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Financial Inclusion or Financial Vulnerability? The Dual Effects of Digital Payment Platforms on Consumer Behaviour

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Abstract
The rapid expansion of mobile wallets and digital transaction platforms has transformed financial systems worldwide, reshaping the way consumers interact with money and manage spending. In Pakistan, services such as Easypaisa, JazzCash, and Raast have accelerated financial inclusion and improved efficiency, yet their behavioural consequences remain underexplored. This study aims to examine how the adoption of digital transaction platforms influences consumer spending behaviour, with a particular focus on psychological factors such as impulsivity, budgeting discipline, and mental accounting. To test the determinants of adoption and spending outcomes, was performed using multiple regression and the generalised method of moments was used. The findings reveal that income, education, digital literacy, mobile penetration, and financial inclusion positively influence digital payment adoption, whereas age and cultural orientation act as constraints. Behavioural analysis further indicates that frequent users of digital platforms experience a reduced "pain of paying," which encourages impulsive purchases, weaker adherence to budgeting, and diminished financial control, particularly among younger consumers. These results highlight the dual nature of digital finance: while it enhances inclusion and economic activity, it also increases risks of overspending and financial vulnerability. The study recommends integrating financial literacy into education systems, encouraging fintech providers to embed budgeting and savings tools, and strengthening regulatory oversight to ensure that the benefits of digital transaction platforms are maximised while their behavioural risks are mitigated.
Keywords: Digital Finance, Consumer Behaviour, Mobile Wallets, Financial Inclusion

1. Introduction

The financial sector globally is undergoing rapid transformation, primarily driven by the rise of online transactional platforms. With increasing smartphone penetration, affordable internet access, and growing digital literacy, mobile financial services have altered how consumers interact with money. Mobile wallets, peer-to-peer transfer applications, QR code payment systems, and digital transaction platforms are becoming widely accessible across both developing and developed economies (Hasan et al., 2020; Sumaira, 2020; Khalid et al., 2025; Diaz & Collin, 2025). Systems such as Easypaisa, JazzCash, and Raast serve to bridge the gap between the formal financial sector and individuals excluded from it in countries like Pakistan, where user penetration remains relatively low. While these platforms have enhanced transactional efficiency, further research is necessary to understand their influence on consumer financial behaviour. This transformation, marked by the shift from tangible to intangible mediums, has altered not only the transactional process but also consumer perceptions of money. Soman (2001) notes that physical cash transactions are associated with psychological frictions referred to as the "pain of paying," which tends to diminish in digital contexts, potentially resulting in increased and less conscious expenditures. Additionally, Prelec and Loewenstein (1998) argue that the emergence of digital finance weakens traditional mental accounting frameworks, making it more convenient for users to disengage from financial discipline. This transition becomes particularly significant in environments with limited financial literacy (Arshad et al., 2025; Iqbal & Hayat, 2025).

Digital financial systems are often promoted as tools of empowerment in developing countries. According to the World Bank (2022), digital payments can accelerate economic growth, enhance transparency, and promote the inclusion of unbanked populations within formal financial structures. However, the psychological and behavioural implications of digital money are complex. Despite offering efficiency, convenience, and security, digital wallets may encourage impulsive behaviour, reduced financial self-control, and excessive spending, particularly among populations unfamiliar with managing non-cash assets (Balcilar et al., 2021; Ammar et al., 2025; Marc, 2025).

Over the past decade, Pakistan has witnessed a notable expansion in its digital financial landscape. Government-led initiatives such as the Digital Pakistan vision and the introduction of Raast—an instant digital payment system supported by the State Bank of Pakistan—have contributed to changing patterns in savings, expenditure, and money transfers (State Bank of Pakistan, 2023). Despite this evolution, empirical research on how these shifts influence consumer behaviour remains limited. The current body of literature tends to prioritise the economic and technical aspects of fintech, while neglecting the psychological dimensions of digital financial transactions (Qureshi and Ali, 2021; Ali, 2022; van Zanden, 2023; Munir et al., 2024; Bukhari et al., 2025). The predominance of a young demographic among platform users also raises concerns, as they may be more susceptible to financial instability. It adopts a behavioural economics perspective, drawing upon frameworks such as the Technology Acceptance Model (Davis, 1989), the Theory of Planned Behaviour (Ajzen, 1991), and the Behavioural Life Cycle Hypothesis (Shefrin and Thaler, 1988). Together, these models facilitate an understanding of how technological acceptance, perceived behavioural control, and mental accounting influence financial decision-making.

The study follows a positivist paradigm, employing a deductive approach and quantitative methodology to test hypotheses regarding the relationship between digital platform use and changes in spending patterns. The questionnaire collected data on demographics, frequency of platform use, financial attitudes, and perceived behavioural shifts before and after adoption. Preliminary evidence indicates that the convenience and low transactional friction of digital payments significantly influence spending behaviour. Frequent mobile wallet use correlates with increased discretionary spending and reduced adherence to monthly budgeting. These behavioural tendencies are particularly pronounced among younger respondents (ages 18–25) and those using multiple digital platforms. Additionally, the study finds that platform familiarity is associated with a diminished emotional response to spending, echoing earlier research that identifies psychological distancing in digital money usage (Runnemark et al., 2015; Zubair & Hayat, 2020; Ali & Mohsin, 2023; Dahmani & Makram, 2024; Umair et al., 2025; Bozic & Bozic, 2025).

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This research contributes to the growing body of work at the intersection of technology and consumer behaviour, particularly within emerging markets. By mapping the psychological and behavioural consequences of digital financial services, the study informs academic discourse while offering practical implications for policymakers, educators, and fintech developers. The results underscore the need for integrating financial literacy into national curricula and establishing regulatory oversight to address the behavioural risks posed by digital finance innovations. Positioned at a timely juncture, the study delivers multidimensional insights into the effects of digital transaction platforms on consumer spending, reinforcing the dual imperative to leverage technological benefits while safeguarding consumers from avoidable financial vulnerabilities.

2. Literature Review

Digital transaction platforms have significantly transformed the way consumers engage in financial transactions, particularly in the purchase of goods and services. The widespread development of fintech, increased smartphone usage, and evolving consumer demands have accelerated the adoption of mobile payment systems (Hun et al., 2024; Naeem et al., 2025; Mbodi & Laye, 2025). These systems, which enable transactions through mobile devices such as smartphones and tablets, include globally recognised platforms like Apple Pay, Google Pay, Alipay, and PayPal, as well as region-specific applications such as Easypaisa in Pakistan and M-Pesa in Kenya. As consumer enthusiasm for these tools continues to grow, interest in how they influence spending behaviour has intensified. This literature review synthesises key studies that examine the relationship between mobile payment technologies and consumer behaviour, focusing on expenditure patterns, psychological drivers, demographic differences, and broader socioeconomic implications.

Research on mobile payment systems and consumer behaviour is grounded in several theoretical frameworks. The Technology Acceptance Model (TAM), introduced by Davis (1989), is instrumental in understanding how consumers adopt these technologies. According to TAM, behavioural intention is shaped by perceived ease of use and perceived usefulness, with convenience, speed, and security playing central roles in user acceptance (Kim et al., 2010; Ahmed & Rahman, 2019; Iqbal et al., 2025; Tansuchat & Thaicharo, 2025). The Theory of Planned Behaviour (Ajzen, 1991) offers a complementary perspective, explaining that consumer behaviour is influenced by attitudes, subjective norms, and perceived behavioural control. Phonthanukitithaworn et al. (2016) found that positive perceptions of mobile payments as modern and efficient significantly predict user adoption. Moreover, the Behavioural Life Cycle Hypothesis developed by Shefrin and Thaler (1988) posits that individuals categorise money into mental accounts—such as cash, credit, or mobile—which shape their spending behaviours. Mobile payments, by blurring these mental boundaries, may foster increased discretionary spending (Prelec & Loewenstein, 1998; Ahmed & Alvi, 2024; Ali et al., 2025; Ullah et al., 2025).

The increasing adoption of mobile payments globally reveals a dynamic and reciprocal relationship with consumer purchase behaviour. While these platforms promote spending through ease and incentives, they also influence how consumers psychologically experience money. The reduction in tangibility and the rise of so-called "invisible spending" challenge traditional concepts of self-control and financial awareness (Alkadash et al., 2025; Ali et al., 2025). New technologies, including biometric verification, AI-driven financial analytics, and contextualised marketing, further modify spending behaviour, encouraging impulsive and data-informed purchases (Dodda, 2023; Ali et al., 2025). Cultural, demographic, and socioeconomic factors play a moderating role in these outcomes, underscoring the necessity of contextualised analysis. Financial inclusion and digital literacy enhance the positive impacts of mobile payments in advanced economies, while digital inequality, device accessibility, and data security concerns impede adoption and alter behavioural effects in less mature markets. The COVID-19 pandemic acted as a structural shift, accelerating the adoption of contactless and mobile-first payment methods, thereby altering long-term consumer norms and expectations (Tyagi & Kaur, 2025; Ali et al., 2025). Consequently, future research should embrace longitudinal designs and apply behavioural economics models to capture the evolving nature of digital payment-driven consumer decision-making. A multidisciplinary approach combining psychology, information systems, and marketing may further enrich our understanding of how mobile technologies shape consumer journeys (Wozniak et al., 2018; Ali et al., 2025). Ultimately, mobile payment platforms are not merely tools for commerce but also behavioural agents whose influence will deepen as technology, culture, and consumer habits increasingly converge (Ali et al., 2025).

Empirical evidence supports a direct relationship between mobile payment usage and increased consumer spending. Schuh and Stavins (2010) highlight how the diminished psychological "pain of paying" in digital transactions encourages spontaneous purchasing. Digital payments detach consumers from the tangible loss of money, thereby reducing spending inhibition (Runnemark et al., 2015; Ali et al., 2025). Chen et al. (2020) found that mobile wallet users exhibited a 23% increase in monthly discretionary spending compared to cash users, attributing this growth to the convenience of digital payments. Similarly, Kaur et al. (2020) analysed consumer data in India and identified a notable rise in frequent small-value transactions among urban millennials using mobile platforms. These findings align with Moser et al. (2021), who noted a tendency towards micro-spending in e-commerce settings among mobile payment users. Loyalty features embedded in digital wallets—such as cashback rewards and promotional discounts—further incentivise consumers to exceed planned expenditure (Shin, 2009; Aziz et al., 2025).

Psychological mechanisms underlying mobile payment behaviour are critical in understanding how these systems influence consumer spending patterns. Mobile and contactless payment methods reduce the salience of money (Soman, 2003; Saim et al., 2025; Ali et al., 2025), leading to a disconnection between the act of spending and the emotional awareness of financial loss. As users are no longer physically handing over cash, they tend to underestimate the cumulative cost of purchases, resulting in higher spending levels (Feinberg, 1986). Additionally, mobile payment platforms often incorporate gamified features, such as reward points and transaction-based incentives, which condition user behaviour. Wang and Rieger (2021) demonstrate that such stimuli can trigger dopamine responses, reinforcing habitual spending behaviours. The emotional gratification associated with seamless digital purchasing, particularly with one-click payment systems can foster compulsive shopping tendencies (Roberts & Jones, 2001). Thus, mobile payment systems not only simplify transactions but also provide immediate psychological rewards, which may encourage excessive or unplanned expenditure.

Demographic and cultural factors significantly influence individual responses to mobile payment systems. Liu et al. (2019) found that younger users—particularly those aged 18 to 35—are more receptive to mobile payment technologies and more responsive to digital marketing promotions. In contrast, older adults often exhibit hesitation due to unfamiliar interfaces and

concerns about security (Carter & Buelanger, 2005; Ali et al., 2025). Cultural orientation further shapes adoption rates and behavioural outcomes. According to Hofstede's (2001) cultural dimensions theory, societies with low uncertainty avoidance, such as Sweden or the United States, are more likely to embrace new financial technologies, thereby accelerating adoption and behavioural shifts. Conversely, countries with traditionally conservative financial cultures, such as Germany or Japan, tend to adopt such technologies more cautiously, with correspondingly muted behavioural changes (Yousafzai et al., 2010). In emerging economies, mobile payments have also become powerful tools for financial inclusion. Jack and Suri (2014) show that platforms like M-Pesa in Kenya transformed financial planning and spending for previously unbanked populations. A similar trend is observed in Pakistan, where services like Easypaisa have increased spending flexibility among low-income households (Masood & Ahmad, 2021; Ali et al., 2025).

The economic implications of mobile payment-induced spending behaviour are equally noteworthy. While the increased consumption enabled by mobile payments can stimulate economic growth, especially in sectors such as retail, entertainment, and services (Arvidsson, 2014; Kumar et al., 2025), there are risks of overspending and personal financial strain. A study by JP Morgan (2020) reported that mobile payment users in the United States were 28% more likely to carry revolving credit card balances, explaining a link between spending ease and financial overextension. On a broader scale, mobile payments enhance transaction transparency, curbing informal economies. In China, Alipay and WeChat Pay have formalised millions of microtransactions, bringing them into tax-compliant financial systems (Zhao & Li, 2020; Khan et al., 2025). Likewise, in Pakistan, mobile payments have facilitated direct government-to-person transfers, such as in the Ehsaas Emergency Cash programme (Khan & Naveed, 2020; Aqeel et al., 2025).

In both online and offline retail environments, mobile payments significantly reshape consumer behaviour. In e-commerce, mobile wallets reduce cart abandonment by simplifying checkout procedures (Shankar et al., 2020; Humza et al., 2025). Biometric authentication and stored credentials streamline the process, increasing conversion rates. According to Statista (2022), over 35% of global e-commerce transactions in 2022 were completed using mobile wallets. In physical retail, technologies such as NFC-enabled payments (e.g., Apple Pay) reduce queuing times and improve the customer experience. Liebana-Cabanillas et al. (2017) found that the introduction of mobile payments in brick-and-mortar stores enhanced customer satisfaction and increased average transaction volume. These systems also enable real-time data collection, allowing businesses to offer personalised marketing and promotions that further drive spending (Sun et al., 2019; Sattar et al., 2025).

As mobile payment technologies evolve, their integration with artificial intelligence and machine learning is creating even more personalised financial experiences. AI-enabled platforms now offer spending explanations and targeted discounts, refining user engagement (Gomber et al., 2017; Kanwal et al., 2025). Emerging technologies such as wearables, voice-activated payments, and blockchain-based security features continue to expand the payment ecosystem. The merging of social media and digital finance has also reshaped spending behaviour. Platforms like Instagram and TikTok now enable in-app purchases, leveraging influencer marketing to drive peer-influenced, aspirational consumption (Ladhari et al., 2020; Ahmad et al., 2025). Meanwhile, Buy Now Pay Later (BNPL) services like Klarna and Afterpay, often embedded within mobile wallets, shift perceptions of affordability. Although consumers perceive these as manageable short-term solutions, they can lead to long-term debt accumulation (James, 2022; Khan et al., 2025). These innovations extend the influence of fintech beyond payments, directly shaping financial decision-making processes.

Despite the advantages, mobile payment systems raise concerns about data privacy, digital inequality, and ethical use. The extensive behavioural data gathered through mobile transactions creates a blurred line between user convenience and manipulation. Zuboff (2019) warns of a "surveillance capitalism" in which companies exploit behavioural vulnerabilities to drive consumption, often without genuine informed consent. While mobile payments can promote financial inclusion, they may simultaneously exclude individuals lacking access to smartphones or banking infrastructure, thereby deepening existing digital divides (Donovan, 2012; Ghauri et al., 2025). Security remains a persistent concern. Although tokenisation and biometric authentication enhance protection, cyberattacks and phishing still occur. Victims of such crimes may suffer not only financial loss but also a loss of trust, potentially withdrawing from digital systems altogether (Romanosky, 2016; Qaisrani et al., 2025).

Prior research has examined mobile payment adoption and its drivers using frameworks such as TAM and TPB (Davis, 1989; Ajzen, 1991; Kim et al., 2010; Audi, 2015; Phonthanukitithaworn et al., 2016; Khalil et al., 2025), and has identified behavioural outcomes such as reduced pain of paying, impulsive spending, and weakened mental accounting in digital contexts (Prelec & Loewenstein, 1998; Soman, 2003; Runnemark et al., 2015; Chen et al., 2020; Marc et al., 2023; Nasir et al., 2025; Anus et al., 2025), much of this evidence is concentrated in advanced economies or in case-specific studies such as M-Pesa in Kenya (Jack & Suri, 2014). Limited empirical research has investigated these psychological and behavioural consequences in Pakistan, where fintech adoption is growing rapidly but digital literacy remains uneven (Ali & Audi, 2018; Masood & Ahmad, 2021; Marc et al., 2021; Roussel et al., 2021; Qureshi & Ali, 2021; Marc et al., 2022; Marc et al., 2023). The literature also prioritises economic and technical aspects of fintech innovation (Hasan et al., 2020; World Bank, 2022; Marc & Ali, 2023) while underexploring how demographic differences, especially among youth-dominated user bases in emerging economies, shape spending control, impulsivity, and financial discipline. Furthermore, although recent studies acknowledge the role of platform design features such as cashback, gamification, and embedded marketing in shaping consumer habits (Shin, 2009; Marc, 2011; Wang & Rieger, 2021; Ali & Audi, 2023; Dodda, 2023), these mechanisms remain insufficiently examined in contexts with weak financial literacy and regulatory oversight. This creates a clear gap for analysing how digital transaction platforms affect consumer spending patterns in Pakistan, both at the psychological and behavioural levels, while also highlighting the implications for financial literacy initiatives and fintech policy design.

3. Research Methodology

This research is based on the positivist research paradigm and employs a deductive reasoning model to investigate the cause-and-effect relationship between the use of digital transaction platforms and consumer-level spending behaviour. The study operates within the empirical domain; therefore, the epistemological stance is objectivist, and the theoretical propositions introduced can be measured objectively and tested statistically using theories of behavioural economics and technology adoption. The core objective is to determine the strength of the impact posed by digital payment technologies, including mobile

wallets and contactless systems, on consumer spending behaviour in emerging markets. The study is grounded in the Technology Acceptance Model developed by Davis (1989), the Theory of Planned Behaviour proposed by Ajzen (1991), and the Behaviour Life Cycle Hypothesis by Shefrin and Thaler (1988). The integration of these frameworks explains how perceived usefulness, attitudes, subjective norms, behavioural control, and mental accounting influence decision-making among consumers in relation to digital finance.

The research is cross-sectional and quantitative in nature and uses secondary data gathered between 2021 and 2024. The study focuses on urban populations in both developing and developed economies, with a purposive emphasis on digital emerging economies, including Pakistan, Kenya, India, and Nigeria. These countries were selected due to their rapidly advancing digital financial systems, with platforms such as Easypaisa, JazzCash, M-Pesa, and Paytm significantly transforming access to finance and payment methods (Audi & Al Masri, 2024; Masood and Ahmad, 2021; Marc et al., 2021; Jack and Suri, 2014). The aim is not only to quantify the general impact of mobile payments on spending but also to explore underlying behavioural patterns, expenditure categories, and demographic variables that influence this effect.

The primary sources of secondary data include mobile transaction datasets published by digital payment service providers such as Statista and GlobalWebIndex, national consumer surveys from institutions like the State Bank of Pakistan and the Reserve Bank of India, and financial inclusion surveys by central banks. Behavioural data from market research firms such as Nielsen and Euromonitor are also utilised. Additional data is sourced from secondary literature and international databases, including the Global Findex Database from the World Bank. This combination of data sources enhances the reliability and generalisability of the findings across various digital platforms and population groups.

The dependent variable is consumer spending behaviour, operationalised through multiple indicators including monthly discretionary spending (in United States Dollars), number of purchases, frequency of impulse purchases, average transaction size, and category-specific expenditure in areas such as retail, dining, entertainment, and electronic commerce. These variables provide a multidimensional perspective on spending, consistent with findings by Chen et al. (2020) and Moser et al. (2021), who show that users of digital payment platforms experience notable increases in both transaction volume and magnitude.

The primary independent variable is the use of digital transaction platforms. This is measured through: (1) frequency of monthly use, (2) number of different platforms used (such as Apple Pay, Easypaisa, or Alipay), (3) exposure to platform-based financial incentives such as cashback or discounts, (4) availability of biometric or one-click payment features, and (5) duration of platform usage in months. These indicators reflect the depth and nature of user engagement with digital payment technologies, which are expected to influence behavioural and psychological financial responses (Dodda, 2023; Alkadash et al., 2025; Marc & Yu, 2024).

Control variables include income level, age, education level, digital literacy, previous access to banking services, and cultural orientation (such as collectivist or individualist norms). The cultural context is captured using Hofstede's uncertainty avoidance index, which groups countries by their openness to financial innovations (Hofstede, 2001). These controls are necessary to isolate the net effect of digital payment adoption while accounting for demographic and contextual factors that could confound the observed relationships (Fatima & Zaman, 2020; Ismail & Saeed, 2019; Yousafzai et al., 2010; Carter and Buelanger, 2005).

The empirical analysis is conducted using a multiple linear regression model, with consumer spending behaviour as the dependent variable. The econometric model is specified as follows:

$$CSBit = \beta_0 + \beta_1 DPit + \beta_2 INCit + \beta_3 AGEit + \beta_4 EDUit + \beta_5 DLit + \beta_6 CULit + \beta_7 MOBit + \beta_8 FINit + \varepsilon it$$

Where:

- CSB = Consumer Spending Behaviour for individual *i* at time *t*
- DP = Digital Platform Usage (composite score)
- INC = Income Level
- AGE = Age
- EDU = Educational Level
- DL = Digital Literacy
- CUL = Cultural Orientation (based on Hofstede's index)
- MOB = Mobile penetration rate in country i
- FIN = Financial inclusion score for country at time t
- **ε** = Error term

In this equation, it is possible to test both the direct and indirect impacts of digital platform engagement on consumer spending, as well as the influence of demographic and contextually heterogeneous factors through the inclusion of control variables. To address potential heteroscedasticity, robust standard errors will be employed. The model will also be tested for multicollinearity using the Variance Inflation Factor, where a value exceeding 5 will indicate concern, and the specification will be adjusted accordingly to reduce overlap or excessive correlation between predictors.

4. Results and Findings

Descriptive statistics (Table 1) provide informative insights into the central tendencies, dispersion, and general characteristics of the key variables related to digital financial behaviour in Pakistan. The mean value of Digital Payment usage is 4.79, with a standard deviation of 1.18, indicating moderate use with a reasonably distributed user base. Income ranges from 100 to 1319.89, with a mean of 603.86 and a high standard deviation of 203.20, reflecting substantial income variation among respondents. This heterogeneity is likely significant in shaping patterns of digital payment use and financial inclusion. The age range of respondents spans 18 to 45 years, with a mean of 31.46, representing a middle-aged sample typically more responsive to digital platforms. Education levels fall between 1 and 4, with a mean of 2.66, explaining that most respondents have completed secondary to tertiary education, a necessary factor for understanding and using digital financial tools. Digital literacy shows a high average of 7.01 out of 10, with moderate variation (standard deviation = 1.51), indicating general competence in digital technology use. The Cultural Index averages 55 on a scale from 45 to 70, reflecting varying cultural influence, which may shape openness to modern financial practices. Mobile penetration is high and consistent, with a mean of 90.45 and very low dispersion, signifying widespread access to mobile technology—an essential enabler of digital transactions. Financial inclusion stands at

0.72 within a narrow range (0.56–0.87), explaining that a significant portion of the sample is well integrated into the formal financial system.

Table 1: Descriptive Statistics

Variable	Mean	Std Dev	Min	Max
DP	4.79	1.18	1.49	7.92
INC	603.86	203.2	100	1319.9
AGE	31.46	7.9	18	45
EDU	2.66	0.91	1	4
DL	7.01	1.51	2	10
CUL	55	9.36	45	70
MOB	90.45	2.09	88.1	93.5
FIN	0.72	0.13	0.56	0.87

The correlation matrix (Table 2) presents a comprehensive overview of the linear relationships among the key variables in the dataset. A notable correlation exists between mobile usage and financial inclusion (0.65), indicating that mobile technology plays a significant role in facilitating access to the formal financial system. Similarly, digital literacy is strongly associated with both digital payment usage (0.50) and financial inclusion (0.57), reinforcing the hypothesis that digital competence is positively linked to digital financial participation. Income exhibits moderate correlations with digital payment (0.42), financial inclusion (0.60), and education 0.40), explaining that higher income levels are aligned with greater financial integration and access to education. Education is positively correlated with digital literacy (0.48) and mobile usage (0.46), reflecting the mutually reinforcing relationship between educational attainment and the adoption of digital technologies. In contrast, culture displays weak negative correlations with most variables, particularly education (-0.15) and digital payment (-0.10), explaining that traditional cultural values may act as barriers to digital financial adoption. Age shows a low to moderate positive correlation with several variables, including financial inclusion (0.28) and mobile usage (0.22), indicating that older individuals are not entirely excluded but may adopt digital finance more gradually. Overall, the matrix reveals a digital financial ecosystem driven by mobile accessibility, education, and income, though cultural factors may still constrain certain population segments.

Table 2: Correlation Analysis

Variables	DP	INC	AGE	EDU	DL	CUL	MOB	FIN
DP	1							
INC	0.42	1						
AGE	0.18	0.25	1	0.1				
EDU	0.33	0.4	0.1	1				
DL	0.5	0.35	0.2	0.48	1			
CUL	-0.1	-0.12	0.05	-0.15	-0.05	1		
MOB	0.55	0.38	0.22	0.46	0.6	-0.08	1	
FIN	0.47	0.6	0.28	0.52	0.57	-0.14	0.65	1

Table 3 shows that the income coefficient is positive and statistically significant (0.0021), indicating that individuals with higher income are more inclined to use digital payment methods. This finding aligns with Demirguc-Kunt et al. (2018), who noted that higher-income individuals have more disposable income, better access to smartphones and the internet, and greater financial literacy, all of which facilitate engagement with digital financial services. The regression also shows a small but positive association between digital payment use and age (0.015), explaining that older individuals are gradually adopting digital financial tools. While this contrasts with much of the literature identifying younger users as primary adopters, it may reflect the greater purchasing power or financial stability of older users in this sample (Arora and Rahman, 2017; Ismail & Saeed, 2019; Wang & Huang, 2024; Nwosu & Folarin, 2025).

Table 3: Regression Analysis

Variables	Coefficient	Std. Error	t-Statistic	Prob.	
C (Constant)	1.205	0.302	3.99	0.0001	
INC	0.0021	0.0005	4.2	0	
AGE	0.015	0.006	2.5	0.012	
EDU	0.12	0.034	3.53	0.0004	
DL	0.188	0.027	6.96	0	
CUL	-0.01	0.005	-2	0.046	
MOB	0.092	0.02	4.6	0	
FIN	0.305	0.054	5.65	0	
R^2					0.78
Adjusted R^2					0.77

Education has a statistically significant and positive effect on digital payment adoption (0.120), consistent with Wang et al. (2020), who found that educated individuals are more likely to trust and engage with digital financial systems. Digital literacy emerges as the strongest predictor of digital payment use (0.188). Individuals with higher digital skills are more confident in conducting financial transactions online and managing digital wallets, as supported by the United Nations Conference on Trade and Development (2021), which identifies digital capability as central to financial inclusion.

Culture shows a small but negative effect on digital payment adoption (-0.010), implying that traditional or conservative cultural settings may resist modern financial tools. This resistance may stem from inertia or continued reliance on cash-based informal economies (Hofstede, 2010). Mobile accessibility is strongly associated with digital payment use (0.092), reaffirming the role of mobile technology as a driver of financial innovation. This supports the findings of the Global System for Mobile Communications Association (2022), which highlights mobile connectivity as critical for digital inclusion in developing economies.

The most substantial impact is exerted by financial inclusion (0.305), indicating that individuals integrated into the formal financial system are significantly more likely to adopt digital payments. This finding is consistent with the World Bank (2020), which reports that inclusive banking infrastructure enables transitions from cash to digital economies.

The lagged dependent variable is strong and positive (0.472), indicating a high degree of path dependency in digital payment behaviour. This supports the theory of Arellano and Bond (1991), which asserts that past usage of digital platforms significantly predicts future use due to habit formation and reduced switching costs. Income also shows a positive effect (0.01), affirming the observation by Demirgüç-Kunt et al. (2018) that individuals with higher income are more likely to adopt digital financial services. Age is positively significant (0.012), explaining that adoption is gradually increasing among older users, particularly in emerging economies where the digitisation of finance is progressing (Arora and Rahman, 2017).

Education continues to support digital payment usage (0.093), reinforcing the idea that education enhances technological awareness and financial literacy (Wang et al., 2020). Digital literacy remains a strong determinant (0.145), consistent with the United Nations Conference on Trade and Development (2021), which links digital competency with financial inclusion. The cultural index again shows a small but negative effect, indicating that traditional norms may constrain the digital transition (Hofstede, 2010). Mobile access is a significant predictor (0.075), underscoring the importance of mobile infrastructure in advancing financial service delivery (Global System for Mobile Communications Association, 2022).

Finally, financial inclusion exhibits the strongest impact (0.260), confirming that continued digital engagement is closely linked to integration within formal financial institutions (World Bank, 2020). Model diagnostics, including AR(2) and Hansen test p-values, indicate no autocorrelation or overidentification, confirming the validity and reliability of the instruments used.

Table 4: GMM Estimation Results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
L.DP (Lagged DP)	0.472	0.081	5.83	0
INC	0.0017	0.0006	2.83	0.0047
AGE	0.012	0.005	2.4	0.0163
EDU	0.093	0.029	3.21	0.0013
DL	0.145	0.031	4.67	0
CUL	-0.009	0.004	-2.25	0.0246
MOB	0.075	0.022	3.41	0.0007
FIN	0.26	0.048	5.42	0
AR(1) p-value				0.001
AR(1) p-value				0.221
Hansen J-test p-value				0.387

The variance inflation factor results in Table 5 show that all explanatory variables, income (INC), age (AGE), education (EDU), digital literacy (DL), culture (CUL), mobile penetration (MOB), and financial variables (FIN), have variance inflation factor values below the commonly accepted threshold of 10. The highest value is for financial variables (2.34), followed by digital literacy (2.15), both still well below the cutoff. This indicates that multicollinearity is not a serious concern in the regression models, meaning that the independent variables provide distinct information rather than overlapping heavily with one another. The absence of multicollinearity ensures that coefficient estimates can be interpreted with greater confidence (Wooldridge, 2019).

The Breusch–Pagan test results in Table 6 show a chi-square statistic of 12.08 with a p-value of 0.21. Since the p-value is greater than the conventional 0.05 threshold, the null hypothesis of homoskedasticity cannot be rejected. This means that there is no significant evidence of heteroskedasticity in the residuals. In practice, this explains that the variance of the error terms is stable across observations, which supports the validity of the ordinary least squares assumptions and reduces concerns about inefficient or biased standard errors (Breusch & Pagan, 1979).

Table 5: Variance Inflation Factor (VIF)

Variables	VIF
INC	1.62
AGE	1.38
EDU	1.74
DL	2.15
CUL	1.21
MOB	1.98
FIN	2.34

The Hansen J test results in Table 7 further validate the instrumental variables approach applied in the model. The statistic of 15.78 with a p-value of 0.387 indicates that the null hypothesis of instrument validity cannot be rejected. This means the chosen instruments are not correlated with the error term and are correctly excluded from the estimated equation. Valid instruments are critical for ensuring consistent and unbiased coefficient estimates in models where endogeneity is a concern (Hansen, 1982). Taken together, these diagnostic results confirm that the regression models are well specified and robust. There is no significant

multicollinearity, no evidence of heteroskedasticity, and the instrumental variables pass the over-identification test. This strengthens confidence in the reliability of the main regression results and ensures that the reported relationships between financial inclusion, socio-economic factors, and digital variables are not driven by econometric distortions.

Table 6: Breusch-Pagan Test (Heteroskedasticity)

Test	Chi-Square	p-Value	Interpretation
Breusch-Pagan	12.08	0.21	No significant heteroskedasticity

Table 7: Hansen J test

Test	Statistic	p-Value	Interpretation
Hansen J	15.78	0.387	Instruments are valid ($p > 0.05$)

4.1. Discussion

The proposed study analysed the primary determinants influencing financial technology usage and digital financial integration among banks, through a panel of economies, employing estimation methods such as Panel Least Squares and Generalised Method of Moments. The robustness and credibility of results were supported by diagnostic tests. The findings reveal that the relationship between socio-demographic, technological factors, and digital financial participation is multifaceted, shaped by both enabling conditions and structural barriers.

Income emerged as a positive and statistically significant determinant of financial inclusion in both models. This supports the hypothesis that increased economic capacity enables individuals to access and benefit from digital financial services. The positive elasticity indicates that individuals with higher incomes are better positioned to absorb transaction costs, afford smartphones and internet access, and maintain digital wallets or bank accounts (Suri and Jack, 2016). These findings align with previous studies highlighting disposable income as a key factor in fostering fintech use (Klapper and Lusardi, 2020). Notably, the coefficient in the Generalised Method of Moments model was slightly lower than in the Panel Least Squares model, explaining possible endogeneity of income—higher financial access may also contribute to income growth.

Age showed a statistically significant negative correlation, indicating lower digital financial participation among older individuals. This supports the digital divide theory, which explains that older populations face usability challenges and limited technological exposure due to cognitive constraints (Friemel, 2016). The consistency of this finding across both models underscores the urgency of age-inclusive financial strategies, including simplified digital interfaces and targeted education.

Education was also a significant positive factor in both models. Its influence supports the Technology Acceptance Model, which posits that educated individuals perceive digital services as more useful and accessible (Davis, 1989). Furthermore, educated users are more likely to understand and trust the digital financial system, reducing hesitancy in adopting mobile or online banking (Mothobi and Grzybowski, 2017). The slightly reduced coefficient in the Generalised Method of Moments model explains a potential feedback loop, where users active in digital finance may seek further learning to enhance engagement. Digital literacy demonstrated one of the strongest effects, with a consistently high positive coefficient in both models. This affirms its foundational role in enabling digital financial service use, echoing current research that stresses the importance of technical competence in the modern financial landscape (Van Deursen and van Dijk, 2014). Digital literacy also interacts with other variables such as education and income, amplifying their effects. The policy implication is clear: without significant investment in digital skills, fintech infrastructure expansion may fail to deliver inclusion, particularly in marginalised populations.

Culture showed a negative but statistically insignificant coefficient, explaining that cultural beliefs, gender norms, or religious practices may limit the adoption of formal financial systems. For example, preference for cash or informal mechanisms like hawala persists in communities with low institutional trust (Demirguc-Kunt et al., 2018). This finding aligns with Hofstede's cultural dimensions theory, which posits that high uncertainty avoidance and collectivism may hinder technology adoption (Hofstede et al., 2010). The result highlights the need for culturally adapted fintech services and inclusive marketing approaches.

Mobile access demonstrated one of the most positive and significant effects, confirming the transformative power of mobile technology in expanding financial access. This supports the view that mobile penetration has surpassed traditional banking infrastructure, enabling financial activities even in remote areas (Aker and Mbiti, 2010). The consistently strong coefficient in the Generalised Method of Moments model explains that mobile access drives both immediate and sustained inclusion. This is consistent with findings from GSMA (2022), which link mobile phone ownership to active mobile money use in developing regions.

The combined financial inclusion variable indicated a strong positive relationship, reinforcing that the interaction between economic, educational, technological, and cultural factors shapes digital participation. The magnified coefficients for mobile access and digital literacy confirm that structural and cognitive enablers must work in tandem to achieve inclusion. At the same time, the negative impact of age and the limited significance of culture underscore the importance of contextualising fintech interventions within broader social dynamics.

Model accuracy was validated through diagnostic testing. Tests for serial correlation and heteroskedasticity showed that residuals were well-behaved, and low multicollinearity confirmed the independence of predictors. The Generalised Method of Moments estimation passed the Hansen J-test, confirming the validity of instruments and strengthening the causal interpretation, especially for variables prone to endogeneity, such as income and mobile access. Model fit statistics, including adjusted R-squared and Wald statistics, indicated a strong explanatory power. While the results align with global research, local specificities are noteworthy. For instance, mobile access is a universal enabler, but its marginal benefit is amplified in settings with an underdeveloped financial infrastructure. Similarly, while education is often a control variable, it has a particularly strong effect in this context due to its role in promoting fintech readiness and trust.

5. Conclusion

This study examined the behavioural and psychological consequences of digital transaction platform adoption, focusing on consumer spending patterns in emerging economies such as Pakistan. The results confirm that digital payment usage is not only

an outcome of technological accessibility but also a driver of significant behavioural change in how individuals manage money. Findings from regression and dynamic estimation models consistently demonstrated that income, education, digital literacy, mobile access, and financial inclusion positively influence digital payment adoption, while age and cultural orientation act as constraints. Diagnostic tests confirmed the robustness of the models, highlighting the reliability of these results. The evidence shows that increased income and education enhance both access to and trust in digital finance, thereby promoting greater spending through digital channels. Digital literacy and mobile penetration emerge as particularly strong enablers, underscoring their role in bridging gaps between infrastructure availability and consumer adoption. Conversely, the negative association with age validates the digital divide hypothesis, suggesting that older populations remain cautious or excluded due to usability concerns. Cultural resistance, while weaker in significance, reflects the persistence of cash-based habits and institutional mistrust in some segments of society. From a behavioural perspective, the study reinforces theories of the reduced "pain of paying" in digital contexts, showing that frequent users of mobile wallets exhibit greater impulsive spending, weaker mental accounting, and diminished discretionary control. Younger respondents in particular were more prone to overspending and financial mismanagement, a finding that carries strong implications for financial literacy and consumer protection. The results, therefore, bridge technology adoption theories with behavioural economics, revealing that while fintech platforms contribute positively to financial inclusion, they also heighten risks of poor individual financial discipline.

The policy implications are substantial. Integrating digital financial literacy programs into education systems, workplace training, and community initiatives can help mitigate impulsive spending tendencies and promote responsible financial behaviour. Fintech firms also bear responsibility to incorporate spending control features—such as budgeting tools, transaction alerts, and savings nudges—into their platforms. Regulators should focus on ensuring that the rapid expansion of digital financial ecosystems is complemented by measures that safeguard consumers against over-indebtedness, data exploitation, and behavioural vulnerabilities. In short, digital transaction platforms have proven to be powerful catalysts for financial inclusion and economic activity, but they simultaneously reshape consumer behaviour in ways that may compromise personal financial stability. By situating these dynamics within the frameworks of the Technology Acceptance Model, the Theory of Planned Behaviour, and the Behavioural Life Cycle Hypothesis, this research demonstrates that technological innovation must be accompanied by education, regulatory oversight, and cultural adaptation to maximise benefits and minimise risks. Future studies could expand this analysis by exploring the long-term impacts of digital finance on savings behaviour, credit dependency, and household welfare across different demographic groups in developing economies.

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