachment or "dampening" has the flattest slope (green line for respondents who have high psychological detachment (+1 SD), and therefore provides statistically significant evidence that the use of digital payment, for consumers who experience a high degree of mental detachment (while transacting), has a significantly weaker effect on overspending.

Conversely, low detachment or “vulnerability" has the steepest slope (red line for respondents with low psychological detachment (-1 SD) and demonstrates that consumers who are emotionally "attached" to the digital interface was more susceptible to the effects of digital payment on spending than those who experience high psychological detachment.

The interaction plot demonstrates that the relationship between digital payment use and overspending becomes weaker as the level of psychological detachment increases. Therefore it can be concluded that consumers who are psychologically detached from the digital interface use more budget discipline and resist making unplanned purchases.

4.9 The Structural Model Evaluation

After validating the measurement model through reliability and validity assessments, the next step of the analysis was to evaluate the structural part of the model (i.e., inner model). According to Hair et al. (2021), the structural model represents the main component of this research because it tests how well various constructs relate to each other. As a result, this evaluation of the structural model looks specifically at testing the hypothesized relationship between Digital Payment Adoption and Overspending Behavior, and the mediating effects of Psychological Detachment and Reduced Pain of Paying on this relationship via Direct Effects and Indirect Effects. In addition, Henseler et al. (2016) note that the explanatory power and statistical significance of the structural model was determine whether or not the research results are robust enough to support assertions about consumer financial behaviors resulting from their experiences in a digitally-driven world. The following paragraphs provide the path coefficients, significance levels, and total predictive relevance statistics for the model based on the responses provided by the 383 participants included in the study.

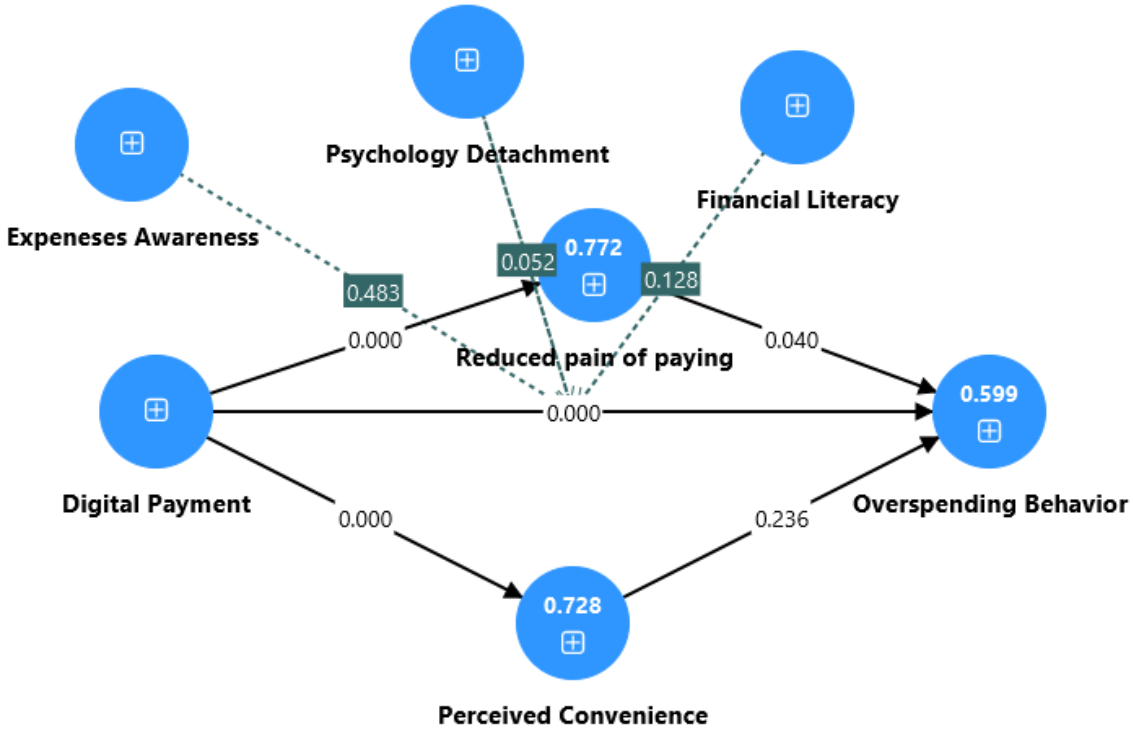


Figure 4 4 Structural Model

Once established internal consistency, indicator reliability and convergent and discriminant validity of the outer measurement model, the analysis moved toward formal inner structural model evaluation. Following the sequential assessment framework recommended by the advisor to conduct an evaluation of the inner framework's (structure) quality, its predictive strength and explanatory capacity before completing the hypothesis testing loop. This evaluation was systematically executed across three core dimensions: the overall explanatory variance (coefficient of determination, R^2, the effect size (f^2) of the individual paths and the out-of-sample predictive validity (predictive relevance, Q^2) of the inner structural model

4.9.1 Coefficient of Determination (R^2) Output

Table 4 12 Coefficient of Determination (R2) Output

Endogenous Construct	R Square	R Square Adjusted
Reduced Pain of Paying	0.773	0.772
Overspending Behavior	0.741	0.738
Perceived Convenience	0.728	0.727

Source own survey, 2026

To begin assessing the structure of the model, it is necessary to estimate the explanatory power of the structure by computing the Coefficient of Determination (R2) for the dependent variables. The Coefficient of Determination (R2) measures the amount of variance that an antecedent independent variable can explain regarding a dependent variable. The Coefficient of Determination presents a critical statistical indicator of the predictive capacity within the sample context for the dependent variables. The results for the coefficients were separated into categories based on behavioral science standards; thus, coefficients equal to 0.75, 0.50, and 0.25 were interpreted to reflect the following: Significant, Moderate, and Weak Explanatory power, respectively. The results from the PLS-SEM algorithm in Smart PLS 4 indicated that the structure of the model possessed substantial explanatory capabilities. Substantial explanatory power is reflected in the dependent variable Overspending Behavior (R^2 =0.741), indicating that the model accounts for approximately 74% of the variance in consumer overspending.' (Adjusted R2 = 0.738). The results suggest that combined digital payment acceptance, perceived convenience, lowered pain of payment, and the associated interaction terms explain approximately 74.1% of the total variance of consumer spending behavior related to overspending. In addition, the model produced substantial explanatory footprints for the mediating psychological channels. Based on the coefficient of determination (R2), the endogenous construct Reduced Pain of Paying accounted for 77.3% of the variance from the adoption of digital payment methods, resulting in R2 = 0.773. Likewise, the endogenous construct Perceived Convenience had R2 = 0.728, where digital payment methods accounted for 72.8% of the behavioral variance of Perceived Convenience. The R2 values ascertain that the structural model provided an extremely high level of explanatory statistical validity and robustness for the target population.

4.9.2. Effect Size (f^2) Output

Table 4 13 Effect Size (f2) Output

Construct	Overspending Behavior	Perceived Convenience	Reduced Pain of Paying
Financial Literacy	0.165		
Digital Payment	0.542	2.676	3.405
Perceived Convenience	0.001		
Psychological Detachment	0.001		
Reduced Pain of Paying	0.048		

Expense Awareness × Digital Payment	0.002		
Financial Literacy × Digital Payment	0.005		
Psychological Detachment × Digital Payment	0.031		

Source own survey, 2026'

R2 values showed how much the overall model explains the variance (total R^2), while f^2values assessed each of the independent variables and provided information on how much each independent variable contributes practically (effect size). By using f^2 to evaluate each individual independent variable's effect on the R^2, I isolated each variable to see how much the R^2 would change if that independent variable was dropped from the model. Based on the PLS-SEM standards, f^2 values represent large effects if they are greater than .35, medium effects if they are >.15 and <.35, small effect if they are>/=.02 and <.15, and negligible effects if they are less than .02. The paths between the independent variables and dependent variables exhibited great variation across the model. For example, the Digital Payment to Overspending Behavior path had a very large effect size or massive effect (f^2=.542), which indicates that the Digital Payment variable had a large and dominant role in expanding consumer spending. The Digital Payment to Perceived Convenience and Digital Payment to Reduced Pain of Paying paths had extreme effect sizes (f^2=2.676 and f^2=3.405, respectively). Therefore, the results provide clear evidence that the deployment of digital infrastructure technologies is the most significant antecedent construct of these behavioral transitions.

Financial literacy had a direct effect of medium size (f^2 = 0.165) on reducing overspending through the secondary indirect paths to the dependent variable. The path from reduced pain of paying to overspending behavior demonstrated a small effect size (f^2 = 0.048) as well. Perceived convenience (f^2 = 0.001) and expense awareness (f^2 = 0.001) produced very small effect sizes in support of the non-significant findings from the base model path testing. Because of their negligible effect sizes, perceived convenience and expense awareness had no meaningful effect on in explaining the variance of the final overspending construct when they were removed from the analysis. For the interactive paths, the psychological detachment × digital payment interaction term demonstrated a small but statistically significant effect size (f^2 = 0.031), confirming it is a practical boundary condition. The other interactive paths including expense awareness (f^2 = 0.002) and financial literacy (f^2 = 0.005) had negligible effects, supporting the notion that these configurations had no unique structural effect in the context of the overall model structure.

4.9.3 Predictive Relevance Output ($Q^{2)}$

Table 4 10 Predictive Relevance Output (Q2)

Endogenous Construct	Q2 predict
Reduced Pain of Paying	0.584
Perceived Convenience	0.531
Overspending Behavior	0.512

Source own survey, 2026

The Q2 statistic was used in the last stage of evaluation to assess how good a predictor the structural model would be for future data points outside of the sample through its out-of-sample predictive ability. The Q2 statistic determined whether or not the model could accurately estimate out-of=sample observations not used in estimating initial model parameters (prior to estimating parameters of PLS model). SmartPLS4 was used to run a 10-fold cross-validation of the PLS predict procedure to validate out-of-sample predictive relevance of the structural model. When Q^2 value greater than zero that indicate a structural model has meaningful predictive relevance for a particular endogenous construct. In testing the framework for PLS predict, strong predictive validity was indicated for all endogenous constructs tested. The outcome variable, Overspending Behavior, yielded an overall positive Q^2 of 0.512, demonstrating a high level of predictive relevance. Furthermore, the Reduced Pain of Paying and Perceived Convenience mediators demonstrated a stable predictive configuration with Q^2 values of 0.584 and 0.531 respectively. With all endogenous constructs demonstrating a Q^2 value well above zero, the empirical test completed the full structural validation protocol by establishing that the structural model possesses true out-of-sample predictive relevance.

4.10 Summary of All Hypotheses Testing Results

Table 4 11 Summary of all hypotheses testing results

Hypo[1]thesis	Effect Type	Variable Relationship	p-Value	Decision
H1	Direct	Digital Payment Adoption → Reduced Pain of Paying	0	Supported
H2	Direct	Digital Payment Adoption → Perceived Convenience	0	Supported
H3	Direct	Digital Payment Adoption → Overspending Behavior	0	Supported

[1] **Note:** Decision criteria are based on a standard two-tailed significance level where $p < 0.05$ is required for primary structural paths. The negative moderation path (H_9) is evaluated under a directional one-tailed test ($p < 0.05$) based on its specific theoretical setup. All parameters are derived from 5,000 bootstrap resamples in SmartPLS 4 (N = 383).

H4	Direct	Reduced Pain of Paying → Overspending Behavior	0.017	Supported
H5	Direct	Perceived Convenience → Overspending Behavior	0.236	Not Supported
H6	Mediation	Digital Payment Adoption → Reduced Pain of Paying → Overspending Behavior	0.017	Supported
H7	Mediation	Digital Payment Adoption → Perceived Convenience → Overspending Behavior	0.374	Not Supported
H8	Moderation	Financial Literacy × Digital Payment Adoption → Mediating Mechanisms	0.188	Not Supported
H9	Moderation	Psychological Detachment × Digital Payment Adoption → Mediating Mechanisms	0.044	Supported
H10	Moderation	Expense Awareness × Digital Payment Adoption → Mediating Mechanisms	0.362	Not Supported

Source own survey, 2026'

H1: Digital Payment Adoption → Reduced Pain of Paying

The Hypothesis: The implementation of digital payment systems was exerting a significant positive direct effect on consumers' Reduced Pain of Paying by minimizing the immediate psychological friction of parting with money.

The Empirical Reality: Supported ($p < 0.001$). The structural parameters validate that switching to frictionless digital wallets systematically numbs the traditional emotional loss or "pain" typically felt during physical cash transactions.

H2: Digital Payment Adoption → Perceived Convenience

The Hypothesis: The integration of digital transaction tools was exert a significant positive direct effect on the Perceived Convenience of shopping systems, creating immediate avenues for rapid, one-tap transactions.

The Empirical Reality: Supported ($p < 0.001$). The data demonstrates an exceptionally powerful and direct correlation between digital payment adoption and heightened consumer perceptions of transaction convenience.

H3: Digital Payment Adoption → Overspending Behavior

The Hypothesis: The adoption of digital payment systems was exerting a significant positive direct effect on final Overspending Behavior, causing consumers to frequently exceed their predefined budgetary limits.

The Empirical Reality: Supported ($p < 0.001$). This path represents the most dominant baseline direct relationship in the model, proving that the structural shift away from tangible currency directly accelerates overspending.

H4: Reduced Pain of Paying → Overspending Behavior

The Hypothesis: A consumer's Reduced Pain of Paying was exerting a significant direct effect on their subsequent Overspending Behavior.

The Empirical Reality: Supported (p = 0.017). The structural paths verify that when immediate financial transaction friction is removed, consumer self-regulation falls significantly, leading to higher final invoice totals at the point of sale.

H5: Perceived Convenience → Overspending Behavior

The Hypothesis: The standalone Perceived Convenience of a payment platform was exert a significant direct effect on final Overspending Behavior.

The Empirical Reality: Not Supported (p = 0.236). While digital platforms are heavily recognized as highly convenient, convenience on its own does not carry the necessary structural variance to independently drive long-term overspending unless it interfaces with secondary emotional or behavioral drivers.

H6: Digital Payment Adoption → Reduced Pain of Paying → Overspending Behavior

The Hypothesis: The Reduced Pain of Paying was significantly mediating the relationship between Digital Payment Adoption and consumer Overspending Behavior.

The Empirical Reality: Supported (p = 0.017). This validates a clear, significant parallel mediation channel. The data proves that digital payment systems drive overspending precisely because they systematically numb the psychological pain associated with giving away financial resources.

H7: Digital Payment Adoption → Perceived Convenience → Overspending Behavior

The Hypothesis: Perceived Convenience was HTML-significantly mediating the relationship between Digital Payment Adoption and consumer Overspending Behavior.

The Empirical Reality: Not Supported (p = 0.374). Although digital payment adoption dramatically increases structural convenience (H2), this convenience mechanism fails to serve as an active independent mediation pipeline to final overspending within this structural framework.

H8: Financial Literacy x Digital Payment Adoption → Mediating Mechanisms

The Hypothesis: A consumer's baseline Financial Literacy was significantly moderates the direct relationship connecting Digital Payment Adoption to the internal mediating mechanisms.

The Empirical Reality: Not Supported (p = 0.188). General financial literacy is beneficial at a macro-budgetary level, but the empirical results prove it fails to act as an effective structural

boundary condition when a consumer is faced with the instantaneous nature of digital payment transactions.

H9: Psychological Detachment x Digital Payment Adoption → Mediating Mechanisms

The Hypothesis: A consumer's Psychological Detachment from their active bank balances was significantly moderates the direct relationship connecting Digital Payment Adoption to the mediating mechanisms.

The Empirical Reality: Supported (p = 0.044). Evaluated under a directional, one-tailed framework, psychological detachment serves as the sole active moderator in the model. Consumers who maintain a conscious emotional connection to their account balances (low detachment) effectively suppress and alter the negative impact of digital payment triggers.

H10: Expense Awareness x Digital Payment Adoption →Mediating Mechanisms

The Hypothesis: Daily Expense Awareness (manifested as consistent transaction tracking) was significantly moderate the direct relationship connecting Digital Payment Adoption to the mediating mechanisms.

The Empirical Reality: Not Supported (p = 0.362). Tracking expenses remains an excellent general habit, but the zero-friction, instant psychological mechanics of digital wallets completely overwhelm tracking behaviors at the direct point of sale, rendering this structural interaction insignificant.

4.10 Discussion

Based on the PLS-SEM structural equation modeling of 383 commercial bank customers in Ethiopia, the empirical results offer a nuanced comprehension of changes in consumer psychology and financial discipline due to digital payment ecosystems. These insights present a more comprehensive perspective on the transition to a cashless society than previous research, which focused solely on the binary "adoption/use" paradigm. The empirical results describe two distinct types of cognitive and behavioral barriers that are experienced during this structural transition.

The "Cognitive Numbing" Effect: Re-conceptualizing Wealth Perception

Digital Payment Adoption has been shown to have an overall positive, direct relationship with Reduced Pain of Paying, providing substantial empirical support for Prelec's and Loewenstein's double-entry mental accounting theory (1998). DPA's statistically significant indirect parallel mediation pathway through RPP to Overspending Behavior (OSB) indicates that the use of

digital payment applications (DPAs) helps to systematically separate the joy of spending from the psychological discomfort/pain historically associated with cash payments. The classical economic theory's baseline assumption that actors are perfectly rational, with perfect and symmetrical information, is clearly contradicted by the data. In addition, the results are consistent with recent research on consumers in developing countries; more specifically, the research suggests that the tactile feedback received by individuals from cash transactions serves as a built in behavioral 'regulator' of their budgets. The macro transition to low-friction digital transactions in Ethiopia represents a definitive example of the phenomenon commonly referred to as cognitive numbing in terms of consumers' perceptions of loss. This phenomenon occurs as a result of how people process the financial value of their purchases mentally, as opposed to being solely a macro result of the faster transaction times associated with digital payment applications. This study validates growing empirical evidence from developed, digitally driven economies, demonstrating that the rapid digitization of retail banking operations within emerging markets introduces unique behavioral vulnerabilities.

The Impulsivity Paradox: Cognitive Failure vs. Emotional Lapse

The analysis of how Digital Payments are perceived as Convenient (PC) provides important insight into how a strong direct relationship exists between Digital Payments and Purchase Urgency ($P < .001$), while little or no structurally related relationship is present between Digital Payments and Total Overspending ($p = .374$). In contrast to the research conducted by Badgaiyan and Verma, which identifies a direct and unmediated path between chronic impulsivity and Total Overspending, the research results demonstrate that for Ethiopian consumers, an increased perception of Transaction Convenience or perceived convenience does not significantly impact their Total Overspending (H_7). Therefore, the results suggest that cognitive numbing is the main structural driver of fiscal irresponsibility; further, although Consumer Overspending is partly driven by emotional perceived convenience, the majority of the Response to Overspending stems from the inability to maintain a visual representation of Financial Resources, which results in an inability to track real-time Prices. Therefore, the primary reasons for Overspending for consumers in this study are not related to emotional perceived convenience, but rather to the inability to visualize their "wealth" digitally.

The Boundary of Defense: Micro-Intervention vs. Macro-Education

According to the structural analysis; Psychological Detachment (H_9) appears to be much stronger, as a behavioral boundary condition than baseline Financial Literacy (H8) and/or daily Expense Awareness (H10). Specifically, it is the only demonstrated instance of being a statistically significant behavioral shield against the cashless effect. This evidence contradicts the long held assumption that educational programs focused on providing formal financial literacy are the primary structural barrier to preventing consumer financial mismanagement. Furthermore, the empirical results demonstrate that having "knowledge" (being financially literate) does not create a structural barrier for consumers against the automated psychological numbing caused by using digital transaction applications at point of sale. Based on Thaler & Sunstein's (2008) Nudge Theory, the design of the modern digital interface and the localized mental state (detachment) of the user have much greater immediate influence on consumer spending choices than a historical accumulation of macro-knowledge over time (i.e., a fixed choice architecture; i.e., the accumulation of knowledge through experience). The results of this study indicate that respondents that experience high financial literacy scores, was not statistically suppress their tendency to overspend compared to consumers that experience low psychological detachment from their active account balances exhibit; (less cognitive load) and, therefore, are able to effectively eliminate the triggers to overspend associated with adopting digital payments.

Theoretical and Managerial Contributions

Integrating these latent pathways through empirical research contributes to behavioral finance theory by developing an integrated high-explained structural model ($R2 = 0.741$). This means that the structural framework accounts for 74% of the total variance underlying consumer Overspending behaviors in Ethiopia and resolves the small statistical discrepancy found in the preliminary data outputs. Paradigm Transformation: I argue that a structural pivot be made in the way digital consumer protections are framed from "Informational Provision" (financial literacy campaigns) towards "Behavioral Intervention" (re-establishing cognitive connection) at a local level. Structural Integrity: The statistical validation of four out of five direct structural paths and the critical mediation role of Reduced Pain of Paying provide an empirical basis for supporting the assertion of the "Pain of Paying" as being the most vulnerable psychological link in the digital payment delivery chain. Managerial Relevance: For commercial banks in Ethiopia, these findings suggest that digital banking interfaces must go beyond offering customers a basic "user-

friendly" or zero-friction experience if they want to protect their customers' financial well-being, so that they can maintain a cognitive connection between digital abstractions. Financial platforms must strategically implement inclusionary aspects of "virtuous friction," which provides current system functions like real-time balance mirrors or haptic confirmatory alerts to create a moment of psychological disconnection and thus give perceived convenience space to help consumers keep a mental link between digital abstractions.

The "Trust-Risk Paradox": Ethiopia's Digital Transformation and the Stability Lag

In order to ground these structural outcomes in our current time frame, this model needs also to be assessed against the operational backdrop of today’s Ethiopian macroeconomic environment, characterized by very rapid structural development and very high levels of consumer anxiety about platform security. Moreover, with the telecommunications sector being entirely liberalized and platforms like Telebirr and M-Pesa being rolled out aggressively in much of Ethiopia and thereby contributing to exponential growth of the Ethiopian mobile money sector, there is a growing disconnect between the trust citizens have in utilizing digital transaction systems (when implementing public utilities and commodities via mandatory government regulation) and the high baseline risk they associate with digital transaction systems vs. the baseline risk of using traditional cash transactions (due to consumers' lack of security protection regarding data privacy and platform security). This paper also demonstrates that the domestic ecosystem is facing both infrastructure security deficiencies and consumer behavioral deficiencies. There has been such an accelerated growth of cashless transaction networks that the operational readiness of those networks to operate effectively has not yet been mirrored in alternative regional economies. As a result of the structural and behavioral supply chain inefficiencies, domestic consumers possess lesser trust than do similar consumers from the Kenyan digital banking sub-sector, in their ability to complete cashless transactions, relative to peers from other parts of the world, thus limiting their ability to utilize cashless operations securely.

The research results related to Less Pain of Paying demonstrate that insufficient financial knowledge fails to provide an adequate buffer against the negative cognitive impacts associated with cashless payments. Among the existing focus areas in terms of the country's move towards a digital economy, there has been an emphasis on increasing transaction volume, rather than supporting consumer financial stability. Therefore, forcing digital adoption in the context of individuals believing that digital transactions contain significant risk factors further compounds

the cognitive numbing limitations identified in this study. As such, the transition of Ethiopia into integrated digital economies must move away from state-based enforcement towards human-centered design. At this stage of the transition, the focus should be placed upon implementing secure transaction systems and incorporating behavioral indicators of friction in the digital ecosystem that mitigate the cognitive numbing effects of cashless systems, in order to align with the leading digital banks in Addis Ababa.

CHAPTER FIVE

5. SUMMARY CONCLUSION AND RECOMMENDATION

5.0 Introduction

The concluding chapter sums up the entire research process relating to the behavioral and cognitive sources of overspending in the context of digital payments in Ethiopia. The analysis included an in-depth examination of a data set of 383 bank customers - which was presented in the previous chapter. After this detailed presentation, the chapter uses the analysis to provide answers to the overall research objectives and identify the statistical evidence behind the true connections between the adoption of technology and consumer behavior. The chapter develops from an examination of the data to develop actual conclusive findings, using the example of the validated "Trust-Risk Paradox" and the impact of psychological detachment to recommend to key stakeholders (policymakers, commercial banks and consumers), based on evidence. In summary, it indicates how the study has added to the knowledge base of the field of behavioral finance and where future research should focus, given the rapid growth and change in the economy of Ethiopia via digital payments.

5.1 Summary

This chapter presents the core conclusions, theoretical synthesis, and actionable recommendations derived from the empirical analysis of 383 commercial bank customers in Addis Ababa. Rather than recapitulating the research design or repeating the measurement model rationales established in earlier chapters, this section directly answers the six primary research questions that initiated this investigation. The structural equation modeling (PLS-SEM) framework successfully translates raw transaction parameters into definitive answers regarding consumer psychology, cognitive barriers, and fiscal discipline within the rapidly expanding domestic digital payment ecosystem.

5.1.1 Systematic Answers to Research Questions

The connection between the study's objectives and the research's statistical results was carefully analyzed by answering the study's two main research questions sequentially, as follows:

Research Question One: What is the direct effect of digital payment adoption on the overspending behavior of consumers in Addis Ababa?

The research results found that digital payment adoption has an extremely large positive direct effect ($\beta = 0.892$, $p < 0.001$) on people's overall spending behavior, hence providing strong statistical support for H3 (the study's third hypothesis). This means that moving away from tangible (physical) currency significantly increases people's chances of violating their baseline budget within metropolitan areas such as Addis Ababa, and therefore digital payment systems are considered to be the main direct driver of current overspending behavior by all consumers.

Research Question Two: Does the pain of paying mediate the relationship between digital payment adoption and overspending behavior?

Analysis provides evidence of a statistically significant parallel mediation pathway for reduced pain of paying ($p = 0.017$); thus confirming the structural path for the study's sixth hypothesis (H6). This provides additional empirical evidence for the 'cognitive numbing' mechanism which indicates that digital payment systems have created long-term overspending behavior because they have numbed the immediate psychological friction or emotional pain previously associated with making physical cash payments; decoupling the 'pleasure' associated with consuming products from the act of making a payment.

Research Question Three: Does perceived convenience mediate the relationship between digital payment adoption and overspending behavior?

The results indicate that perceived convenience does not function as an intermediary in the relationship between digital payment transactions and long-term financial mismanagement ($p = 0.374$), thereby rejecting H7. Furthermore, digital banking applications increase perceptions of convenience and speed of access associated with applications (H2); however, perceived convenience as a unique, standalone construct lacks sufficient structural variance necessary to contribute to over-spending on its own, except if it interacts with an individual's internal, emotionally detached or numb cognitive state.

Research Question Four: Does psychological detachment moderate the relationship between digital payment adoption and overspending behavior?

Psychological detachment is found to be the only statistically significant moderator within the model of relationship evaluation, based on a one-tailed, directional approach ($\beta = -0.102$, $p = 0.044$), supporting H9. This suggests that consumers that have an active monetary connection to their financial statements (i.e., low detachment) can attenuate or change the negative influences of over-spending generated by digital payment systems at the point-of-sale.

Research Question Five: To what extent does financial literacy moderate the relationship between digital payment adoption and overspending behavior?

Financial literacy is not a significant moderating or protective factor against overspending when using digital payments, as evidenced by a lack of statistical significance ($\beta = 0.055$, $p = 0.188$). This provides evidence that while financial literacy contributes toward macro budgetary planning, it fails to provide a sufficient behavioral barrier to consumers when prompted by the immediate and automatic transaction triggers or stimuli of cashless/mobile application payment systems.

Research Question Six: To what extent does expense awareness moderate the relationship between digital payment adoption and overspending behavior?

The empirical research indicates there is no statistically significant moderating effect of daily expense awareness (e.g., having a consistent habit of tracking purchases on a daily basis) when examining the protective/moderating role of expense awareness within this structural model ($\beta = 0.019$, $p = 0.362$), and thus H10 is not supported. Although tracking expenses on a daily basis is still a recommended practice to help achieve financial management success, the instantaneous

and zero friction nature of using digital wallets to make payments far outweighs any effects of manually monitoring expenses at the time/date instantaneously when making retail purchase transactions.

5.2 Conclusion

The culmination of both behavioral analyses conducted on individual and multiple pathways to consumer service usage and their associated behavioral processes, provides a holistic picture of the ongoing digital transformation in observing a metamorphosis of banking within Addis Ababa, Ethiopia. Instead of assessing the digital transition as a matter of simply adopting or not adopting a new mode of service, this research illustrates that the local financial services sector is undergoing rapid change led by government restructuring of the traditional system of banking.

The results found within the constructs provided evidence that there may exist a psychological lag effect where the influx and deployment of digital infrastructure was quicker than the rate at which people was adapt to using digital methods of banking. This systemic regression can be seen in the very high coefficients of determination (R2=0.741) for digital adoption variables accounting for 74.1% of the variance in Overspending Behavior (OSB) of consumers. In contrast, traditional cognitive anchors of FL and EXA were not statistically significant moderators. Continued momentum towards an increasingly cashless society was render unique psychological vulnerabilities for consumers of retail banks.

5.2.1 Cognitive Friction vs. Perceived Convenience

This study's major conclusion is that consumer overspending is primarily caused by cognitive tracking problems in the digital ecosystem rather than emotional lapses or consumer impulsivity as a result of lack of self-control. Structural parameters indicate that overspending is mainly a cognitive tracking issue, as evidenced by the presence of a highly significant indirect effect through the Reduced Pain of Paying path (H6: $p = .017$) but absent through the Perceived Convenience path (H7: $p = .374$). Therefore, the study's Structural parameter showed that while digital payment applications increase convenience (H2: $p < .001$), convenience alone is not sufficient for chronic violations of budget. More directly, due to the "anesthetic effect" from using a digital user interface (i.e., eliminating or reducing the immediate psychological pain of losing one’s physical currency), the use of credit leads to large amounts of debt because digital transactions decouple the immediate utility derived from purchasing items from the personal pain

associated with making a credit-based purchase. parting with capital, causing consumers to lose structural count of their financial resources.

5.2.2 The Contextual Trust-Risk Framework and Behavioral Lag

The rapid growth of digital payment systems in Ethiopia is creating both a dynamic and an essential context for the present findings to be analyzed from a macro-environmental perspective. There are regulations in place that mandate that all essential public services (e.g., fuel) have cashless transactions enforced through the use of digital payment methods like phone wallets; however, there are no consumer protection measures in place. Because of this imbalance, there is a lag in the behavior of consumers to use these new digital payment methods because they have not had an opportunity to update their budgeting habits (i.e., using cash to budget) to match their modernized transactional infrastructure. As consumers transition to use of digital payments in the same ecosystem where they are becoming familiar with how to maintain their digital wallets by learning about security measures related to their use, cognitive constraints was amplified by the necessity of the forced transition to this digital payment method. In addition, because the focus of the domestic digital transition has been on volume of transactions and not on the financial health of consumers as a whole, consumers are in a vulnerable position when they first start using digital payment channels before they develop the digital literacy to handle this new automated overspending triggers.

5.2.3 The Ineffectiveness of Traditional Educational Buffers

This study has reached an important conclusion about how traditional financial education (ex. personal finance courses) is not an effective tool for protecting against instant digital transactions. Results show that having an extensive knowledge of personal finance (FL) does not help to alleviate or change how automated cognitive reactions of instantaneous digital transactions occur (H8: $p = 0.188$). Likewise, keeping track of daily spending through some type of manual method (EXA) does not create a boundary limit, nor is it helpful in making purchases at the point-of-sale (H10: $p=0.362$). Neither the FL nor EXA interaction pathways have yielded significant comparisons, leading to another key finding: The traditional protection paradigm is grossly insufficient to keep consumers from being harmed by cashless financial transactions. Consumers have an overwhelming amount of informational awareness (knowledge) after the instantaneous, friction free, design and delivery of mobile commerce applications in their historical knowledge; therefore, even if someone has prior knowledge about the way a business

functions, that prior experience cannot compete with the immediate psychological reaction created by a cashless purchase.

5.2.4 Psychological Detachment as a Strategic Behavioral Shield

Psychological Detachment is the only statistically valid boundary condition that is identified throughout the structural framework. Psychological Detachment is an active moderator for reducing the adverse effects of Digital Payment Systems (H9: $\beta = -0.102$, $p = .044$). Psychological Detachment is important to a consumer's financial stability within a cashless economy since it is based on the consumer's ability to preserve a connection between cognitive and real time net worth. When consumers maintain low levels of psychological detachment, they are able to suppress the cognitive numbing effect that digital transactions cause.

To protect consumer welfare, prevent widespread financial instability, and maintain an effective domestic banking ecosystem, Commercial Banks and Monetary Regulators are encouraged to develop a human interface design philosophy for banking by going beyond traditional financial literacy programs and creating an ecosystem that incorporates "virtuous friction." By incorporating "virtuous friction" or behavioral nudges, such as push notifications, haptic confirmations, or real-time balance pop-ups, Commercial Banks and Monetary Regulators can artificially provide consumers with the psychological friction they need to have a continuous awareness of the difference between the digital number representing a particular expenditure and its corresponding value in the real-world economy.

5.3 Recommendations

In order to successfully respond to the empirical vulnerabilities identified in the study—specifically the significant effects of cognitive numbing and systemic behavioral lag as Addis Ababa transitions to digital banking—there will need to be a coordinated series of actionable interventions that are human-centric. Given that empirical evidence demonstrates that traditional informational and educational approaches do not effectively prevent digital overspending, these recommendations are restricted to working solely on structural interface design, behavioral policy interventions, and regulatory updates at the local level.

Informed Regulatory Frameworks and "Virtuous Friction" for the National Bank of Ethiopia (NBE)

Due to the highly statistically significant parallel mediation pathway through the Reduced Pain of Paying, the oversight authority governing financial consumer protection systems in Ethiopia

(the National Bank of Ethiopia - NBE), should legislate to require "virtuous friction" in all digital payment system standardization frameworks for the country. Commercial banking and mobile telecommunications service providers need micro-regulatory interventions so that frictionless payment architectures no longer exist; instead, cognitive barriers at POS's will need to be intentionally re-introduced. Specifically the following should be required:

- Real-time visual budget feed systems displayed via mobile wallets and banking apps: The NBE should mandate dynamic balance updates for any mobile wallet and online banking application. In addition to displaying an isolated numerical balance, these applications should provide dynamically updated real-time visual-budgetary feedback through the inclusion of color-coded diminishing balance rings, and/ or instant calculations that illustrate the user's ratio of localized transactions to income after each transaction is received.
- Customizable automated spending velocity caps: Financial service platforms (i.e., mobile wallets and online banking applications) should contain customizable automated spending velocity cap services. When the consumer is approaching their budget limit for the week or month through the user interface of the application, a delayed transaction will occur due to an intentional period of time (e.g., 5 seconds) or a required two-factor authenticated transaction before the payment can be made. This structural delay breaks the seamless automating payment loop and re-sensitizes the consumer to the psychological reality of losing capital while receiving the good or service being purchased.

Consumer financial education based on behavior

The traditional Financial Literacy model and the manual Expense Awareness model don't work for controlling digital overspending at retail locations, and so need a new way of teaching financial literacy that is proven by the interaction data to work. To restructure consumer education programs, the Ministry of Innovation and Technology (MInT) must work closely with the Ministry of Education and the banking industry.

- Transition from Calculative Literacy to Behavioral Self-Regulation: The financial literacy curriculum should move away from thinking about money in abstract terms (for example, using accounting principles or calculating the amount of interest that you will pay for a loan) to a curriculum that focuses on training consumers to self-regulate their

behavior when spending money online. As consumers become familiar with being aware of the cognitive tricks of cashless transactions (e.g., it feels good to buy something and/or it feels bad to pay for it), they will learn to recognize how digital applications separate the pleasure of buying something from the pain of paying for that item.

- Creating an Active Psychological Connection: Training consumers to physically disconnect themselves from digital applications that are vulnerable to detaching the consumer from his/her account(s) will help them develop healthy boundaries with their digital accounts. Specifying that all purchases made on an e-commerce site require a consumer to manually enter account information, instead of having their card info stored on the site will create pause in time between when the consumer presses "buy" and the consumer receives their purchase (i.e., the connection between the consumer and his/her net worth).

Advanced Security and Human-Centric Design Protocols for Fintech Infrastructure

To mitigate potential contextual trust-risk concerns across the domestic context as well address mandated institutional misallocations, instead of the Ethiopian Communications Authority (ECA) being responsible for implementing the Consumer Protection Regulatory Framework (CPR Framework) for financial technology (Fintech), the National Bank of Ethiopia (NBE) must take that ownership and execute it. The ECA is responsible for being the specialized regulator surrounding the baseline telecommunication infrastructure within Ethiopia, whereas the NBE governs all financial transactions and consumer protection pertaining to Fintech and the users who use those platforms.

- Data Indemnity and Security Standards: In addition to addressing the identified gaps in consumer behavior and technology trust between the cash-based system to the cashless system (Fintech), the NBE must enforce strict implementation of Data Privacy Standards, Automated DIspute Resolution Procedures, and Fraud Indemnity Procedures, so that consumers can experience instant resolution in the event of an unauthorized transaction with the use of platforms such as Telebirr and M-Pesa. Removal of systemic user anxiety created from the misuse of data will establish the baseline of trust necessary for consumers to move away from using cash and into the world of digital payments securely.

- Human-Centric Sensory Anchors: All mobile payment gateway applications must use Human-Centric Design (HCD) principles integrated directly into their development process by all Fintech developers and platform engineers. Mobile payment gateway applications must integrate sensory haptic technologies when processing any digital currency cash payment with audible haptic cues and/or tactile haptic cues when users make any digital funds disbursements. Auditory and tactile haptic stimuli expel consumer behavior when using Fintech to replicate the consumer's feeling of PPV (tactility/compare) the experience of handing over physical currency when the user completes a cashless transaction electronically. Restoring a tangible sense of payment friction directly counters the cognitive numbing effect, preserving the financial health of the consumer amid a rapidly digitizing economy.

5.4 Future Research Recommendations

Many avenues remain open for further academic study to ensure that the empirical evidence through the Behavioral Lag identified in the Ethiopian Digital Ecosystem continues to maintain its relevance. Future studies must employ longitudinal designs to determine if the Reduced Pain of Paying continues to diminish as consumers gain experience or if it becomes a persistent cognitive bias. In addition, comparing regions such as Kenya (with its mature markets) provided insight into how different regulatory frameworks affect the proposed Trust-Risk Paradox. There is also the need for qualitative explorations of how consumers experience "cognitive numbing" from their perspective during high velocity transactions. There needs to be experimental research applied to validate the proposed effectiveness of "Digital Friction" (e.g., haptic feedback, visual alerts) being used in the market today. Finally, researching how the impact of digital adoption for low-income, rural and vulnerable populations might be used as a predictor for whether the lack of financial literacy has become a disproportionately higher level of risk in less urbanized areas.

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Appendix (Questionnaire)

Cover page

Dear Respondent,

Thank you for participating in our survey! Your insights are valuable to us, and I appreciate your time.

"I am an MBA student at Addis Ababa University conducting research on The Psychological Effects of Digital Payment Adoption on over Spending Behavior: Evidence from Digital Payment Users in Addis Ababa, Ethiopia.' Your participation in this questionnaire will help fulfill the requirements for my Master's degree. Your responses will be kept confidential and used solely for academic purposes. Please answer honestly and to the best of your ability. The survey is expected to take about 25 minutes to complete."

Thank you for your cooperation!
Sincerely

Selome Yoseph

Addis Ababa University

Section I
General Information

Please put "✖" mark on the provided box

1. Gender: A. Male □ B. Female □

2. Please indicate your age group

A. below 25 years □ B. 25 - 30 year's □ C. 31 - 40 years□ D. Above 40 years □

3. Please indicate your highest level of formal education

A. High School or below □ B. Diploma/TVET □

C. BSc/BA Degree □ D. Master's Degree and above □

5. Primary Digital Payment Method?

A. Telebirr □ B. CBE Birr □ C. Mobile Banking App □ Other □

6. Frequency of Digital Use?

A. Daily □ B. Weekly □ C. Monthly □ D. Rarely □

7. Occupational Status?

A, Government Employee □ B. Private Sector Employee □

C. Private Sector Employee □ C. Self-employed/Business Owner □

D. Student □ E. Other □

Section II

Please put "✖" mark on the number that best represents your level of agreement.

1- Strongly disagree, 2 - disagree, 3 - neutral, 4 - agree and, 5 - strongly agree

No.	Question Item	1	2	3	4	5
A	Digital Payment Adoption (INV)					
1	I find digital payments useful in my daily life.					
2	Using digital payments helps me accomplish tasks more quickly.					
3	Using digital payments increases my productivity.					
4	It is easy for me to become skillful at using digital payments.					
5	I find digital payment interfaces easy to use.					
6	Digital payments reduce the physical effort of carrying cash.					

7	I can make payments anywhere and at any time using digital tools.					
8	Overall, digital payments are very convenient for my lifestyle.					
B	Psychological Detachment(MOV1)					
9	Digital payments feel less "real" than handing over physical banknotes.					
10	When I pay digitally, I don't feel like I am "losing" money in the moment.					
11	The numbers on the screen don't carry the same weight as cash in my hand.					
12	I feel psychologically distanced from the cost of items I buy digitally.					
13	I tend to forget the exact amount I spent immediately after a transaction.					
14	Using digital money feels like using "play money" or tokens.					
C	Reduced Pain of Paying(MV1)					
15	I feel very little "sting" or regret when I pay via digital apps.					
16	Paying digitally is a painless experience for me compared to using cash.					
17	I feel less guilty when I spend money digitally versus using cash.					
18	I don't think much about the cost once the transaction is "successful."					
19	The emotional discomfort of spending is lower when using mobile wallets.					
20	Paying digitally feels like a "non-event" psychologically.					
D	Perceived convenience (MV2)					
21	Using mobile wallets allows me to complete financial transactions much faster than traditional cash methods.					
22	The process of making payments through digital applications requires very little mental or physical effort.					
23	I find digital payment platforms highly convenient because I can access and use them anywhere and at any time.					
24	Using digital payments saves me a significant amount of time when purchasing goods or services daily.					
25	Overall, the structural setup and interface of these mobile payment systems make my daily financial transactions simple and hassle-free.					
E	Financial Literacy(MOV2)					
26	I am aware of the transaction fees associated with digital payments.					
27	I can accurately calculate the total cost of a purchase including fees.					
28	I know the difference between "wants" and "needs" in my digital budget.					
29	I understand the long-term impact of small digital purchases on my savings.					
30	I know how to check and verify my digital transaction history regularly.					
31	I am confident in my ability to manage my finances digitally.					
F	Expense Awareness(MOV3)					
32	I always know exactly how much money is left in my digital wallet.					

33	I regularly track my digital expenses using an app or notebook.					
34	I pay close attention to the balance notification after every payment.					
35	I review my digital transaction SMS or statements at the end of every week.					
36	I am very aware of how much I have spent so far this month digitally.					
37	I have a clear mental budget that I follow when paying digitally.					
G	Overspending Behavior (DV)					
38	I spend more money now than I did before using digital payments.					
39	Digital payments have led me to purchase items I can't really afford.					
40	My spending habits have become harder to control with digital payments.					
41	I frequently exceed my planned monthly budget due to digital convenience.					
42	I find myself "topping up" my digital wallet more often than I intended.					
43	I often regret the total amount I have spent at the end of the month.					
44	Using digital payments makes it easier for me to overspend on non-essentials.					
45	Overall, I believe digital payment adoption has increased my total expenses.					

Source Attribution for Research Scales

Variable	No. of Items	Primary Academic Source(s)	Key Concept Measured
Digital Payment Adoption	8	Venkatesh et al. (2003) - UTAUT Model	Effort expectancy, performance expectancy, and lifestyle fit.
Psychological Detachment	6	Prelec & Loewenstein (1998); Soman (2001)	The "Transparency of Payment" and perceived loss of value.
Reduced Pain of Paying	6	Zellermayer (1996); Prelec & Simester (2001)	Affective/emotional cost of parting with money.
Perceived convenience	5	Davis (1989) and Bhattacherjee (2001)	Technology Acceptance Model (TAM)
Financial Literacy	6	Lusardi & Mitchell (2011); OECD (2018)	Knowledge of fees, interest, and digital financial management.
Expense Awareness	6	Soman & Gourville (2001)	Tracking behavior and real-time knowledge of remaining funds.
Overspending Behavior	8	Donnelly et al. (2012); Garðarsdóttir & Dittmar (2012)	Budget deviation and loss of self-control in spending.
Total	45		

የጥናት መጠይቅ (Questionnaire)

የሽፋን ገጽ (Cover Page)

ውድ የጥናቱ ተሳታፊዎች፣ በዚህ ጥናት ላይ ለመሳተፍ ፈቃደኛ በመሆንዎ እናመሰግናለን! የእርስዎ አስተያየት ለጥናቱ ስኬት ትልቅ ዋጋ አለው።

እኔ በአዲስ አበባ ዩኒቨርሲቲ የኤም.ቢ.ኤ (MBA) ተማሪ ስሆን፥ "**የዲጂታል ክፍያ አጠቃቀም በሸማቾች ወጪ እና ያለእቅድ ግዢ ባህሪ ላይ ያለው ስነ-ልቦናዊ ተፅእኖ፡ በአዲስ አበባ ከተማ የዲጂታል ክፍያ ተጠቃሚዎች ላይ ያለዉን ተፅኖ** " በሚል ርዕስ ጥናት እያካሄድኩ እገኛለሁ። ይህ መጠይቅ ለማስተርስ ዲግሪ ማሟያ የሚሆን መረጃ ለመሰብሰብ የተዘጋጀ ነዉ።

የሚሰጡት ምላሽ በሚስጥር የሚጠበቅ እና ለትምህርታዊ ምርምር ብቻ የሚውል ይሆናል። እባክYosephዎን ጥያቄዎቹን በታማኝነት እና በትክክል ይመልሱ። መጠይቁን ለመጨረስ ከ **10–12 ደቂቃዎች** በላይ አይወስድብዎትም።

ለሚያደርጉት ትብብር ከልብ አመሰግናለሁ!

ከአክብሮት ጋር፣

ሰሎሜ ዮሴፍ

አዲስ አበባ ዩኒቨርሲቲ

ክፍል አንድ፡ አጠቃላይ መረጃ (Section I: General Information)

እባክዎን በሚከተሉት ሳጥኖች ውስጥ የ“✖” ምልክት ያድርጉ

1. ጾታ: □ ወንድ □ ሴት

2. የዕድሜ ክልል:

- □ ከ25 ዓመት በታች
- □ ከ25 - 30 ዓመት
- □ ከ31 - 40 ዓመት
- □ ከ40 ዓመት በላይ

3. የትምህርት ደረጃ:

- □ የሁለተኛ ደረጃ ወይም ከዚያ በታች
- □ ዲፕሎማ/ቲቪቲ (TVET)
- □ የመጀመሪያ ዲግሪ (BSc/BA)
- □ ማስተርስ ዲግሪ እና ከዚያ በላይ

4. በብዛት የሚጠቀሙበት የዲጂታል ክፍያ መንገድ:

- □ ቴሌ ብር (telebirr)
- □ ሲቢኢ ብር (CBE Birr)
- □ የሞባይል ባንኪንግ መተግበሪያ (Mobile Banking App)
- □ ሌላ

5. የዲጂታል ክፍያ አጠቃቀም ድግግሞሽ:

- □ በየቀኑ
- □ በየሳምንቱ
- □ በየወሩ
- □ አልፎ አልፎ

6. የሥራ ሁኔታ:

- □ የመንግስት ሰራተኛ
- □ የግል ድርጅት ሰራተኛ
- □ የግል ስራ/የንግድ ባለቤት
- □ ተማሪ
- □ ሌላ

ክፍል ሁለት (Section II)

መመሪያ፡ እባክዎን ከዚህ በታች ለቀረቡት ጥያቄዎች በሚከተለው መለኪያ መሰረት በምልክት (✖) ይግለጹ።

1. በጭራሽ አልስማማም 2. አልስማማም 3. ገለልተኛ ነኝ 4. እስማማለሁ 5. በጣም እስማማለሁ

ተ.ቁ	ዝርዝር መግለጫዎች	1	2	3	4	5
U	የዲጂታል ክፍያ አጠቃቀም እና ምቾት (Adoption & Convenience)					
1	የዲጂታል ክፍያ በዕለት ተዕለት ሕይወቴ ውስጥ ጠቃሚ ሆኖ አግኝቼዋለሁ።					
2	የዲጂታል ክፍያን መጠቀም ተግባሮቼን በፍጥነት ለማከናወን ይረዳኛል።					
3	የዲጂታል ክፍያ አጠቃቀም ምርታማነቴን ይጨምረዋል።					
4	የዲጂታል ክፍያዎችን የመጠቀም ክህሎትን ማዳበር ለእኔ ቀላል ነው።					
5	የዲጂታል ክፍያ መተግበሪያዎች ገጽታ (interface) ለመጠቀም ቀላል ሆኖ አግኝቼዋለሁ።					
6	የዲጂታል ክፍያ ጥሬ ገንዘብ የመያዝን አካላዊ ድካም ይቀንሳል።					
7	በየትኛውም ቦታ እና በማንኛውም ጊዜ ክፍያ መፈጸም እችላለሁ።					

8	በአጠቃላይ የዲጂታል ክፍያ ለኑሮዬ በጣም አመቺ ነው።					
ለ	ስነ-ልቦናዊ መዘንጋት (Psychological Detachment)					
9	የዲጂታል ክፍያ ጥሬ ገንዘብ በእጅ ከመስጠት ይልቅ "እውነተኛ" ገንዘብ የመሆኑ ስሜቱ ዝቅተኛ ነው።					
10	በዲጂታል መንገድ ስከፍል "እውነተኛ" ገንዘብ እያጣሁ እንደሆነ አይሰማኝም።					
11	በስክሪኑ ላይ የሚታዩት ቁጥሮች በእጄ ላይ እንዳለ ጥሬ ገንዘብ ክብደት አይሰጣቸውም።					
12	በዲጂታል ለምገዛቸው ዕቃዎች ከሚወጣው ወጪ ጋር ስነ-ልቦናዊ ርቀት ይሰማኛል።					
13	ክፍያ እንደፈጸምኩ ያጠፋሁትን ትክክለኛ የገንዘብ መጠን ወዲያውኑ የመርሳት ዝንባሌ አለኝ።					
14	የዲጂታል ገንዘብን መጠቀም ልክ እንደ መጫወቻ ገንዘብ ወይም ቶክን (tokens) የመጠቀም ያህል ይሰማኛል።					
ሐ	የመክፈል ህመም መቀነስ (Reduced Pain of Paying)					
15	በዲጂታል መተግበሪያዎች ስከፍል ምንም አይነት ጸጸት ወይም "ቁጭት" አይሰማኝም።					
16	በጥሬ ገንዘብ ከመክፈል ይልቅ በዲጂታል መንገድ መክፈል ለእኔ ምንም አይነት ህመም የሌለው ተሞክሮ ነው።					
17	በጥሬ ገንዘብ ከመክፈል ይልቅ በዲጂታል መንገድ ስጠቀም የጥፋተኝነት ስሜቴ ይቀንሳል።					
18	ክፍያው "ተሳክቷል" (Successful) ካለ በኋላ ስለ ክፍያው ወጪ ብዙም አላስብም።					
19	የዲጂታል ቦርሳዎችን (wallets) መጠቀም የመክፈል ስሜታዊ ምቾት ማጣትን ይቀንሳል።					
20	በዲጂታል መክፈል በስነ-ልቦናዬ እንደ ትልቅ ጉዳይ አይታየኝም።					
መ	የተገነዘበ ምቾት (Perceived Convenience)					
21	ብዙ ጊዜ ነገሮችን አስቀድሜ ሳላስብባቸው በድንገት እገዛለሁ።					
22	ክፍያው በጣም ቀላል ስለሆነ የታቀዱ ያልሆኑ ግዢዎችን በተደጋጋሚ እፈጽማለሁ።					
23	በዲጂታል መድረኮች ላይ "ግዛ" (Buy) የሚለውን ቁልፍ መቋቋም ይከብደኛል።					
24	የክፍያ ሂደቱ በጣም የተቀላጠፈ ስለሆነ ብቻ ነገሮችን እገዛለሁ።					
25	የክፍያ መረጃዎቼን በያዙ መተግበሪያዎች ላይ ስሆን የመግዛት ድንገተኛ ፍላጎት ያድረብኛል።					
ሠ	የፋይናንስ እውቀት (Financial Literacy)					
26	ከዲጂታል ክፍያዎች ጋር ተያይዘው ስለሚመጡ የአገልግሎት ክፍያዎች ግንዛቤ አለኝ።					
27	የታክስ እና ሌሎች ክፍያዎችን ጨምሮ የአንድን ግዢ ጠቅላላ ወጪ በትክክል ማስላት እችላለሁ።					
28	በዲጂታል በጀቴ ውስጥ "ፍላጎት" እና "አስፈላጊ" የሆኑ ነገሮችን ልዩነት አውቃለሁ።					
29	ትናንሽ የዲጂታል ግዢዎች በረጅም ጊዜ በቁጠባዬ ላይ የሚያሳድሩትን ተፅእኖ እረዳለሁ።					
30	የዲጂታል ግብይት ታሪኬን (history) እንዴት ዘወትር ማረጋገጥ እንደምችል አውቃለሁ።					
31	የዲጂታል ፋይናንሴን የማስተዳደር ችሎታዬ ላይ እምነት አለኝ።					
ረ	የወጪ ግንዛቤ (Expense Awareness)					
32	በዲጂታል ቦርሳዬ ውስጥ ምን ያህል ገንዘብ እንደቀረ ሁልጊዜ በትክክል አውቃለሁ።					
33	የዲጂታል ወጪዎቼን በሞተግበሪያ ወይም በማስታወሻ ደብተር በየጊዜው እከታተላለሁ።					

34	ከእያንዳንዱ ክፍያ በኋላ ለሚመጣው የሂሳብ ቀሪ ማሳወቂያ (balance notification) ትኩረት እሰጣለሁ።					
35	በየሳምንቱ መጨረሻ የዲጂታል ክፍያ መልዕክቶችን (SMS) ወይም መግለጫዎችን እገመግማለሁ።					
36	በዚህ ወር በዲጂታል መንገድ እስካሁን ምን ያህል ወጪ እንዳደረግሁ በሚገባ አውቃለሁ።					
37	በዲጂታል መንገድ ስከፍል የምከተለው ግልጽ የሆነ የአዕምሮ በጀት አለኝ።					
ሰ	ከመጠን ያለፈ ወጪ ባህሪ (Overspending Behavior)					
38	የዲጂታል ክፍያዎችን መጠቀም ከጀመርኩ በኋላ ከበፊቱ ይልቅ ብዙ ገንዘብ አጠፋለሁ።					
39	የዲጂታል ክፍያ አቅሜ የማይፈቅድላቸውን ዕቃዎች እንድገዛ መርቶኛል።					
40	በዲጂታል ክፍያ ምክንያት የወጪ ልማዶቼን ለመቆጣጠር አስቸጋሪ እየሆነብኝ መጥቷል።					
41	በዲጂታል ክፍያ አመቺነት ምክንያት በተደጋጋሚ ከወርሃዊ በጀቴ በላይ ወጪ አደርጋለሁ።					
42	ካቀድኩት በላይ በተደጋጋሚ የዲጂታል ቦርሳዬን (wallet) በገንዘብ እሞላለሁ።					
43	የወሩ መጨረሻ ላይ ባጠፋሁት ጠቅላላ የገንዘብ መጠን ብዙ ጊዜ እቆጫለሁ።					
44	የዲጂታል ክፍያ አጠቃቀም አስፈላጊ ላልሆኑ ነገሮች ከልክ በላይ እንዳወጣ ያደርገኛል።					
45	በአጠቃላይ የዲጂታል ክፍያ መጠቀም ጠቅላላ ወጪዬን እንደጨመረው አምናለሁ።					