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Research Article

Predictors for the adoption of digital payment modes in Administrative Divisions of Haryana State

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Abstract: ***Purpose***: This study aims to identify the key predictors influencing the adoption of digital payment modes across the administrative divisions of Haryana State. It focuses on examining the effects of self-efficacy, facilitating conditions, peer influence, and external influence on digital payment adoption. ***Design***: Primary data were collected from 806 respondents using a structured questionnaire administered across various administrative divisions of Haryana. The proposed research model was tested using Partial Least Squares–Structural Equation Modeling (PLS-SEM), which is appropriate for predictive analysis and complex relationships among latent constructs. Reliability and validity of the measurement model were established prior to hypothesis testing. ***Findings:*** The results reveal that all independent variables—self-efficacy, facilitating conditions, peer influence, and external influence—have a positive and significant impact on the adoption of digital payment modes. Self-efficacy and facilitating conditions play a crucial role in enhancing users' confidence and access to digital payment infrastructure, while peer and external influences highlight the importance of social and institutional factors. The findings provide valuable insights for policymakers and service providers to design targeted strategies for promoting digital payment adoption across Haryana State.

Keywords: Digital Payment Adoption, Self-Efficacy, Facilitating Conditions, Social Influence, PLS-SEM.

INTRODUCTION

Knowing The Concept of Digital Payment Systems

The internet boom along with mobile technology and smartphones have contributed massively to propelling electronic payment adoption. Digital payments continue as an interface between e-commerce, mobile commerce (m-commerce), and digital banking ecosystems. As per Kalakota and Whinston (1997), E-payment systems are the backbone of e-commerce since they enable financial transactions to take place without hindrance between sellers and buyers in the virtual environment. Hence, digital payment systems have bridged some of the online purchases to include utility bill payments, transport, healthcare, school fees, P2P money transfer, and shopping retailing.

Digital payments create an electronic transaction record, thus increasing transparency and accountability on the part of financial institutions and policymakers. The data-driven nature of these systems, however, raises issues regarding privacy, security, and the potential misuse of personal information. Therefore, digital payments should not be viewed merely as a technological innovation but as systems whose acceptance is heavily impacted by users' attitudes, perceptions, and confidence.

In recent years, digital payment systems have evolved toward real-time, interoperable, and user-centric platforms. The shift from card-based systems to account-to-account transfer mechanisms has reduced transaction costs and enhanced scalability. This evolution reflects broader institutional and technological changes in the financial sector, where fintech firms, non-bank payment service providers, and platform-based ecosystems play an increasingly important role alongside traditional banks.

There are emerging economies that have adopted digital payments, albeit at varying speeds. Countries such as China and India have shown remarkable growth in the adoption of digital payments, driven by largely populated areas, fast-settling smartphone penetration, and a supportive government. The adoption of mobile payment platforms such as Alipay and WeChat Pay in China has turned consumer payment behavior into a mild hub through which payment seamlessly integrates into social and commercial activity (World Bank, 2018).

A significant contributor leading to the widespread acceptance of digital payments in India was the demonetization initiative announced in November 2016, which temporarily withdrew high-denomination currency notes from circulation. The policy shock triggered consumers and businesses alike to search for other forms of payment, leading to an explosion of digital transactions (Sivathanu, 2018). If the cash was slowly returning to its glory, the change in behavior for digital payment applications was solidified through innovated infrastructures and awareness.

From the reports by the RBI and NPCI, UPI has gained the highest popularity in India and registers billions of

transactions every month. A notable contribution towards digital payment growth has also been made by mobile wallets, debit and credit cards, internet banking, and Aadhaar-based payment systems. Research firms such as Worldpay and FIS stated that digital wallets hold a major share portion of e-commerce payments in India, showcasing how consumer behavior is shifting towards cashless payments.

Contribution in the field of Digital Payment Systems

O'Cass and Lim (2001) examined the role of brand associations on brand preference and purchase intention in an Asian consumer environment. The study shows that brand associations including symbolic meaning, functional benefits, and emotional value play an important role in influencing consumers' preferences. The findings suggest that favorable brand associations positively affect brand preference, which in turn affects purchase intention. They assert that cultural context acts as the moderator for the strength and type of associations valued by consumers, with Asian markets placing greater emphasis on social symbolism and status. The findings shall be relevant for multinational firms working to adapt branding strategies across different markets, thereby strengthening the strategic bearing of managing their brand associations toward improved consumer decision-making outcomes.

Mantel (2001) discussed factors keeping consumers back from adoption, including perceived risks, trust issues, and usability concerns toward acceptance of electronic and online payment systems. This empirical study uses a survey to arrive at the conclusion that when consumers view a digital payment system as secure, usable with broad acceptance, they are more likely to adopt it. The arguments developed in the study prove that trust becomes the mediating mechanism between system characteristics and adoption intention. The findings discussed herein formulate an extension of trust and technology acceptance models to the more expansive literature of consumer resistance and readiness towards adopting digital payments.

Tan & Piron (2002) studied the perception of internet advertising from the viewpoints of advertisers and advertising agencies. This research, therefore, notes that there was considerable disparity in the manner the two groups assess online advertising's performance and functions. Whereas the accountants focus on accountability, measurable outcomes, and return of investment, the agencies focus on creativity, innovation, and audience engagement. Thus, these findings can explain the aggravation caused by the standardization, as well as credibility and evaluation metrics for internet advertising. This research also contributes to the advertising and digital marketing literature by illuminating the current situation regarding managerial decision making as well as the evolving dynamics among advertisers and agencies within the realm of digital advertisement.

Eastin (2002) investigated into determining factors of constructs affecting consumer perceptions in adopting applications of electronic commerce, which includes electronic payment mechanisms. This study concluded with the results claiming that it significantly affects the intention of consumers towards engaging in online transactions with the presence of testing constructs of perceived usefulness, perceived ease of use, and perceived security. From the findings, it becomes clearer that consumers would prefer the adoption of digital payments wherever necessary in case they are convinced in regards to their advantages, ease of use as well as security.

Pavlou (2003) integrated trust and risk with the Technology Acceptance Model (TAM) to identify the factors that affect consumer acceptance of electronic commerce. The information was derived from online consumers, resulting in establishing perceived usefulness and perceived ease of use having significant influence on consumer intention to transact online. The study established that trust positively affects consumer acceptance while perceived risk negatively affects transaction intentions. The findings highlighted that in technology-driven and uncertain environments such as electronic payments, consumer acceptance cannot be explained solely by technological factors, and trust and risk perceptions play a crucial role in shaping attitudes and intentions toward electronic transactions.

Gefen (2003) extended the technology acceptance model towards explaining online shopping behavior with the formal integration of trust. The study suggested that in the online shopping environment, technological acceptance gains—perceived usefulness and perceived ease of use—are rather inadequate without some level of uncertainty and nonphysical interaction exist. The investigation, utilizing empirical evidence from experienced online buyers, inferred that trust affects significantly users' intention to complete transactions online and complements the traditional TAM work. This, somehow, opposes the perception of risk and increases the credibility of web merchants for the consumer. The contribution of this paper was to place trust as an essential belief core rather than just a marginal aspect in the adoption of e-commerce. Many implications in electronic payment systems come from this as the process of payment adoption also hinges on privacy, security, and financial loss-related perceptions of risk. Through its work, the study was comprehensive towards various possible research directions that may be taken because of the present study.

Gefen & Straub (2004) examined consumer trust in business-to-consumer e-commerce, notably in web social presence. The study argued that social cues incorporated in the online interfaces such as the humanistic quality of interaction elements augment trust by making digital environments seem more personal and reliable. Via an experiment and survey-based approaches, the authors could demonstrate that social presence positively affects trust, and in return, impact's purchase intention, a significant finding to this research. The result was also important because trust formation does not depend only on technical safeguards but on the most subtle issues related to the front end of the design and perception of human warmth. For instance, the trust of consumers toward possible payment solutions might evolve due to the level of design

attractiveness and communication strategy specification. By adding social interaction to trust formation, this research also adds perspectives to the broader trust literature that could be defined a bit better by exploring the psychological and social factors related to the outcome of technology adoption.

Akinci et al. (2004) examined the differences in account holders as far as Internet banking services are concerned, together with those who did not had account holdings in terms of Internet banking services. The data that was studied was taken from academic professionals in Turkey, and the findings demonstrated that factors causing adoption of internet banking included attitude toward technology, convenience, perceived benefits, and previous experience with digital platforms consumers. The conclusion stated that although the technological infrastructure was prerequisite, consumer attitudes and behavioral readiness had an impact on their decision in acceptance of internet-based banking and payment services.

Chang et al. (2005) empirically examined quality and related factors affecting the acceptance of Internet tax-filing by taxpayers. Drawing upon prior application success studies, the study defines quality by system quality, information quality, and service, then considers the effects on trust and usage intention. In this study, data from user surveys to online tax services demonstrate that the higher the perceived quality, the higher was government-operated electronic system trust. Trust becomes a mediating variable between the quality perception and user acceptance. Firm efforts to build trust in the system cannot be traded off for trust in a situation where the system quality expected was visible in terms of aspects such as clarity and ease to refer to. The results of this research suggest that trust and assurance of service responsibility are paramount in attracting online payment adoption. The data provide a foundational justification for proposing that trust plays a significant role in the acceptance of e-payment, particularly in the public-sector context.

Scharl et al. (2005) examined the spread and success factors of mobile marketing. The study identified personalization, message relevance, timing, and consumer permission as key determinants for the effectiveness of mobile marketing. According to the authors, intrusive or poorly targeted messages create negative consumer attitudes, while messages that are relevant and timely will surely evoke the consumers' commitment. The research emphasizes the consumer's ability to trust the privacy and the value perceived in the mobile marketing process. The study thus provides a contribution to mobile marketing literature by providing empirical insights into factors affecting acceptance by consumers and success of mobile marketing campaigns.

Hung et al. (2006) analyzed the factors that determined user acceptance of e-government services, in particular the online tax filing systems. The study extended the traditional technology acceptance perspectives by including trust and perceived risk as central explanatory variables. By empirical survey data, the authors were able to show that citizens' willingness to adopt online services was mainly influenced by their trust in government institutions and confidence in system reliability.

Hwang and Kim (2007) explored the customer's self-service systems-how perceived web quality affect the trust, emotional responses, and usage intention. The essence of web quality was conceptualized in dimensions, including information accuracy, system functionality, and responsiveness of service. The actual findings showed that a high perceived web quality significantly increases trust while minimizing emotions of anxiety from users. Trust was also seen to mediate the effect of web quality in determining the intention to use electronic services. This study was in favor of the online payment literature, showing that technical excellence and interface quality combined play an important psychological role in trust formation. For online payment platforms, this means well-designed, reliable systems that are also user-friendly would lower cognitive and emotional barriers in increasing intention to adopt.

Teo (2010) studied the different influences related to the intention to use technology by individuals. The Technology Acceptance Model was extended in the study by facilitating conditions and subjective norms. Structural equation modeling was used to analyze the data obtained from pre-service teachers, showing that perceived usefulness and perceived ease of use had a very significant influence on the attitude toward usage, which in turn affected behavioral intention. The findings confirmed the robustness of TAM in explaining acceptance of technology and also emphasized the mediating role of attitude in shaping the user's intention to use technology-based systems.

Kim et al. (2010) conducted an empirical study to find customers' perceptions of the security and trust in e-payment systems. With the responses collected from 219 respondents, the study was conducted in South Korea and analyzed through structural equation modelling. It highlighted that perceived security had a high positive influence on trust, thus making a significant impact in the usage of electronic payment systems. The findings identified that not only the technical safeguards can shape the customer's decision with respect to the usage of e-payment systems; rather it was their subjective evaluation of security.

Wang Li (2012) investigated factors affecting mobile service adoption from the standpoint of brand equity, using structural equation modeling to analyze survey data obtained from mobile service users. The study showed that the attributes of the mobile service significantly influence consumer perception and behavioral intention. While the authors focused on mobile value-added services, it contributed to the literature on digital payments by stating that user perception and service quality and trust-related attributes greatly attribute to the formation of consumer attitudes and adoption behavior in the mobile commerce environment.

Chauhan (2015) conducted an empirical study using trust

along with Technology Accepted Model (TAM) to check the acceptance of money services via mobile among poor citizens of India. Primary data were collected from 225 actual and prospective mobile money users holding below-poverty-line (BPL) cards, and the data were analysed using Partial Least Squares (PLS) modelling. Trust, perceived usefulness, and attitudes towards using mobile money services had significant effects on the adoption intention, while perceived ease of use had no direct significant impact. Trust was critical in driving digital financial inclusion for the economically vulnerable. Findings indicate that user trust, their perceived advantages, and their affirmative attitudes correlate with the aforementioned acceptance of digital payment systems in developing economies such as India.

Pal et al. (2021) studied the reasons that lead to the adoption of mobile payment technology by individuals as well as the factors that drive their continued usage in the Indian context. The focus was on behaviour after adoption, particularly in relation to continued usage. The study was based on survey data collected from 617 mobile payment users in India and analysed with the help of structural equation modelling (SEM). Findings emanating from continuance intention and technology adoption theories reveal that perceived usefulness, trust, satisfaction, and habit significantly explain both initial adoption and later use of mobile payment systems. Results show how trust and perceived security play an important role in the short-term phases of use while developing habits and satisfaction into strong influencing factors for long-term use. This contribution was made to digital payment literature by providing longitudinal insight on adoption and continuance-aspects that policy interventions and platform strategies for emerging economies like India should address not only bundling adoption drivers but also mechanisms that would encourage repeat and continued usage of mobile payment technologies.

Yamin and Abdalatif (2024) examined consumer behavior toward the adoption of QR code-based mobile payment systems in the fintech ecosystem, intending to reveal the driving forces to use. The study was conducted using primary data obtained from 412 consumers already exposed to mobile payment applications; data were analyzed using structural equation modeling (SEM). The construct was derived from the Technology Acceptance Model (TAM) and had additional constructs added to it and the results indicate that perceived usefulness, perceived ease of use, trust and perceived security significantly, as well as positively, influence consumers' attitudes toward QR code mobile payments that had a strong influence on the intention to adopt it. It further shows that perception of trust and security plays an important mediating role; in addition, such a depiction reflects consumers' reality in terms of fears and concerns regarding the safety of processing transactions and the privacy of their data. The contribution this study makes to digital payment and fintech literature was by showing that for rapidly evolving digital economies, the combination of technological efficiency with trust-building mechanisms was very important for speeding up adoption of QR code mobile payments.

The recent government policies, initiatives and technological advancements have increased the presence of digital payment. However, the existing literature depends on data collected during earlier phases of digitalization, creating a time gap in understanding the perception of the users in the current scenario.

Research Objectives

The purpose of the study is to evaluate the predictors for the adoption of digital payment modes.

Research Hypotheses

H1: Self-efficacy has a positive impact on adoption.
H2: External Influence has a positive impact on adoption.
H3: Peer influence has a positive impact on adoption.
H4: Facilitating conditions has a positive impact on adoption.

Research Design

Exploratory-cum-Descriptive research design was used for this research work. Exploratory in the sense that it provides new insights or understanding to the research work. Descriptive research design provides answers to the Who, What, When, Where, Why and How type questions. Tale 1 and Table 2 depicts demographics and data collection design respectively.

Table 1:Demographics

Characteristics	Categories	No. of Respondents	Percentage (%)
Gender	Male Female	412 394	51.11 48.89
Age	18 - 22	133	16.50

	23 - 27	124	15.38
	28 – 32	134	16.62
	33 – 37	130	16.13
	38 – 42	150	18.62
	More than 42 years	135	16.75
Marital Status	Married	352	43.67
	Unmarried	454	56.33
Education	Graduation	342	42.44
	Post Graduation	297	36.84
	Ph.D.	167	20.72
Occupation	Student	190	23.57
	Self-employed	215	26.67
	Government Employee	198	24.57
	Private Employee	203	25.19
Administrative Division	Ambala	129	16.00
	Faridabad	133	16.50
	Gurugram	128	15.88
	Hisar	132	16.38
	Rohtak	149	18.49
	Karnal	135	16.75

Source: Primary Data (SPSS 26.0)

Table 2:Data Collection

Sr. No.	Description	Contents
1	Who	Students, Self-Employed, Government Employee, Private Employee
2	What	To analyze the various predictors for the adoption of digital payment modes.
3	When	January 2025 to May 2025.
4	Where	Six Administrative Divisions of Haryana State.
5	How	Survey
6	Research Instrument	Questionnaire

Data Analysis and Interpretation

The present chapter reports the results of the empirical investigation into customer attitudes and adoption towards digital payment modes using Partial Least Squares Structural Equation Modeling (PLS-SEM). The choice of PLS-SEM is justified on the grounds that it is particularly suitable for predictive analysis, where the research model incorporates multiple constructs and complex relationships (Hair et al., 2022). Unlike covariance-based SEM, PLS-SEM is advantageous for handling non-normal data, smaller sample sizes, and models with both formative and reflective constructs, all of which are relevant to the present study (Hair et al., 2019). The analysis begins with an assessment of demographics data, followed by the evaluation of the measurement model to establish the reliability and validity of the constructs.

Subsequently, the structural model is examined to test the hypothesized relationships among constructs and to evaluate the explanatory power and predictive relevance of the model (Hair et al., 2010). The results highlight the significant factors shaping adoption toward digital payments.

Measurement Model

The measurement model was evaluated to ensure construct reliability and validity (Hair et al., 2010). Indicator reliability was originally investigated using item outer loadings on their corresponding constructs. All loadings above the recommended threshold of 0.70, showing that each indicator was well associated with its underlying construct (Hair et al., 2017). The internal consistency reliability was then assessed using Cronbach's Alpha and Composite Reliability (CR) scores. All constructs have Cronbach's Alpha values greater than 0.70 and CR values greater than 0.70, indicating that the measurement model is internally consistent (Hair et al., 2019).

Convergent validity was tested using the Average Variance Extracted (AVE), and all constructs had values more than 0.50. To guarantee discriminant validity, the heterotrait-monotrait ratio (HTMT) was used. HTMT ratios fell below the cautious criterion of 0.85, indicating discriminant validity (Hair et al., 2019). Overall, these findings demonstrate that the measurement model is very reliable and accurate, giving a solid foundation for investigating the expected structural correlations.

Table 3:Construct Reliability and Validity

Constructs and Items	Outer Loadings	Cronbach's Alpha	Composite Reliability (CR) (rho_a); (rho_c)	Average Variance Extracted (AVE)

Self-Efficacy (SE)…		0.826	0.826; 0.878	0.590
SE1	0.744			
SE2	0.745			
SE3	0.777			
SE4	0.782			
SE5	0.790			
External Influence (EI)…		0.801	0.803; 0.863	0.557
EI1				
EI2	0.748			
EI3	0.756			
EI4	0.746			
EI5	0.756			
	0.723			
Peer Influence (PI)…		0.812	0.816; 0.869	0.571
PI1	0.801			
PI2	0.757			
PI3	0.750			
PI4	0.736			
PI5	0.731			
Facilitating Conditions (FC)…		0.812	0.812; 0.876	0.639
FC1	0.817			
FC2	0.792			
FC3	0.795			
FC4	0.792			
Adoption (AD)…		0.822	0.823; 0.875	0.584
AD1	0.736			
AD2	0.747			
AD3	0.783			
AD4	0.780			
AD5	0.775			

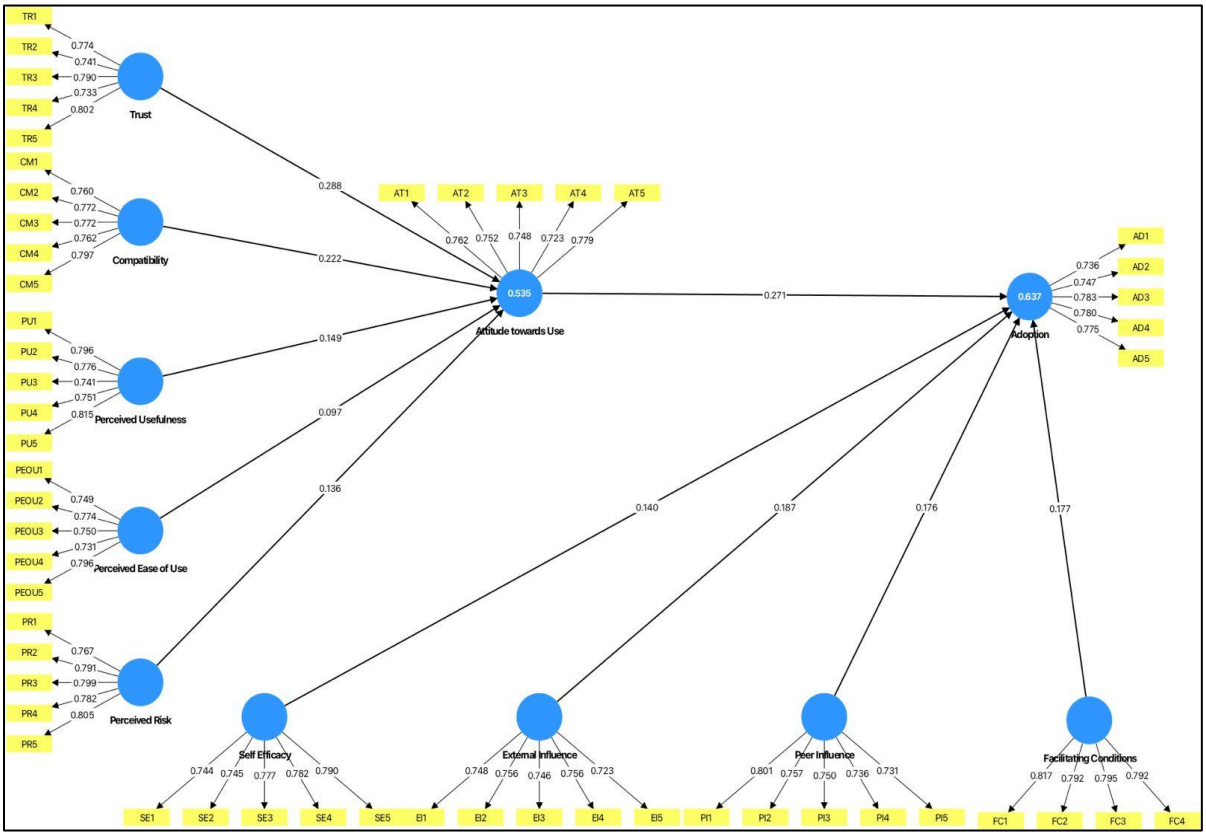
Source: Author's self-creation

Table 4: Discriminant Validity (HTMT)

	AD	EI	FC	PI
AD				
EI	0.802			
FC	0.820	0.818		
PI	0.807	0.753	0.796	
SE	0.807	0.745	0.836	0.799

Source: Author's self-creation

Figure 1: Path Model



Source: Smart Pls4

Tabel 5: Multicollinearity Analysis

Construct	Inner VIFs	Items	Outer VIFs
SE	2.488	SE1	1.521
		SE2	1.522
		SE3	1.709
		SE4	1.793
		SE5	1.758
EI	2.118	EI1	1.455
		EI2	1.562
		EI3	1.538
		EI4	1.601
		EI5	1.494
PI	2.244	PI1	1.780
		PI2	1.508
		PI3	1.572
		PI4	1.611
		PI5	1.539
FC	2.478	FC1	1.761
		FC2	1.592
		FC3	1.695
		FC4	1.606
AD	-----	AD1	1.511
		AD2	1.533
		AD3	1.683
		AD4	1.695
		AD5	1.708

Source: Smart PLS4

Table 6: Structural Model Results

Hypothesis	Beta (b)	T statistics	p values	f2	Supported

H1: SE -> AD	0.140	3.150	0.002	0.022	Yes
H2: EI -> AD	0.187	4.417	0.000	0.045	Yes
H3: PI -> AD	0.176	3.512	0.000	0.038	Yes
H4: FC -> AD	0.177	3.882	0.000	0.035	Yes

Source: Smart PLS4

Table 7: Summary of Hypotheses

H1: Self-efficacy has a positive impact on adoption.	Supported
H2: External Influence has a positive impact on adoption.	Supported
H3: Peer influence has a positive impact on adoption.	Supported
H4: Facilitating conditions has a positive impact on adoption.	Supported

CONCLUSIONS

The findings indicate that self-efficacy, external influence, peer influence, and facilitating conditions are strong predictors of actual adoption, thereby bridging the gap between attitude and behavior. This is aligned with the UTAUT perspective, where performance expectancy is often complemented by social and facilitating factors (Venkatesh & Davis, 2000). External and peer influences were particularly powerful in shaping consumer decisions, suggesting that adoption is not just an individual cognitive process but is also embedded in social interactions and networks (Belanche et al., 2022). Facilitating conditions, such as accessibility, technical support, and infrastructure, also emerged as vital enablers, underscoring the importance of ecosystem readiness in promoting widespread usage of digital payment systems.

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