

Understanding the Impact of Digital Payment Adoption on E-Commerce Growth: Evidence from Indian Consumers

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Abstract—Digital payment systems in India have transformed the Indian e-commerce industry, providing Indian consumers with safe, simple and efficient options for online shopping. Digital India, UPI adoption, smartphone usage, internet access and more, have accelerated the uptake of digital payments across the country. However, few empirical studies have examined the effect of digital payment adoption on e-commerce growth by investigating the mediating factors such as consumer trust and purchase frequency. This study investigates the mediating role of consumer trust and purchase frequency in the relationship between digital payment adoption and e-commerce growth in India. It combines the Technology Acceptance Model (TAM), UTAUT2 and Trust theory to propose a theoretical framework. In line with the theory, quantitative methodology is used in the research, while the primary data are collected from 205 online buyers through a questionnaire. With the help of SmartPLS 4, the research hypotheses are assessed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Results show a positive relationship between adoption of digital payment and e-commerce growth. Results also show that adoption of digital payments has a positive impact on trust and purchase frequency of Indian consumers. The study also confirms that the frequency of purchase mediates the relationship between adoption of digital payment and growth of e-commerce while the mediation role of consumer trust is insignificant. The present research adds to the existing literature by providing an explanation to behavioural factors via which digital payment adoption promotes e-commerce growth. The findings also provide policy implications to policy makers, fintech organizations, digital payment providers, and online merchants for developing digital economy and encouraging people to shop online in India.

Keywords— Digital Payment Adoption; E-Commerce Growth; Consumer Trust; Purchase Frequency; Technology Acceptance Model (TAM); Unified Theory of Acceptance and Use of Technology 2 (UTAUT2); Trust Theory; PLS-SEM; India.

I. INTRODUCTION

The purchasing behavior of customers has been rapidly changed, thanks to the exponential rise of e-commerce and related technological improvements. Information and communication technology (ICT), rising smartphone usage, cheap internet services, and access to online digital marketplaces are some of the factors that have changed the customer shopping process to a large extent. Digital payment technologies have been a major facilitator of the rise in e-commerce because the payment technology has provided secure and easy ways to conduct digital payment in e-commerce, hence increasing the ease and timeliness of the payment process during online shopping for customers.

In the last decade, one of the biggest digital payment transitions in the world has taken place in India. Through government programs such as Digital India, Start-up India, and the growing popularity of the Unified Payments Interface (UPI) via NPCI, the country has adopted cashless payments at a rapid rate. There have been various types of payment modes such as:

- UPI
- Mobile wallet
- debit cards
- credit cards
- internet banking
- QR-based payments
- Buy Now Pay Later (BNPL)

that have contributed to reducing the usage of cash and also increased the tendency among customers to shop online, resulting in the significant growth of e-commerce in the country. The impact of the pandemic further increased the inclination of customers towards online shopping for various needs such as daily needs, healthcare, education, entertainment, banking services and digital payments emerged as the preferred choice for customers, owing to fewer physical contacts, ease of payment and ability to continue the business with lockdown conditions. Post-pandemic also there has been an increase in digital payments in India implying that it is not a temporary change in behavior but a permanent solution for digital payments in the digital economy of India.

Digital payments offer various advantages to the customers like convenience, speed, safety, transparency, cashback, and reward points, and various other payment options available online. Various aspects like efficiency, cost reduction, quick remittance, better customer management, and the ability to use collected payment data for customer personalization and retention have improved business due to digital payments. This has made digital payment adoption one of the major strategic determinants for business success and sustainable e-commerce growth. However, various barriers to digital payments continue to influence the decision of customers to adopt and use digital payments such as security issues, online frauds, privacy concerns, technical failure, availability of internet, and security concerns among others. Among all such factors, trust of customers is one of the most important factors for their decision for adopting digital payments. In like

manner, the increasing number of digital payment users have increased the probability of online shopping for customers and their frequency of online shopping and contribution to the growth of e-commerce in India.

Most of the existing literature is based on the digital payment adoption based on Theory (TAM), UTAUT and UTAUT2, DOI, Trust theory A considerable body of existing work has examined various factors, including perceived usefulness, ease of use, security, social influence, behavioral intention, and facilitating conditions in relation to digital payment. While this research has helped enhance our understanding of technology adoption, scant attention has been focused on the impact of digital payment on e-commerce growth. Moreover, there has been little empirical examination of how consumer trust and purchase frequency simultaneously mediate the relationship between digital payment adoption and e-commerce growth. Consumer trust represents the consumers' level of confidence in the security, transparency, and dependability of digital payment platforms, which encourages users to engage in online purchasing. Meanwhile, purchase frequency reflects the behavioural outcome of making electronic payments. Understanding the mediating role of these two constructs is critical in offering an in-depth explanation of the relationship between digital payments adoption and e-commerce growth.

Therefore, this study develops a theoretical model using the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and Trust Theory to explain the effect of Digital payment on the growth of e-commerce in India. The study measures the effect of the digital payment on the growth of e-commerce directly with the mediation of consumer trust and purchase frequency in the relationship.

The conceptual model was empirically validated based on the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, utilizing data from an online consumer survey in India. The study makes a novel contribution to the literature by investigating the relationship between technology adoption and e-commerce growth, and it explains the role of consumer trust and purchase frequency in digital payment adoption. This will provide additional theoretical insights into the effect of digital payment adoption on e-commerce growth, and will provide guidance to policymakers, fintech, the banking sector, digital payment providers, and e-commerce organizations in developing strategies to encourage more online transactions as they seek to expand India's digital economy.

The rest of the paper is arranged as follows. Section 2 discusses the literature related to digital payment adoption, consumer trust, purchase frequency, and e-commerce growth, Section 3 discusses the research gap, research theory, conceptual model, hypotheses, and research method, Section 4 discusses the empirical results and Section 5 discusses the conclusions, theoretical and practical implications, limitations, and directions for future work.

II. LITERATURE REVIEW

Allen et al. (2022) The study, which investigated the relationship between ICT infrastructure and digital financial inclusion in low-income countries, found that increased investment in digital networks led to a greater proportion of people with a transaction bank account, more merchants accepting digital payment instruments and better access to financial services. The authors argue that we need to scale up ICT investments for the development of the digital trade market.

Khandelwal (2024) examined the antecedents of digital payment adoption using the technology acceptance model (TAM). He found that perceived ease of use, perceived usefulness, and transaction security strongly influence the intention of the users to migrate from cash to digital payment. This suggests that the adoption of the technology is a precondition for achieving digital financial inclusion and a sound digital economy.

Tribhan (2024) studied how the Government of India is driving the adoption of cashless transactions. As per the author, the increased adoption and public confidence in digital payments stem from decades of spending in digital infrastructure and financial inclusion.

In the writer's opinion, government interventions have played an important role in boosting digital payments in cities and villages.

Sindakis and Showkat (2024) examined the role of BharatNet and Pradhan Mantri Gramin Digital Saksharta Abhiyan in digital inclusion. Their research findings reveal that improved rural connectivity and digital proficiency has led to increased access to digital financial services and that the key driver in the transition to digital financial inclusion is infrastructure development.

Patel (2025) explored how the Digital India initiative promotes the growth of digital payments. According to this study, the government intervention contributes to digital payment adoption and growth by promoting the adoption of payment solutions such as UPI, mobile wallets, and online banking with the growth in investment in digital infrastructures and expansion of financial inclusion services. He opines that the role of government should be to build an environment that is conducive for the growth of digital economy.

Kadam and Jadhav (2025) assessed how digital payments affect online e-businesses. This study finds that payments digitally allow online businesses to conduct transactions that are more transparent, less expensive and more efficient. The study argues that digital payments are essential to improve business performance.

Roopa et al. (2025) studied the development of UPI in retail payments in India. The research shows that UPI has emerged as an important part of retail payments, reducing the demand for cash payments. They found that the adoption of UPI has spurred e-commerce and has helped more consumers to participate in the digital marketplace.

Finally, Devi (2025), studied the effect of digital payments on the informal businesses, and her findings indicate that digital payments promote transparency, improve the

management of cash flows and support small businesses to go formal. This indicates that digital payments are assisting in bridging the gap between traditional e-commerce and ordinary physical retail stores.

Chavan and Jogdand (2025) analyzed the obstacles that limit small businesses from digital payment usage. The findings reveal that the major challenges affecting small business digital payment usage are security threats, high transaction fees, and lack of digital literacy among users; they also recommended that small businesses should be provided with financial support to ensure their digital payment adoption and better digital infrastructure.

Kumar (2025) studied the post-pandemic digital payment adoption among the street vendors and the micro-retailers. Research indicates that a significant number of these small businesses have since moved from cash transactions to digital ones, having become aware of the superiority of digital payment over cash in their digital experiences. It also showed that usage of digital payments by the street sellers and small retailers is no longer a transitory trend, but a permanent practice.

Prasad and M (2025) investigated the digital transformation of informal retailers. They revealed that the adoption of digital payment tools had facilitated easier accessibility for customers, better market reach, and more visibility for the informal businesses; their study showed that informal retail businesses are increasingly becoming a part of India's digital economy.

Adnan and Pathak (2025) investigated the relationship between security against cyber threats and consumer trust in digital payments. Their study revealed that the apprehensions among consumers regarding digital payments in terms of online fraud and safety of data as well as transactions still affect how they decide to opt for financial services over traditional means; they recommended strengthening security measures through robust cybersecurity frameworks to enhance consumer trust in digital payments.

Ojha et al. (2025) investigated the institutional mechanisms that could help to increase consumer confidence in digital payments. Their research found that having effective mechanisms to redress consumer grievances and having consumer protection measures in place can make people trust digital payments. Their findings indicated that consumer protection is vital in digital payments for the long-term adoption of digital financial transactions.

Dagur et al. (2025) looked at how digital payments could benefit from Artificial Intelligence (AI) and blockchain. The study showed that using AI to monitor for fraudulent transactions and using blockchain for authenticating payments can significantly improve the security of payments as well as promote transparency in the operations of digital payments; the authors showed that the advent of new technological developments could improve digital payment systems.

Niveditha and Madduri (2025) researched the role of Open Networks for Digital Commerce (ONDC) in expanding digital commerce. Their study showed how interoperability between digital platforms is crucial in promoting digital commerce in India. Their study found that ONDC has created opportunities

for micro-enterprises by improving digital infrastructure and enabling seamless connectivity thereby making markets more accessible.

Sharma and Vyas (2025) investigated the effect of technological literacy on mobile banking adoption. The study found that such initiatives may improve the capability of users to operate digital payment channels and address the gaps in financial inclusion across socio-economic segments. In addition, it showed that online literacy is important in forecasting the ongoing use of digital payment services.

Shitole (2026), for their part, focused on the relationship between acceptance of technology and digital finance, noting the higher probability of customers opting for digital payment channels where they perceived the systems to be secure, reliable and user friendly. It also increases our understanding about the impact of attitude in the continuance of digital payments.

Mittal (2026) explored the impact of a cashless economy on businesses in India. He noted that igital payments have helped businesses achieve better cash transactions, reduced the need for cash, increased the accountability of the businesses, and also showed the positive effects of digital payments in improving the efficiency of the economy.

Shenoy and Bhandarkar (2026) examined the efficacy of the Unified Payments Interface (UPI) in semi-urban areas. They found out that it allows quick, non-intrusive, and cheap payment transactions, with customers being more inclined to buy from merchants that embrace digital payments. On the other hand, the study reveals some barriers to the wider use of digital payments that still exist in the form of inadequate internet access, transaction errors, and lack of digital awareness.

Sehgal et al. (2026) studied the influence of digital payment on the development of MSMEs and the findings revealed that digital payment platforms reduce the reliance on cash-based transactions, enhance the business process of financial record keeping, and enable small businesses to reach out to a wider market across the country. The research concludes that digital financial technology enhances the ability of MSMEs to compete in the market.

Jedhe (2026) studied the role of smartphone payment applications in business success and found that digital payments facilitate inventory management, customer relationship management, and business intelligence. The research indicates that digital technologies are important tools for supporting informed decision making in small businesses.

Gupta et al. (2026) studied the effects of digital payments adoption on business success and reported that businesses adopting digital payment technology showed increased sales volume and monthly revenue. The research demonstrates the positive role of digital financial technologies in business performance and the overall sustainability of businesses.

Collectively, studies imply the positive effect of digital payment adoption on financial inclusion, business efficiency, and e-commerce. However, very few studies have examined the direct and indirect effects of digital payment adoption on e-commerce with mediating factors of consumer's trust and purchase frequency in Indian scenario. To fill this gap in

literature, the present study is attempted to examine the effects of digital payment adoption on e-commerce with mediation effect of consumer's trust and purchase frequency.

III. RESEARCH GAP

Digital payment adoption; technology acceptance and government effort for promoting digital payment has been the main theme of research in earlier studies. Previous research has been largely focused on various factors such as perceived usefulness, perceived ease of use, perceived security, trust, social influence, facilitating conditions and other factors and has studied their influence on digital payment technology's adoption intention of consumer. Researchers have also focused on different types of payment system such as UPI, mobile wallet, internet banking and card based payment system adoption and its effects on financial inclusion, business efficiency, technology acceptance. Although the extant literature of digital payment adoption is rich but has very limited evidence about the effect of digital payment adoption on growth of e-commerce.

Another observation from the literature review is that digital payment adoption has mainly been considered as a dependent variable. In other words, the researchers have largely focused on the factors that drive the digital payment adoption instead of its effects. Consequently, there are limited research that has examined the effect of digital payment adoption over continued usage on online consumer purchase behavior and its effect on e-commerce growth. As a result, the effect of digital payment adoption on e-commerce growth is not been well explored. This research gap is particularly important to examine in the context of India.

Besides, the relationship between digital payment adoption and e-commerce growth through the mediation of consumer trust is also not clear. Even though consumer trust has been considered as a factor for adoption intention of consumers in earlier studies. However, very limited research has studied consumer trust as a mediating factor for the effect of digital payment adoption on e-commerce. Similarly, purchase frequency, as one of the behavioral consequence of digital payment adoption, has not been well studied as a mediating variable for the effect of digital payment adoption on e-commerce. Previous research has little explored the link between increased usage of digital payment systems and frequency of online purchase behavior as one of its consequences in promoting the growth of e-commerce.

Another limitation of previous research is that it has mainly focused on the adoption of single digital payment method such as UPI, mobile wallet or internet banking but the research focusing on digital payment adoption as an aggregate construct encompassing all digital payment methods is less explored. As such, it is difficult to conclude from the available studies about the adoption of digital payment system as a single construct and its influence on e-commerce in India.

Finally, the review of the literature indicates that previous studies have focused largely on descriptive statistical analysis, correlation analysis and multiple regression for understanding the effect of digital payment adoption. However, for exploring multiple and complex relationships between multiple latent

variable including mediation, these methods are less effective and PLS-SEM is a more preferred technique for such type of analysis because it helps in simultaneous analysis of measurement model and structural model including mediation relationship among the variables.

While India has become one of the biggest markets for digital payments globally, there is not much empirical evidence on which TAM, UTAUT2 and Trust Theory have been integrated and used to demonstrate that the adoption of digital payment contributes to e-commerce growth. The literature does not yet provide a framework that simultaneously captures the direct impact of digital payment adoption on e-commerce growth as well as the mediating influence of consumer trust and frequency of purchases. In order to fill these research voids, the present study creates an integrated conceptual framework and tests it empirically to shed light on the effect of digital payment adoption on e-commerce growth for Indian online consumers. In doing so, the current study assesses the direct effect of digital payment adoption on e-commerce growth, together with the mediating effect of consumer trust and purchase frequency using Partial Least Squares Structural Equation Modeling (PLS-SEM). In this manner, the current study enriches literature on the digital payment adoption while giving significant theoretical and practical implications to stakeholders such as policy makers, fintech companies, digital payment service providers and e-commerce companies for the Indian market.

IV. THEORETICAL FOUNDATION

Based on the synergies between the theories of technology adoption and consumer behavior, the current study is based on three main theories: the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and Trust Theory. These theories show why the consumer will use the digital payment technologies and for how long he or she will continue to use them, and in what way these adoptions would contribute to the e-commerce growth through consumer trust and the frequency of purchase.

4.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), is one of the most popular theories that has been used to explain the user acceptance of Information Technologies. TAM suggests that the Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are the major factors that affect the user's acceptance of a technology. Perceived usefulness means how much the user feels that the technology would enhance his or her performance and perceived ease of use means how easy it is to use the technology (Davis, 1989).

So consumers will adopt digital payment options like UPI, mobile wallet, internet banking and use of debit or credit card where the digital payment technology is seen by the consumer to be easy to use, safe, reliable and convenient. This has led to the high adoption and use of digital payment technology because it has made online purchase easier, less time consuming and has increased the user's online shopping experience and ultimately, it will lead to more digital payment

adoption and hence, increase in e-commerce growth. Thus, TAM is used as the theoretical basis in the relationship between Digital Payment Adoption and E-Commerce Growth.

4.2 Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)

In addition to TAM, the current study also uses the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) introduced by Venkatesh et al. (2012). UTAUT2 builds on the prior technology adoption theories by adding more variables that impact technology use and these include performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit.

In the Indian context, these are key factors that significantly influence the uptake and sustained utilization of digital payment systems. In this context, performance expectancy measures how much users feel digital payments will help them get things done quickly and conveniently. Factors such as having a smartphone, easy internet access, and good banking infrastructure (facilitating conditions) also have an impact on the persistence of digital payment use. Digital payment tools are developed to encourage users to use them more and, ideally, to encourage them to develop a habit of using digital payment tools, thus prompting them to shop online more frequently. The UTAUT2 model therefore offers an integrated framework of the continuance usage behavior of digital payments and its effects on online transaction frequency and e-commerce consumption.

4.3 Trust Theory

Trust Theory describes the level of willingness of users to perform online financial transactions as a result of trust in the safety, dependability, and legitimacy of digital payment systems. Given that digital payment has inherent risks associated with monetary transactions, privacy and cybersecurity, it has a significant determinant in the level of people that are willing to avail the service of using digital payment. It is argued that users will be more willing to utilize or avail of digital payment systems if they believe that the transaction processes are safe, clear and can protect their personal and financial data. Moreover, apart from the intention to adopt digital payment, the theory suggests that Trust Theory also plays a role in the intention to repeat transactions, to refer the digital payment platform, and to continue patronizing e-commerce platforms.

Thus, this research conceptualizes consumer trust as a mediating variable through which digital payment adoption impacts e-commerce growth.

4.4 Integrated Theoretical Framework

This study employs a combination of the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), and Trust Theory to build a holistic theoretical framework that elucidates the association between digital payment adoption and e-commerce growth. TAM and UTAUT2 provide the technological and behavioral basis for understanding the adoption and continued use of digital payment systems, respectively, while Trust

Theory sheds light on the role of trust in payment security and reliability on consumer purchase behavior in the online space.

With the support of these complementary theoretical frameworks, this study hypothesizes that Digital Payment Adoption has a direct positive impact on E-Commerce Growth, and an indirect impact through Consumer Trust and Purchase Frequency. Consumer trust, in this context, is a mechanism that strengthens consumers' confidence to engage in online transactions, and purchase frequency is a mechanism that reinforces consumers' repeated online buying patterns as a result of digital payment adoption and leads to sustained participation in e-commerce activities. This integration of these three theoretical frameworks helps in developing a holistic conceptual framework that explains the phenomenon of digital payment adoption from technological, behavioral, and psychological perspectives. Consequently, this integrated theoretical framework provides a robust theoretical basis for investigating the direct and indirect relationships between the constructs under consideration in this study and lays the foundation for the conceptual model and research hypotheses developed in this research.

V. CONCEPTUAL FRAMEWORK

Combining the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) as well as the Trust Theory will form the conceptual basis of this study, in an effort to demonstrate how digital payments adoption impacts the growth of e-commerce in India. According to the theoretical model, digital payment adoption will have a direct effect on e-commerce growth and an indirect effect through two key mediating behavioral variables – consumer trust and purchase frequency.

Digital payment adoption is the independent variable. As consumers increasingly use digital payment methods such as unified payments interface (UPI), mobile wallet, internet banking, debit cards, and credit cards, their behavior in relation to online purchases changes fundamentally. In addition, these digital payment solutions are more convenient, faster, secure, and easier to use than previous methods, thereby reducing transaction barriers, and stimulating higher online buying behavior among consumers. Thus, higher levels of digital payment adoption are expected to have a direct positive effect on the growth of e-commerce.

The first mediating variable is consumer trust. Trust is one of the most important constructs to the study because consumers are more likely to buy products and services online if they perceive digital payments to be safe, secure, reliable and transparent. The degree of consumer trust in digital payments is believed to impact online buying behavior by affecting consumers' sense of risk and uncertainty in online purchasing decisions. When consumer trust is high, customers are more likely to buy products and services online, and are more likely to do so frequently. Hence, consumer trust is hypothesized to mediate the relationship between digital payment adoption and the growth of e-commerce in India.

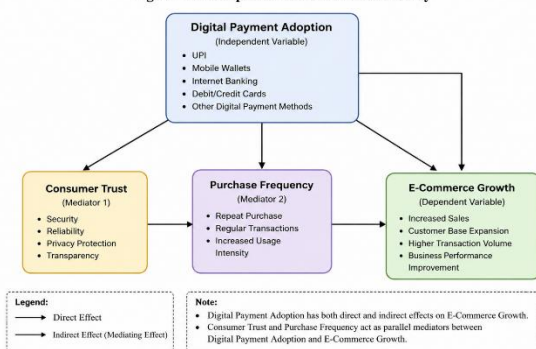
The study model has another mediator, which is purchase frequency. Digital payment enables the user to pay more easily, faster, and more efficiently which in turn facilitates

shopping online. Users of digital payment systems, as such, are more likely to shop online because they can be more confident in the use of the system. Frequent purchases result in increased sales, customer retention, and long-term business success, which in turn leads to more profitability for businesses selling online. Therefore, the frequency of purchase is considered to serve as a mediator in the influence of the adoption of digital payment on the growth of e-commerce in India.

To sum up the model, the adoption of digital payment influences the growth of e-commerce in India not only as a direct factor but also indirectly through customer trust and purchase frequency. Through the integration of the theories and their assumptions as they relate to the topic of digital payment adoption and the impact on e-commerce growth, the model presents an integrated perspective on how digital payment adoption can contribute to the long-term e-commerce evolution in India. The study model forms the basis for hypothesis formulation and empirical analysis for the study.

Proposed Conceptual Framework

Figure 1: Conceptual Framework of the Study



VI. HYPOTHESIS DEVELOPMENT

Based on the literature review, identified research gaps, and the theoretical foundations of the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), and Trust Theory, this study proposes a conceptual framework to examine the direct and indirect relationships between Digital Payment Adoption, Consumer Trust, Purchase Frequency, and E-Commerce Growth. Accordingly, the following hypotheses are developed for empirical testing:

- H1: Digital Payment Adoption has a positive and significant effect on E-Commerce Growth.
 H2: Digital Payment Adoption has a positive and significant effect on Consumer Trust.
 H3: Digital Payment Adoption has a positive and significant effect on Purchase Frequency.
 H4: Consumer Trust has a positive and significant effect on E-Commerce Growth.
 H5: Purchase Frequency has a positive and significant effect on E-Commerce Growth.
 H6: Consumer Trust mediates the relationship between Digital Payment Adoption and E-Commerce Growth.
 H7: Purchase Frequency mediates the relationship between Digital Payment Adoption and E-Commerce Growth.

VII. RESEARCH METHODOLOGY

This study adopted a quantitative, cross-sectional, and explanatory research design to examine the influence of Digital Payment Adoption on E-Commerce Growth in India. The proposed research model investigated the direct relationship between Digital Payment Adoption and E-Commerce Growth while examining the mediating roles of Consumer Trust and Purchase Frequency. Since the study aimed to empirically test the proposed hypotheses, a quantitative approach was considered appropriate because it enables the statistical examination of relationships among latent constructs using Structural Equation Modeling (SEM).

7.1 Research Design

In this study, the deductive approach of research was followed based on the theoretical frameworks of Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and Trust Theory. The primary data was collected by cross-sectional survey design from the Indian consumers who regularly used digital payment modes for their online shopping.

7.2 Population of the Study

The target population was Indian consumers aged 18 years and above and who used one or more digital payment methods such as UPI, mobile wallets, internet banking, or debit/credit cards for online purchases in the last six months. These respondents were selected based on their hands-on experience with digital payment systems and online purchasing behaviour.

7.3 Sampling Technique

A non-probability convenience sampling technique was employed due to the enormous geographical expanse and diversity of online consumers in India. The questionnaire was distributed through various digital platforms like social media, online consumer groups, email networks and Google form. Convenience sampling has been extensively used in technology adoption studies and consumer behaviour studies due to its practicality, cost-effectiveness and accessibility to digital active respondents.

7.4 Sample Size

Finally, 205 valid responses were obtained for the final analysis. Partial Least Squares Structural Equation Modelling (PLS-SEM) is applicable for studies with rather moderate sample sizes (Hair et al., 2022) as long as the minimum sample size requirements are met based on model complexity. Thus, the obtained sample was considered adequate for estimating the proposed structural model and for testing the hypothesised direct and mediating relationships.

7.5 Data Collection Method

Primary data were collected by means of a structured questionnaire distributed through Google forms. The questionnaire was composed of two parts. The first part contains demographic information of the respondents such as gender, age, educational qualification, occupation, monthly income, preferred digital payment method and online

shopping frequency. The second section contained measurement items for the study constructs; Digital Payment Adoption, Consumer Trust, Purchase Frequency and E-Commerce Growth. All measurement items were adopted from previously validated scales in the literature.

7.6 Measurement of Constructs

The study investigated four latent constructs namely, Digital Payment Adoption, Consumer Trust, Purchase Frequency and E-Commerce Growth. Measurement items for each construct were adapted from validated instruments used in prior studies. Responses were measured on a five-point Likert scale from 1 = Strongly Disagree to 5 = Strongly Agree. In Table 8.1 all constructs and their measurement items are operationalised and depicted.

7.7 Reliability and Validity

The reliability and validity of the measurement model were assessed according to the guidelines suggested by Hair et al. (2022). Cronbach's Alpha, Composite Reliability (CR) and rho_A were used to assess internal consistency reliability. Convergent validity was assessed by indicator loadings and Average Variance Extracted (AVE). An AVE value of 0.50 or greater indicates sufficient convergent validity. Furthermore, discriminant validity was examined through the Fornell–

Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio to ensure that each construct was empirically different from others. The assessment criteria confirmed the reliability and validity of the measurement model before assessing the structural relationships between the constructs.

TABLE 8.1: Measurement of Constructs

Construct	No. of Items	Sample Measurement Item	Original Scale Source
Digital Payment Adoption	5	<i>I frequently use digital payment methods for online shopping.</i>	Davis (1989); Venkatesh, Thong, & Xu (2012)
Consumer Trust	5	<i>I believe digital payment platforms are secure and reliable.</i>	Gefen, Karahanna, & Straub (2003); McKnight, Choudhury, & Kacmar (2002)
Purchase Frequency	4	<i>I frequently purchase products through online shopping platforms.</i>	Pavlou (2003); Kim, Ferrin, & Rao (2008)
E-Commerce Growth	5	<i>Digital payment methods have increased my online shopping activities.</i>	Pavlou (2003); Oliveira et al. (2016)

Note: All measurement items were adapted from previously validated scales reported in the literature. Responses were measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

TABLE 8.2: Operational Definition of Constructs

Construct	Variable Type	Operational Definition	Measurement Scale	Supporting Theory	Source
Digital Payment Adoption (DPA)	Independent Variable	Digital Payment Adoption refers to the extent to which consumers regularly use digital payment methods such as UPI, mobile wallets, internet banking, debit cards, and credit cards for conducting online transactions and purchases.	Five-point Likert Scale (1 = Strongly Disagree to 5 = Strongly Agree)	Technology Acceptance Model (TAM); UTAUT2	Davis (1989); Venkatesh et al. (2012)
Consumer Trust (CT)	Mediating Variable	Consumer Trust refers to consumers' confidence in the security, reliability, privacy, and integrity of digital payment platforms while conducting online financial transactions.	Five-point Likert Scale	Trust Theory	Gefen et al. (2003); McKnight et al. (2002)
Purchase Frequency (PF)	Mediating Variable	Purchase Frequency refers to the frequency with which consumers make online purchases using digital payment methods over a given period.	Five-point Likert Scale	Consumer Behaviour Theory	Pavlou (2003); Kim et al. (2008)
E-Commerce Growth (ECG)	Dependent Variable	E-Commerce Growth refers to the increase in consumers' online purchasing activities, transaction volume, repeat purchasing behaviour, and overall participation in electronic commerce resulting from digital payment adoption.	Five-point Likert Scale	Technology Acceptance Model (TAM); UTAUT2	Oliveira et al. (2016); Pavlou (2003)

TABLE 8.3: Data Analysis Plan

Research Objective	Hypothesis	Statistical Technique	Software
To examine the effect of Digital Payment Adoption on E-Commerce Growth.	H1	Path Coefficient Analysis (PLS-SEM)	SmartPLS 4
To examine the effect of Digital Payment Adoption on Consumer Trust.	H2	Path Coefficient Analysis (PLS-SEM)	SmartPLS 4
To examine the effect of Digital Payment Adoption on Purchase Frequency.	H3	Path Coefficient Analysis (PLS-SEM)	SmartPLS 4
To examine the effect of Consumer Trust on E-Commerce Growth.	H4	Path Coefficient Analysis (PLS-SEM)	SmartPLS 4
To examine the effect of Purchase Frequency on E-Commerce Growth.	H5	Path Coefficient Analysis (PLS-SEM)	SmartPLS 4
To examine the mediating role of Consumer Trust in the relationship between Digital Payment Adoption and E-Commerce Growth.	H6	Mediation Analysis (Bootstrapping in PLS-SEM)	SmartPLS 4
To examine the mediating role of Purchase Frequency in the relationship between Digital Payment Adoption and E-Commerce Growth.	H7	Mediation Analysis (Bootstrapping in PLS-SEM)	SmartPLS 4

7.8 Data Analysis Technique

The data were analysed using IBM SPSS Statistics and SmartPLS 4 software. Data cleaning, coding, descriptive statistics and analysis of respondent profiles were performed

using IBM SPSS Statistics. The measurement model and structural model were then tested using Partial Least Square Structural Equation Modelling (PLS-SEM) with SmartPLS 4. The measurement model was assessed based on indicator reliability, internal consistency reliability (Cronbach's Alpha, Composite Reliability, and rho_A), convergent validity (Average Variance Extracted) and discriminant validity (Fornell-Larcker criterion and HTMT ratio). The structural model was assessed via path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), bootstrapping and mediation in an effort to test the proposed hypotheses. Table 8.3: Statistical techniques employed to answer the research questions and test the study hypotheses.

VIII. DATA ANALYSIS AND RESULTS

8.1 Introduction

This chapter presents the empirical findings of the study based on the analysis of data collected from 205 respondents. The data were analysed using IBM SPSS Statistics and SmartPLS 4. IBM SPSS Statistics was employed for data screening, coding, and descriptive statistical analysis, whereas Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS 4 was employed to examine the proposed research model and test the hypotheses.

Data analysis was performed in two consecutive stages. Firstly, the measurement model was assessed to examine the measurement instrument reliability and validity through indicator reliability, internal consistency reliability, convergent validity and discriminant validity. Secondly, the structural model was assessed to test the hypothesised relationships between the constructs through path coefficients, coefficient of determination (R^2), effect size (f^2), fit of the model indices, and mediation analysis using the bootstrapping procedure.

8.2 Respondents' Profile

The demographic profile of the respondents gives the overview of the characteristics of the sample used in the study. 205 valid responses were collected and analysed. The respondents were segmented on gender, age, education, occupation, monthly income and frequency of online shopping. The demographic distribution is given in the tables below.

TABLE 8.1: Gender-wise Distribution of Respondents

Gender	Frequency	Percentage (%)
Male	67	32.7
Female	138	67.3
Total	205	100.0

Source: Primary Data.

Interpretation

Table 8.1 shows that out of the 205 respondents, 138 (67.3%) were females and 67 (32.7%) were males. The higher representation of female respondents indicates that women are significantly participating in online shopping and digital payment usage which provides valuable insights about consumer behaviour.

TABLE 8.2: Age-wise Distribution of Respondents

Age Group	Frequency	Percentage (%)
18–25 years	117	57.1
26–35 years	41	20.0
36–45 years	33	16.1
46–55 years	11	5.4
Above 55 years	3	1.5
Total	205	100.0

Source: Primary Data.

Interpretation

The majority of respondents (57.1%) were in the 18–25 years age group, followed by the 26–35 years age group (20.0%). It implies that the sample was mainly comprised of younger people who are generally more familiar with digital payment technologies and e-commerce platforms.

TABLE 8.3: Educational Qualification of Respondents

Educational Qualification	Frequency	Percentage (%)
Postgraduate	67	32.7
Graduate	66	32.2
Higher Secondary	36	17.6
Doctorate	34	16.6
Others	2	1.0
Total	205	100.0

Source: Primary Data.

Interpretation

Table 8.3 shows that most of the respondents were well educated. The largest group was the Postgraduates (32.7%) followed by the Graduates (32.2%). This demonstrates that the respondents had enough education background to understand and evaluate digital payment services and online shopping platforms.

TABLE 8.4: Occupation of Respondents

Occupation	Frequency	Percentage (%)
Student	116	56.6
Salaried Employee	56	27.3
Self-employed	15	7.3
Others	13	6.3
Business Owner	5	2.4
Total	205	100.0

Source: Primary Data.

Interpretation

More than half of the respondents were students (56.6%), followed by salaried employees (27.3%). Students' participation shows the rising use of digital payment systems by the younger and technology savvy users

TABLE 8.5: Monthly Income of Respondents

Monthly Income	Frequency	Percentage (%)
Less than ₹25,000	131	63.9
₹25,001–₹50,000	32	15.6
₹50,001–₹75,000	19	9.3
₹75,001–₹1,00,000	10	4.9
Above ₹1,00,000	13	6.3
Total	205	100.0

Source: Primary Data.

Interpretation

Majority of the respondents (63.9%) had a monthly income of less than ₹25,000 and 15.6% had an income between

₹25,001 and ₹50,000. The income distribution shows that the majority of the sample consists of low-to-middle income consumers, who form a substantial segment of India's digital payments and e-commerce market.

TABLE 8.6: Frequency of Online Shopping

Online Shopping Frequency	Frequency	Percentage (%)
Rarely	80	39.0
Monthly	50	24.4
Weekly	47	22.9
Daily	28	13.7
Total	205	100.0

Source: Primary Data.

Interpretation

Table 8.6 shows 39.0% respondents shopped online rarely. 24.4% shopped online monthly and 22.9% shopped online weekly. A smaller percentage (13.7%) said they shop online every day. The results suggest that although online shopping is widespread, the frequency of purchase differs across consumers, thus confirming the significance of examining Purchase Frequency as a mediating variable in this study.

TABLE 8.7: Outer Loadings of Measurement Items

Measurement Item	Consumer Trust	Digital Payment Adoption	E-Commerce Growth	Purchase Frequency
Digital payment availability has improved my overall online shopping experience.	–	–	0.878	–
Digital payment convenience has increased my online spending.	–	–	0.883	–
Digital payment methods are easy for me to use.	–	0.925	–	–
Digital payment methods encourage me to shop online more often.	–	–	–	0.903
Digital payment methods have increased my online shopping activities.	–	–	0.883	–
Digital payment systems are reliable for online transactions.	0.695	–	–	–
Digital payment systems have positively influenced my participation in e-commerce.	–	–	0.837	–
Digital payments encourage me to purchase from different e-commerce platforms.	–	–	0.918	–
Digital payments save my time while making online purchases.	–	0.916	–	–
I am more likely to make impulse purchases because digital payments are convenient.	–	–	–	0.812
I believe my personal and financial information is safe when I use digital payments.	0.927	–	–	–
I feel confident while making payments through digital payment platforms.	0.932	–	–	–
I frequently use digital payment methods (UPI, mobile wallets, debit/credit cards, or internet banking) for online shopping.	–	0.805	–	–
I intend to continue using digital payment methods for future online purchases.	–	0.911	–	–
I make repeat purchases from online shopping websites.	–	–	–	0.899
I prefer digital payments over cash while shopping online.	–	0.916	–	–
I purchase products online frequently.	–	–	–	0.855
I trust digital payment platforms to complete my transactions securely.	0.929	–	–	–
Overall, I trust digital payment systems for online shopping.	0.927	–	–	–
The availability of digital payments has increased my online shopping frequency.	–	–	–	0.906

Source: SmartPLS 4 Output.

Interpretation

Table 8.7 shows the standardised outer loadings of the measurement items used in the study. The results indicated that almost all indicators had outer loading values above the suggested threshold of 0.70 that shows satisfactory indicator reliability. An indicator under Consumer Trust construct was slightly below the recommended threshold, with an outer loading of 0.695. However, its loading was very close to 0.70, and the construct showed satisfactory Cronbach's Alpha

8.3 Measurement Model Assessment

Before testing the structural relationships between the latent constructs, reliability and validity of the measurement model were established. The measurement model was tested on indicator reliability, internal consistency reliability, convergent validity and discriminant validity as per Hair et al. (2022). The establishment of these measurement properties ensures that the observed indicators are adequate representations of their respective latent constructs and the results of the structural model are statistically reliable.

8.3.1 Indicator Reliability

Indicator reliability was assessed by examining the standardized outer loadings of the measurement items. According to Hair et al. (2022), outer loading values of 0.70 or above indicate that an indicator adequately represents its corresponding latent construct. However, indicators with loadings between 0.40 and 0.70 may also be retained if the construct demonstrates satisfactory internal consistency reliability and convergent validity.

(0.930), Composite Reliability (0.948), and Average Variance Extracted (0.787), so the indicator was kept for further analysis in accordance with the recommendations of Hair et al. (2022).

Overall, the outer loading values indicate that the measurement items are sufficient representative of their respective latent constructs and therefore provide acceptable evidence of indicator reliability.

8.3.2 Internal Consistency Reliability and Convergent Validity

Internal consistency reliability was assessed using Cronbach's Alpha, Composite Reliability (CR) and rho_A, and convergent validity was assessed using Average Variance Extracted (AVE). Cronbach's Alpha, Composite Reliability and rho_A values should be greater than 0.70, and AVE should be greater than 0.50 (Hair et al., 2022).

TABLE 9.8 Construct Reliability and Convergent Validity

Construct	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Consumer Trust	0.930	0.948	0.948	0.787
Digital Payment Adoption	0.938	0.940	0.953	0.803
E-Commerce Growth	0.927	0.929	0.945	0.775
Purchase Frequency	0.923	0.924	0.943	0.767

Source: SmartPLS 4 Output.

Interpretation

Table 8.8 presents the evaluation of the internal consistency reliability and convergent validity. Cronbach's Alpha values ranged from 0.923 to 0.938 suggesting excellent internal consistency reliability of all constructs. Similarly, the rho_A ranged from 0.924 to 0.948 and the Composite Reliability ranged from 0.943 to 0.953, all above the recommended threshold of 0.70.

Furthermore, the Average Variance Extracted (AVE) values ranged from 0.767 to 0.803, which were significantly higher than the minimum recommended value of 0.50. These results confirm that each construct explained more than half of the variance of its indicators, thus confirming satisfactory convergent validity.

The results show that the measurement model has good internal consistency reliability, adequate convergent validity, and supports its suitability for further assessment of discriminant validity and structural relationships.

8.3.3 Discriminant Validity

Discriminant validity was assessed to determine whether each construct was empirically distinct from the other constructs included in the research model. Following the recommendations of Hair et al. (2022), discriminant validity was evaluated using the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio. These two complementary approaches provide robust evidence regarding the uniqueness of the latent constructs.

8.3.3.1 Fornell–Larcker Criterion

The Fornell–Larcker criterion compares the square root of the Average Variance Extracted (AVE) of each construct with the correlations between that construct and all other constructs. Discriminant validity is established when the square root of the AVE of each construct is greater than its correlations with other constructs (Hair et al., 2022).

Interpretation

Table 8.9 presents the results of the Fornell–Larcker criterion. The diagonal elements (shown in bold) represent the square root of the Average Variance Extracted (AVE), whereas the off-diagonal values indicate the correlations among the latent constructs. The square root of the AVE for Consumer Trust (0.887), Digital Payment Adoption (0.896),

E-Commerce Growth (0.880), and Purchase Frequency (0.876) exceeded their corresponding inter-construct correlations. These findings satisfy the Fornell–Larcker criterion and confirm that each construct is empirically distinct from the others. Therefore, satisfactory discriminant validity was established.

TABLE 8.9: Fornell–Larcker Criterion

Construct	Consumer Trust	Digital Payment Adoption	E-Commerce Growth	Purchase Frequency
Consumer Trust	0.887			
Digital Payment Adoption	0.866	0.896		
E-Commerce Growth	0.625	0.702	0.880	
Purchase Frequency	0.622	0.668	0.871	0.876

Source: SmartPLS 4 Output.

8.3.3.2 Heterotrait–Monotrait (HTMT) Ratio

To further assess discriminant validity, the Heterotrait–Monotrait (HTMT) ratio was examined. Hair et al. (2022) recommend that HTMT values should generally remain below 0.90 to establish adequate discriminant validity.

TABLE 8.10: Heterotrait–Monotrait (HTMT) Ratio

Construct	Consumer Trust	Digital Payment Adoption	E-Commerce Growth	Purchase Frequency
Consumer Trust	—			
Digital Payment Adoption	0.919	—		
E-Commerce Growth	0.665	0.755	—	
Purchase Frequency	0.658	0.720	0.940	—

Source: SmartPLS 4 Output.

Interpretation

Table 8.10 HTMT Ratios among the Constructs of the Study HTMT values for most construct pairs were below the recommended threshold of 0.90, indicating adequate discriminant validity. However, the HTMT values for Consumer Trust and Digital Payment Adoption (0.919) and E-Commerce Growth and Purchase Frequency (0.940) were slightly above the recommended threshold.

However, these values suggest relatively strong associations between the respective constructs, and the Fornell–Larcker criterion confirmed satisfactory discriminant validity for all constructs. Further, the constructs are conceptually distinct dimensions based on well-established theoretical frameworks and were thus retained for further structural model analysis.

8.3.4 Summary of Measurement Model Assessment

The measurement model was evaluated in a holistic way by indicator reliability, internal consistency reliability,

convergent validity and discriminant validity. The results revealed that all the measurement indicators had satisfactory outer loadings, and the Cronbach's Alpha, Composite Reliability, and rho_A were above the recommended threshold of 0.70, which confirmed the excellent internal consistency reliability. Further, all AVE values were higher than 0.50 thus confirming convergent validity.

The discriminant validity was tested by Fornell–Larcker criterion and HTMT ratio. The Fornell–Larcker criterion indicated that each construct shared more variance with its own indicators than with other constructs. Although the two HTMT values were a little higher than the suggested threshold, the measurement model, as a whole, showed acceptable discriminant validity when taking into account the Fornell-Larcker results and the theoretical distinctiveness of the constructs. Thus, the measurement model was found to be reliable and valid for evaluating the structural relationships between the study constructs.

8.4 Structural Model Assessment

Once the measurement model was deemed adequate, the structural model was then evaluated to test the hypothesised relationships among the latent constructs. The structural model was assessed according to the recommendations of Hair et al. (2022) and included the assessment of collinearity, coefficient of determination (R^2), effect size (f^2) and fit of the model. These criteria provide evidence for the predictive validity and explanatory power of the proposed research model.

8.4.1 Collinearity Assessment

Before investigating the structural relationships, multicollinearity among the predictor constructs was tested using the Variance Inflation Factor (VIF). Hair et al. (2022) states that multicollinearity is not a problem for the structural model estimation when the VIF value is less than 5.00.

TABLE 8.11: Collinearity Statistics (Inner VIF Values)

Structural Relationship	VIF
Digital Payment Adoption → Consumer Trust	1.000
Digital Payment Adoption → Purchase Frequency	1.000
Digital Payment Adoption → E-Commerce Growth	4.485
Consumer Trust → E-Commerce Growth	4.043
Purchase Frequency → E-Commerce Growth	1.832

Source: SmartPLS 4 Output.

Interpretation

Table 8.11 presents the collinearity statistics for the structural model. The VIF values ranged from 1.000 to 4.485, all of which were below the recommended threshold of 5.00. These findings indicate that multicollinearity was not present among the predictor constructs. Therefore, the structural relationships could be estimated without any concern regarding collinearity.

8.4.2 Coefficient of Determination (R^2)

The coefficient of determination (R^2) was used to evaluate the predictive accuracy and explanatory power of the endogenous constructs. According to Hair et al. (2022), R^2 values of 0.75, 0.50, and 0.25 represent substantial, moderate, and weak explanatory power, respectively.

TABLE 8.12: Coefficient of Determination (R^2)

Endogenous Construct	R^2	Adjusted R^2	Interpretation
Consumer Trust	0.749	0.748	Substantial
Purchase Frequency	0.447	0.444	Moderate
E-Commerce Growth	0.786	0.782	Substantial

Source: SmartPLS 4 Output.

Interpretation

Table 8.12 shows the explanatory power of the structural model. The results indicate that Digital Payment Adoption explained 74.9% of the variance in Consumer Trust, demonstrating substantial explanatory power. Likewise, 44.7% of the variance in Purchase Frequency was explained by Digital Payment Adoption, representing moderate explanatory power. Furthermore, Digital Payment Adoption, Consumer Trust, and Purchase Frequency jointly explained 78.6% of the variance in E-Commerce Growth, indicating that the proposed model possesses strong predictive capability.

8.4.3 Effect Size (f^2)

The effect size (f^2) was examined to determine the contribution of each exogenous construct to the endogenous constructs. Hair et al. (2022) recommended that 0.02, 0.15, and 0.35 represent small, medium, and large effect sizes, respectively.

TABLE 8.13: Effect Size (f^2)

Structural Relationship	f^2	Interpretation
Digital Payment Adoption → Consumer Trust	2.989	Very Large
Digital Payment Adoption → Purchase Frequency	0.808	Large
Digital Payment Adoption → E-Commerce Growth	0.070	Small
Consumer Trust → E-Commerce Growth	0.004	Negligible
Purchase Frequency → E-Commerce Growth	1.363	Very Large

Source: SmartPLS 4 Output.

Interpretation

The results indicate that Digital Payment Adoption exerted a very large effect on Consumer Trust ($f^2 = 2.989$) and a large effect on Purchase Frequency ($f^2 = 0.808$). Similarly, Purchase Frequency demonstrated a very large effect on E-Commerce Growth ($f^2 = 1.363$). Conversely, the direct effect of Digital Payment Adoption on E-Commerce Growth was relatively small ($f^2 = 0.070$), while Consumer Trust exhibited a negligible effect ($f^2 = 0.004$), indicating a minimal contribution to explaining variations in E-Commerce Growth.

8.4.4 Model Fit Assessment

The overall fit of the structural model was evaluated using the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI). According to Hair et al. (2022), an SRMR value below 0.08 indicates an acceptable model fit.

TABLE 8.14: Model Fit Indices

Model Fit Index	Estimated Model	Recommended Value	Assessment
SRMR	0.064	< 0.08	Good Fit
NFI	0.881	≥ 0.80	Acceptable Fit

Source: SmartPLS 4 Output.

Interpretation

The model fit indices indicate that the proposed structural model adequately represents the observed data. The SRMR value of 0.064 is below the recommended threshold of 0.08, indicating a good model fit. Likewise, the NFI value of 0.881 exceeds the acceptable threshold of 0.80, suggesting that the

proposed model provides a satisfactory representation of the observed covariance structure. Overall, the model fit indices confirm that the structural model is appropriate for hypothesis testing.

8.4.5 Summary of Structural Model Assessment

The structural model assessment confirmed that the proposed research model possesses satisfactory predictive and explanatory capability. The absence of multicollinearity was verified through acceptable VIF values, while the R^2 values demonstrated moderate to substantial explanatory power for the endogenous constructs. The effect size analysis revealed that Digital Payment Adoption exerted a substantial influence on Consumer Trust and Purchase Frequency, whereas Purchase Frequency showed a strong contribution towards explaining E-Commerce Growth. Furthermore, the model fit indices (SRMR = 0.064 and NFI = 0.881) indicated that the proposed structural model adequately fits the observed data and is suitable for hypothesis testing.

8.5 Hypothesis Testing

The proposed hypotheses were tested using the bootstrapping procedure with 5,000 bootstrap resamples in SmartPLS 4. The significance of each hypothesized relationship was evaluated using the standardized path coefficient (β), t-statistic, and p-value. Following the recommendations of Hair et al. (2022), a hypothesis was considered statistically supported when the p-value was less than 0.05 and the t-statistic exceeded 1.96.

TABLE 8.15: Hypothesis Testing Results

Hypothesis	Structural Relationship	β	t-value	p-value	Decision
H1	Digital Payment Adoption $\rightarrow$ E-Commerce Growth	0.260	3.129	0.002	Supported
H2	Digital Payment Adoption $\rightarrow$ Consumer Trust	0.866	37.095	0.000	Supported
H3	Digital Payment Adoption $\rightarrow$ Purchase Frequency	0.668	12.868	0.000	Supported
H4	Consumer Trust $\rightarrow$ E-Commerce Growth	-0.055	0.666	0.505	Not Supported
H5	Purchase Frequency $\rightarrow$ E-Commerce Growth	0.732	14.707	0.000	Supported

Source: SmartPLS 4 Bootstrapping Output.

Interpretation

The bootstrapping results indicate that Digital Payment Adoption has a statistically significant positive effect on Consumer Trust ($\beta = 0.866$, $t = 37.095$, $p < 0.001$), thereby supporting H2. Similarly, Digital Payment Adoption significantly influences Purchase Frequency ($\beta = 0.668$, $t = 12.868$, $p < 0.001$), confirming H3.

The direct relationship between Digital Payment Adoption and E-Commerce Growth was also positive and statistically significant ($\beta = 0.260$, $t = 3.129$, $p = 0.002$), providing support for H1.

Furthermore, Purchase Frequency exhibited a strong positive effect on E-Commerce Growth ($\beta = 0.732$, $t = 14.707$, $p < 0.001$), supporting H5. However, the relationship between

Consumer Trust and E-Commerce Growth was not statistically significant ($\beta = -0.055$, $t = 0.666$, $p = 0.505$). Therefore, H4 was not supported.

Overall, four out of the five direct hypotheses were supported, while one hypothesis (H4) was rejected.

8.6 Mediation Analysis

The mediating effects of Consumer Trust and Purchase Frequency on the relationship between Digital Payment Adoption and E-Commerce Growth were examined using the bootstrapping procedure. The significance of each indirect effect was determined based on the standardized indirect effect (β), t-statistic, and p-value.

TABLE 8.16: Mediation Analysis Results

Hypothesis	Indirect Relationship	β	t-value	p-value	Decision
H6	Digital Payment Adoption $\rightarrow$ Consumer Trust $\rightarrow$ E-Commerce Growth	-0.048	0.668	0.504	Not Supported
H7	Digital Payment Adoption $\rightarrow$ Purchase Frequency $\rightarrow$ E-Commerce Growth	0.489	10.243	0.000	Supported

Source: SmartPLS 4 Bootstrapping Output.

Interpretation

The mediation analysis revealed that Consumer Trust did not significantly mediate the relationship between Digital Payment Adoption and E-Commerce Growth ($\beta = -0.048$, $t = 0.668$, $p = 0.504$). Consequently, H6 was not supported.

In contrast, Purchase Frequency significantly mediated the relationship between Digital Payment Adoption and E-Commerce Growth ($\beta = 0.489$, $t = 10.243$, $p < 0.001$). This finding suggests that greater adoption of digital payment methods encourages more frequent online purchasing behaviour, which subsequently contributes to the growth of e-commerce. Therefore, H7 was supported.

The findings indicate that Purchase Frequency serves as an important mechanism through which digital payment adoption enhances e-commerce growth, whereas Consumer Trust does not play a statistically significant mediating role in the proposed research model.

8.7 Summary of Findings

TABLE 8.17: Summary of Hypothesis Testing

Hypothesis	Statement	Decision
H1	Digital Payment Adoption positively influences E-Commerce Growth.	Supported
H2	Digital Payment Adoption positively influences Consumer Trust.	Supported
H3	Digital Payment Adoption positively influences Purchase Frequency.	Supported
H4	Consumer Trust positively influences E-Commerce Growth.	Not Supported
H5	Purchase Frequency positively influences E-Commerce Growth.	Supported
H6	Consumer Trust mediates the relationship between Digital Payment Adoption and E-Commerce Growth.	Not Supported
H7	Purchase Frequency mediates the relationship between Digital Payment Adoption and E-Commerce Growth.	Supported

Source: Developed by the Researcher based on SmartPLS 4 Output.

IX. DISCUSSION

9.1 Overview

This section evaluates the study's outcomes relative to the stated objectives, hypotheses, and the chosen theory. It involves comparisons of the results of this study with the previous empirical literature. Most significantly, this chapter deals with the interpretation of the significant and insignificant paths in the PLS-SEM and what that means relative to the topic of the research which is the acceptance of digital payments and the development of the e-commerce industry.

9.2 Discussion of Findings

H1: Digital Payment Adoption → E-Commerce Growth (Supported)

There is a significant and positive impact of Digital Payment Adoption on E-Commerce Growth ($\beta = 0.260$, $p = 0.002$). In simpler terms, the rise in digital payments increases the number of online purchases, thus growing e-commerce. This finding confirms earlier studies which showed that accessible, convenient, and secure payment systems enhance consumers' willingness to shop online, resulting in more rapid e-commerce growth. The study results concur with the Technology Acceptance Model (TAM) which states that technology that is easy to use and is perceived to be useful is adopted more by users. It also supports the UTAUT2 argument, which states that when people use digital payment technologies frequently, they are more likely to develop positive buying behavior which would help e-commerce develop.

H2: Digital Payment Adoption → Consumer Trust (Supported)

There was a strong positive relationship between Digital Payment Adoption and Consumer Trust ($\beta = 0.866$, $p < 0.001$). Therefore, it is inferred that if the digital payments system is reliable, consumers trust the online payment systems more. This could be because the consumers feel safe if there is a fast processing of transactions and the transaction history is transparent; this increases the level of trust among consumers. This finding supports earlier studies that show that successful and functioning payment technologies generate trust among customers. This aligns with the Trust Theory's argument that consumers would be willing to participate in e-commerce if they had the necessary trust with the system. It also supports the TAM argument that customers perceive technology to be useful, reliable, and easy to use, and would therefore find that such a perception increases the trust and confidence of the customer in the system.

H3: Digital Payment Adoption → Purchase Frequency (Supported)

From the research, there was a significant positive relationship between Digital Payment Adoption and Purchase Frequency ($\beta = 0.668$, $p < 0.001$). Digital payments lead to consumers making more frequent purchases because it is easier and more convenient to make the payments. This finding is in agreement with earlier empirical studies that showed consumers are more likely to buy more if they do not experience any difficulties making the payments.

H4: Consumer Trust → E-Commerce Growth (Not Supported)

Contrary to expectations, the study findings show there was no statistically significant influence of Consumer Trust on E-Commerce Growth ($\beta = -0.055$, $p = 0.505$). The reason for this may be that over the years, digital payment systems have become very familiar to consumers. Consumers now make the decision to buy online based on other factors such as convenience, cost of delivery, delivery time, discounts, and promotions instead of trusting the system. Although the role of trust as an influential factor in e-commerce growth might not be as strong as it used to be, it is likely that trust will still be an important consideration in certain areas.

H5: Purchase Frequency → E-Commerce Growth (Supported)

There is a significant positive relationship between Purchase Frequency and E-Commerce Growth ($\beta = 0.732$, $p < 0.001$), suggesting that a greater volume of online purchasing has a higher rate of transaction activity and, consequently, business success. The finding indicates that a key strategy to promote e-commerce growth is to enhance purchase frequency behavior and is also supported by previous research on customer behavior and e-commerce.

H6: Mediating Role of Consumer Trust (Not Supported)

The mediating influence of Consumer Trust in the relationship between Digital Payment Adoption and E-Commerce Growth was not statistically significant ($\beta = -0.048$, $p = 0.504$), which suggests that although Digital Payment Adoption has a positive impact on Consumer Trust, that trust may not be enough to influence technological adoption on e-commerce growth, which implies that other factors of consumer behavior may be more influential.

H7: Mediating Role of Purchase Frequency (Supported) The mediation of Purchase Frequency between Digital Payment Adoption and E-Commerce Growth was significant ($\beta = 0.489$, $p < 0.001$), suggesting that greater adoption of digital payments can influence online purchasing frequency behavior, which, in turn, can promote e-commerce growth. Thus, it reveals that behavioral factors, rather than perceptual factors, are a more direct pathway through which digital payment adoption leads to business success.

X. CONCLUSION AND IMPLICATIONS

10.1 Conclusion

This research investigated the influence of Digital Payment Adoption on E-Commerce Growth, with the mediating variables of Consumer Trust and Purchase Frequency. Using a dataset of 205 respondents, the study used Partial Least Squares Structural Equation Modelling (PLS-SEM) to generate statistical data and analyze the interaction between these specific constructs. The findings showed that Digital Payment Adoption influenced the level of Consumer Trust and Purchase Frequency, which positively affect E-Commerce Growth. The analysis also showed that Purchase Frequency has a positive effect on E-Commerce Growth and plays a significant mediating role between Digital Payment Adoption and E-Commerce Growth. However, while Digital Payment Adoption increased Consumer Trust, the level of Trust did not influence E-Commerce Growth significantly, nor did it play a mediating role between Digital Payment Adoption and E-Commerce Growth. Overall, the study demonstrates that

technology adoption does not explain e-commerce growth. The findings suggest that the most prominent avenue through which digital payment systems positively influence the growth of e-commerce is by increasing purchase frequency behavior.

10.2 Theoretical Implications

This research contributes to the literature in three ways. First, it extends the Technology Acceptance Model (TAM) to show that if people view a technology as useful and easy to use, they will have a higher likelihood of adopting digital payment systems, which in turn influences e-commerce growth. Second, the results offer support for the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) by showing that adoption of digital payment systems encourages continued online purchasing behavior. This, in turn, is a key factor in e-commerce growth. Third, this research also supports Trust Theory, noting that while digital payment adoption positively impacts the consumer trust level, purchase frequency is a better behavioral measure that explains the relationship between Digital Payment Adoption and E-Commerce Growth. All of these outcomes help build a richer literature with findings demonstrating the direct and indirect relationship between the adoption of digital payments and e-commerce growth in the Indian context.

10.3 Practical Implications

The findings of this study have certain practical implications.

- E-commerce firms need to invest in the creation and management of secure and hassle-free digital payment channels in order to stimulate repeat purchasing.
- Commercial bankers and other payment system providers are constantly trying to improve digital payments in order to make the payment process easier, faster, and more secure for users.
- Business owners and managers need to devise schemes of payment rewards and customer loyalty programs to encourage customers to keep buying online.
- Developers of digital systems should place greater focus on providing good service in order to satisfy customers, since this would encourage customers to buy again, which in turn helps the growth of e-commerce.

10.4 Policy Implications

The results of the study also have significant policy implications.

The government and the regulatory authorities need to keep improving the digital payment environment in the country through the improvement of security and digital infrastructure, through the promotion of financial inclusion and through the promotion of financial literacy. The Reserve Bank of India (RBI), and the National Payments Corporation of India (NPCI) can promote the adoption of digital payment systems by ensuring that the security and privacy of customers are guaranteed, by educating the public on the advantages of electronic payments and by expanding the availability of

electronic payment systems in the semi-urban and rural areas. Such efforts would be important to the future development and sustainability of the Indian digital economy.

10.5 Limitations of the Study

Nevertheless, the present study has a few limitations.

- The study was cross-sectional in design, and therefore could not examine changes in consumer behavior through time.
- The sample used in the study was small (205 respondents) and thus the results from this study cannot be generalized.
- The data used for the study was based on self-reported questionnaires.
- The proposed model was a limited model, as it included only two mediating variables and did not examine any moderating variables.

10.6 Future Research Directions

Subsequent research may build on these findings.

- Future research could be designed as a longitudinal study to examine how consumers' use of digital payments and their consumption behaviors evolve.
- Studies of digital payments can also use other variables, such as perceived security, customer satisfaction, service quality, technology readiness and the perceived value.
- These future investigations can also explore how new innovations like Central Bank Digital Currency (CBDC), Buy Now Pay Later (BNPL) and AI-based payment services impact these outcomes.
- The present research study needs to be replicated in other geographic regions and in other industries to further validate the applicability of the current results.
- Multi-group analysis could be used to understand the influence of different demographic and socio-economic characteristics on consumer adoption of digital payments.

10.7 Concluding Remarks

Digital payment technology has emerged as a critical component of today's digital economy in today's modern digital era. Based on this study, the widespread acceptance of digital payments is a critical driver of the e-commerce sector. This is made possible mostly by encouraging consumers to conduct more online transactions. Even though consumer trust is a vital outcome of the acceptance of digital payments, the most important factor is the purchase frequency. This study produces empirical findings which can be utilized by researchers, practitioners, companies and the policymakers to understand how an effective digital payment environment can help propel the expansion of the e-commerce industry in India.

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