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The Impact of FinTech-Based Digital Payment Systems on Readiness for Cashless Economy Transition in Algeria

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Abstract
This study examines the relationship between FinTech-based digital payment systems and users' readiness for the transition toward a cashless economy in Algeria amid ongoing digital financial transformation. It investigates whether key dimensions of digital payment systems, namely ease of use, security, efficiency and speed, reliability, and acceptance and diffusion, are associated with users' readiness to adopt less cash-dependent payment practices. The study adopts a quantitative approach based on a structured questionnaire administered to users of digital payment services in Algeria. Data were analyzed using IBM SPSS Statistics 22 for descriptive analysis and SmartPLS 4 for Partial Least Squares Structural Equation Modeling (PLS-SEM), including assessment of the measurement and structural models. The findings reveal a positive and statistically significant relationship between FinTech-based digital payment systems and readiness for the cashless economy transition. The model explains 54.8% of the variance in readiness ($R^2 = 0.548$), indicating that FinTech-based digital payment systems account for a substantial proportion of users' readiness within the surveyed sample. The findings underscore the relevance of usability, security, efficiency, reliability, and acceptance and diffusion in shaping readiness for reduced reliance on cash. The study highlights the need to strengthen digital payment infrastructure, enhance cybersecurity and consumer protection, promote digital financial literacy, and expand payment acceptance networks to support Algeria's transition toward a more digitally integrated and less cash-dependent payment environment.

Keywords: FinTech; Digital Payment Systems; Cashless Economy; Digital Transformation; Financial Inclusion; Algeria.
JEL Classification: G20; G21; O33; O35; O55.

1. Introduction

Financial technology (FinTech) is reshaping financial services through mobile applications, digital wallets, online banking, and other technology-enabled channels. Yet, adoption of digital financial transactions depends not only on technological availability but also on users' perceptions and behavioural responses. A systematic review of 106 empirical studies identifies perceived usefulness, ease of use, compatibility, trust, security, effort expectancy, performance expectancy, and facilitating conditions as frequently examined determinants, while perceived risk, privacy concerns, complexity, and resistance to change remain important barriers (Kajol, Singh, & Paul, 2022).

Digital payment systems are central to this transformation because they enable transactions without exclusive reliance on physical cash. Evidence from FinTech-led mobile-payment users shows heterogeneous profiles shaped by perceived benefits, behavioural characteristics, and trust, indicating that the shift from cash-based to digital payments is not uniform (Jaiswal, Mohan, & Deshmukh, 2023). At the global level, (Niankara & Traoret, 2023), using data from 127,854 respondents across 123 economies from the Global Findex 2021, found that financial inclusion significantly increased the likelihood of using digital payment solutions for in-store and online purchases and regular bill payments, while cashless-payment preferences varied across countries according to macroeconomic, regulatory, cultural, and digital-infrastructure conditions (Demirgüç-Kunt, Klapper, Singer, & Ansar, 2022).

User perceptions remain particularly relevant to the transition toward cashless payments. Trust and security are important considerations in digital financial transaction adoption, whereas perceived risk and privacy concerns can constrain adoption (Kajol, Singh, & Paul, 2022). Evidence from 431 Vietnamese mobile-wallet users further highlights the relevance of user experience and trust to continued FinTech-payment use (Rahman, Nguyen-Viet, Nguyen, & Kamran, 2024). Similarly, (Alamoudi, 2024) using 400 responses and SmartPLS 4.0, found that outcome expectancy strongly predicts consumer trust and that trust plays an important role in FinTech digital-payment usage and recommendation behaviour.

Thus, digital payment systems represent more than transaction technologies: their contribution to cashless transition depends on whether users perceive them as accessible, secure, efficient, reliable, and sufficiently accepted and diffused. Digital financial inclusion can expand access to formal financial services through digital devices (Inoue, 2024), although FinTech development also introduces technological and institutional complexities, including cybersecurity and financial-stability concerns (Cevik, 2024).

This distinction between digital-payment availability and user readiness to rely on digital payments instead of cash is particularly relevant in emerging financial systems, where infrastructure, financial inclusion, digital capabilities, and trust may differ.

In Algeria, digital financial services have expanded through payment cards, digital banking, mobile-based services, and other payment channels. Nevertheless, recent evidence indicates that FinTech use for financial transactions remains comparatively underdeveloped despite relatively widespread access to mobile phones and internet connectivity (IMF, 2024). Research on the Algerian banking sector likewise reports continuing digital transformation alongside challenges related to technology penetration and banking culture.

Although previous studies have examined digital-transaction adoption, mobile-wallet use, trust, financial inclusion, and cashless-payment preferences, these dimensions have generally been investigated separately. Limited evidence examines an integrated digital payment-system construct comprising ease of use, security, efficiency and speed, reliability, and acceptance and diffusion in relation to users' readiness for a cashless-economy transition, particularly in Algeria.

The study therefore addresses the following question:**To what extent do FinTech-based digital payment systems influence users' readiness for the transition toward a cashless economy in Algeria?**

1.2 Research Gap and Hypothesis Development

The preceding literature indicates that digital-payment research has primarily focused on technology adoption, actual usage, trust, security, financial inclusion, and payment preferences. However, these strands of research do not fully address whether the characteristics and diffusion of digital payment systems translate into users' readiness to reduce their reliance on cash and embrace a broader transition toward a cashless economy. In particular, limited empirical attention has been given to the relationship between an integrated set of digital payment-system characteristics and readiness for cashless transition, especially in the Algerian context.

To address this gap, the present study conceptualizes FinTech-based digital payment systems as a higher-order construct comprising ease of use, security, efficiency and speed, reliability, and acceptance and diffusion, and examines their direct effect on readiness for the transition toward a cashless economy. This formulation distinguishes the study from research that focuses on individual adoption determinants or specific payment instruments by linking the overall characteristics of digital payment systems to a broader readiness outcome. Accordingly, the following hypothesis is proposed:

- H_1: FinTech-based digital payment systems have a positive and statistically significant effect on users' readiness for the transition toward a cashless economy in Algeria.

2. Theoretical Framework

2.1 Digital Payment Systems

Digital payment systems enable individuals and businesses to conduct financial transactions through technology-based channels, including payment cards, mobile applications, and digital wallets. Their adoption has become an important area of FinTech research, with perceived usefulness, security, trust, and ease of use among the factors repeatedly examined in the digital-payment literature (Alkhowaiter, 2020).

Rather than considering digital payments solely as technological substitutes for cash, their use depends on users' perceptions of the quality and functionality of the payment service. A systematic review of FinTech adoption research identifies technology-related factors, trust, security, and service quality among the principal dimensions shaping users' behavioural intentions (Jafri, Syajarul , Aisyah , & Shifa , 2023).

2.2 Dimensions of Digital Payment Systems

In this study, FinTech-based digital payment systems are conceptualized as a higher-order construct comprising five dimensions: ease of use, security, efficiency and speed, reliability, and acceptance and diffusion. These dimensions are selected to capture the principal user-oriented and service-related characteristics relevant to the effective use of digital payment systems.

2.2.1 Ease of Use

Ease of use refers to the extent to which users perceive a digital payment system as easy to learn, understand, and operate. Perceived ease of use has been identified as an important factor in explaining digital payment adoption (Ly & Ly, 2024).

2.2.2 Security

Security refers to users' perceptions that digital payment systems adequately protect their transactions and personal and financial information. Security is consistently identified as an important determinant of FinTech adoption and behavioural intention (Jafri, Syajarul , Aisyah , & Shifa , 2023).

2.2.3 Efficiency and Speed

Efficiency and speed refer to the ability of digital payment systems to complete transactions rapidly while reducing the time and effort required from users. Transaction efficiency is identified as a relevant factor in digital payment adoption (Ly & Ly, 2024).

2.2.4 Reliability

Reliability refers to the consistent and dependable performance of a digital payment system during transaction processing. Service quality, including system and service reliability, is recognized as relevant to users' acceptance and utilization of FinTech services (Jafri, Syajarul , Aisyah , & Shifa , 2023).

2.2.5 Acceptance and Diffusion

Acceptance and diffusion refer to the extent to which digital payment methods are adopted by users and become sufficiently available across the payment ecosystem. Merchant participation and the achievement of sufficient adoption levels are important for the wider diffusion of mobile-payment services (Moghavvemi, Mei, Phoong, & Phoong, 2021).

2.3. Readiness for the Transition toward a Cashless Economy

A cashless economy refers to a payment environment in which non-cash and digital payment instruments account for an increasing share of financial transactions. The transition toward such an environment involves changes in payment behaviour as well as the conditions that support the use and diffusion of digital payment systems (Niankara & Traoret, 2023).

Readiness for the transition toward a cashless economy therefore refers in this study to the extent to which users are prepared to reduce their reliance on cash and use digital payment methods as regular alternatives. Evidence from 123 economies shows that financial inclusion and digital access are associated with individuals' use and preferences for cashless payment solutions (Niankara & Traoret, 2023).

In this study, readiness is operationalized through five dimensions: reduction in cash dependency, digital payment adoption, digital financial inclusion, financial transparency and transaction traceability, and reduction of the informal economy. These dimensions constitute the operationalization adopted by the present study to capture the behavioural and broader economic aspects of readiness for a transition from cash-based toward digitally mediated transactions.

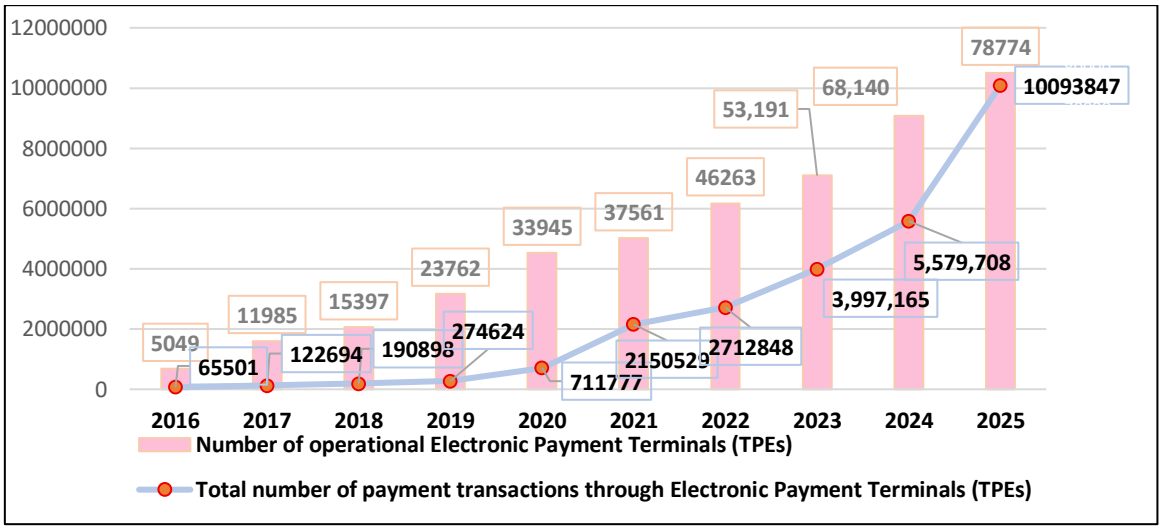
2.4 Digital Payment Development in Algeria

Algeria has progressively developed a diversified digital-payment ecosystem encompassing payment cards, electronic payment terminals (TPE), online payments, and mobile-based payment services. This diversification is supported by an institutional framework aimed at expanding electronic payment channels, improving interoperability, and strengthening the infrastructure for non-cash transactions. In 2024, the country had 19,844,903 payment cards in circulation, comprising 4,239,021 CIB cards and 15,605,882 Edahabia cards, while the number of active CIB and Edahabia cards reached 15,795,681, corresponding to an overall activity rate of 79.6% (Banque d'Algérie, 2025).

The diversification of payment channels has been accompanied by increasing use of digital-payment instruments. In 2024, the value of payments processed through TPEs reached DZD 40.551 billion, while online payments amounted to DZD 28.514 billion, representing increases of 45.0% and 127.8%, respectively, compared with 2023 (Banque d'Algérie, 2025). Mobile payments have also become part of the national payment landscape, with the development of interoperable mobile-payment infrastructure intended to connect different banking solutions and facilitate mobile transactions across providers.

Within this broader ecosystem, TPE activity provides a particularly relevant indication of the expansion of payment acceptance in everyday transactions. The number of TPE-payment transactions increased from 5,579,708 in 2024 to 10,093,847 in 2025, while the number of TPEs in operation increased from 68,140 to 78,774 over the same period. The corresponding transaction value reached DZD 89.541 billion in 2025 (GIE Monétique, 2026).

Figure 1. Evolution of TPE payment transactions and operating TPEs in Algeria, 2016–2025



Source: Authors' compilation based on GIE Monétique data.

The expansion of different payment channels, together with the growth in TPE infrastructure and transaction activity, indicates that digital payments are becoming increasingly established within Algeria's payment environment. However, these aggregate indicators primarily describe the availability and observed use of payment infrastructure; they do not directly establish whether individual users are ready to reduce their reliance on cash. This distinction is central to the present study, which conceptualizes Digital Payment Systems (DPS) through five dimensions: Ease of Use, Security, Efficiency and Speed, Reliability, and Acceptance and Diffusion, and examines their relationship with Readiness for Cashless Economy Transition (RCEC).

3. Research Methodology

3.1 Research Design and Data Collection

This study adopts a quantitative research approach based on the descriptive-analytical method, as it is well suited to examining the relationships among the study constructs and addressing the proposed research objectives. Primary data were collected through a structured questionnaire developed based on an extensive review of the relevant literature and previously validated measurement scales, with appropriate adaptations to reflect the Algerian context of digital payment systems.

The questionnaire was administered in both digital and paper-based formats to maximize participation and ensure broader coverage of individuals using digital payment systems in Algeria, including users of bank cards, the Edahabia card, mobile banking applications, and other digital financial services.

The target population consists of users of digital payment systems in Algeria. Given the absence of a comprehensive sampling frame and the broad geographical distribution of the target population, the study employed a non-probability convenience sampling technique. Approximately 300 questionnaires were distributed, and after screening the returned responses for completeness and consistency, 257 valid questionnaires were retained for statistical analysis. The retained sample of 257 valid responses was considered adequate for estimating the proposed PLS-SEM model, given its structural complexity and the number of predictors in the endogenous construct.

The determination of the sample size was guided by established methodological recommendations for PLS-SEM. In particular, the study considered the guidelines proposed by (Hair, Sarstedt, Pieper, & Ringle, 2012), while also taking into account the more recent recommendations of (Kock & Hadaya, 2018), which emphasize selecting an adequate sample size according to the complexity of the structural model and the number of structural relationships to be estimated, thereby enhancing the stability and reliability of the estimation results.

The questionnaire consists of two main sections. The first section collects participants' demographic information, including gender, age, educational level, occupation, monthly income, region of residence, banking relationship, types of digital payment instruments used, years of experience with digital payment systems, and frequency of digital payment usage.

The second section measures the study constructs through two principal dimensions. The first construct, Digital Payment Systems, is operationalized through five dimensions: Ease of Use, Security, Efficiency and Speed, Reliability, and Acceptance and Diffusion, measured using 20 indicators (four indicators for each dimension). The second construct, Readiness for Cashless Economy Transition, is measured through five dimensions: Reduction in Cash Dependency, Digital Payment Adoption, Digital Financial Inclusion, Financial Transparency and Traceability, and Reduction of the Informal Economy, also comprising 20 indicators distributed equally across the five dimensions.

We conceptualized both Digital Payment Systems and Readiness for Cashless Economy Transition as second-order reflective constructs, each comprising five first-order reflective dimensions. The hierarchical component model was estimated in SmartPLS 4 using the repeated indicators approach, whereby all indicators of the first-order constructs were assigned to their corresponding higher-order construct. This approach is widely recommended for estimating multidimensional constructs in PLS-SEM and provides reliable parameter estimates for hierarchical latent variables (Hair, Hult, Ringle, & Sarstedt, 2022).

Participants' responses were measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Following data collection, the dataset was coded and initially analyzed using IBM SPSS Statistics Version 22 to generate descriptive statistics and assess data quality. Subsequently, the proposed conceptual model was evaluated using SmartPLS 4 through the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. The analytical procedure involved assessing the measurement model by examining internal consistency reliability (Cronbach's Alpha, Composite Reliability, and rho_A), convergent validity (Average Variance Extracted), and discriminant validity (HTMT criterion and the Fornell–Larcker criterion). The structural model was then evaluated by estimating path coefficients, the coefficient of determination (R^2 and Adjusted R^2), effect size (f^2), predictive relevance (Q^2), and variance inflation factor (VIF).

3.2 Sample Characteristics

Table 1 presents the demographic profile of the study sample, based on descriptive statistics generated in IBM SPSS Statistics Version 22. The analysis provides an overview of the demographic and digital-payment characteristics of the respondents.

Table 1. Demographic Characteristics of the Study Sample (n = 257)

Variable	Category	Frequency	Percentage	Variable	Category	Frequency	Percentage
Gender	Male	147	57.2%	**Monthly income**	Less than 40,000 DZD	36	14.0%
	Female	110	42.8%		40,000–70,000 DZD	114	44.4%
	Total	257	100%		70,001–100,000 DZD	69	26.8%
Age	Less than 25 years	43	16.7%		More than 100,000 DZD	38	14.8%
	25–34 years	111	43.2%		Total	257	100%
	35–44 years	66	25.7%	**Most frequently used digital payment instrument**	Edahabia Card	116	45.1%
	45 years and above	37	14.4%		CIB Card	58	22.6%
	Total	257	100%		Mobile Banking Applications	63	24.5%
Educational level	Secondary or below	19	7.4%		QR Code / Other Digital Payment Methods	20	7.8%
	Diploma	41	16.0%		Total	257	100%
	Bachelor's degree	132	51.4%	**Frequency of digital payment usage**	Daily	59	23.0%
	Postgraduate	65	25.2%		Weekly	101	39.3%
	Total	257	100%		Monthly	68	26.5%
Occupation	Public sector	98	38.1%		Occasionally	29	11.3%
	Private sector	71	27.6%		Total	257	100%
	Self-employed	39	15.2%				
	Student	31	12.1%				
	Unemployed	18	7.0%				
	Total	257	100%				

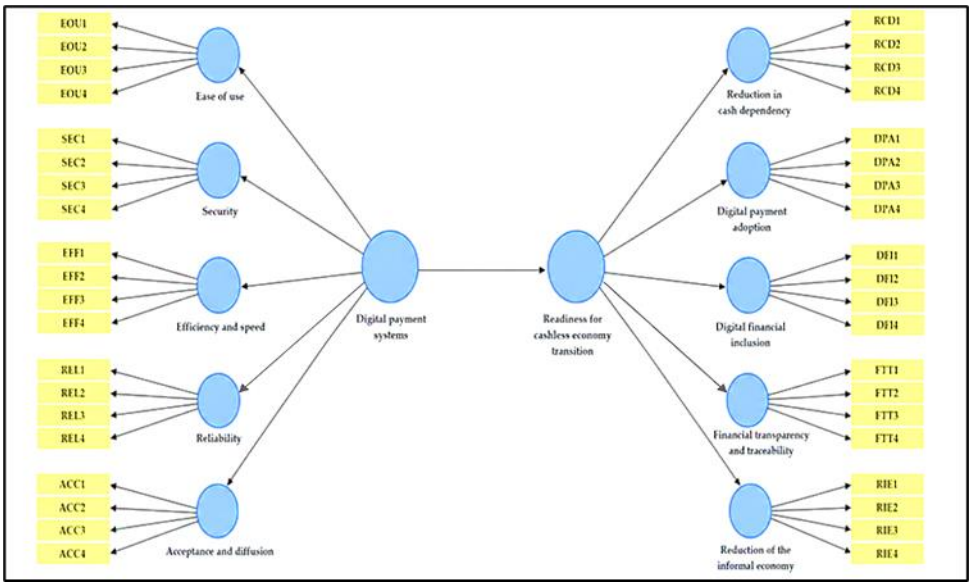
Source: Compiled by the authors based on the survey data using IBM SPSS Statistics Version 22.

3.3 Measurement Model Assessment

Before testing the proposed structural relationships, the measurement model was evaluated to verify the reliability and validity of the reflective constructs included in the conceptual framework. Following the PLS-SEM assessment procedure recommended by (Hair, Hult, Ringle, & Sarstedt, 2022), the evaluation was conducted in two consecutive stages. First, the measurement model was assessed by examining indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. After confirming the adequacy of the measurement model, the structural model was evaluated by estimating the path coefficients, coefficient of determination (R^2 and Adjusted R^2), effect size (f^2), predictive relevance (Q^2), and the significance of the hypothesized relationships using the bootstrapping procedure.

Figure 2 illustrates the proposed research model implemented in SmartPLS 4. The model integrates both the measurement model and the structural model used to test the proposed research hypothesis. The first construct, Digital Payment Systems, is conceptualized as a multidimensional construct reflected by five dimensions: Ease of Use, Security, Efficiency and Speed, Reliability, and Acceptance and Diffusion. The second construct, Readiness for Cashless Economy Transition, is measured through five dimensions: Reduction in Cash Dependency, Digital Payment Adoption, Digital Financial Inclusion, Financial Transparency and Traceability, and Reduction of the Informal Economy. The structural model further specifies the hypothesized positive effect of Digital Payment Systems on Readiness for Cashless Economy Transition.

Figure 2. Proposed Research Model



Source: Developed by the authors using SmartPLS 4.

The higher-order constructs were evaluated following the repeated indicators approach, and the assessment criteria were applied to both the lower-order and higher-order measurement models in accordance with the recommendations of (Hair, Hult, Ringle, & Sarstedt, 2022).

3.4. Assessment of the Measurement Model (Outer Model Analysis)

Before evaluating the structural relationships, the measurement model was assessed to verify the adequacy of the reflective measurement scales. Following the guidelines of (Hair, Hult, Ringle, & Sarstedt, 2022), the assessment focused on indicator reliability, internal consistency reliability, convergent validity, and discriminant validity.

The initial estimation of the measurement model indicated that four indicators (EFF3, ACC2, DFI4, and RIE4) were removed sequentially because their outer loadings were below the recommended level. After re-estimation, the retained indicators demonstrated satisfactory reliability and convergent validity. After re-estimating the model, all remaining indicators satisfied the recommended reliability and validity criteria. The results of the convergent validity assessment are presented in Table 2.

Table 2. Convergent Validity Assessment

Indicator	Loading	Cronbach's Alpha	Rho A	CR	AVE
Ease of Use					

EOU1	0.792	0.823	0.830	0.884	0.656
EOU2	0.846				
EOU3	0.817				
EOU4	0.829				
Security					
SEC1	0.751	0.806	0.812	0.873	0.634
SEC2	0.824				
SEC3	0.838				
SEC4	0.786				
Efficiency and Speed					
EFF1	0.821	0.792	0.801	0.878	0.706
EFF2	0.873				
EFF4	0.824				
Reliability					
REL1	0.768	0.798	0.806	0.868	0.624
REL2	0.801				
REL3	0.833				
REL4	0.785				
Acceptance and Diffusion					
ACC1	0.804	0.784	0.792	0.874	0.698
ACC3	0.852				
ACC4	0.838				
Reduction in Cash Dependency					
RCD1	0.812	0.841	0.847	0.894	0.679
RCD2	0.854				
RCD3	0.832				
RCD4	0.796				
Digital Payment Adoption					
DPA1	0.846	0.862	0.868	0.906	0.707
DPA2	0.873				
DPA3	0.814				
DPA4	0.838				
Digital Financial Inclusion					
DFI1	0.773	0.821	0.827	0.882	0.653
DFI2	0.817				
DFI3	0.846				
Financial Transparency and Traceability					
FTT1	0.835	0.854	0.861	0.902	0.696
FTT2	0.847				
FTT3	0.821				
FTT4	0.829				
Reduction of the Informal Economy					
RIE1	0.784	0.797	0.804	0.869	0.690
RIE2	0.836				
RIE3	0.858				

Source: Calculated by the authors using SmartPLS 4.

The final results demonstrate that all retained indicators achieved standardized outer loadings ranging from 0.751 to 0.873, confirming satisfactory indicator reliability. Furthermore, Cronbach's Alpha values ranged between 0.784 and 0.862, rho A values varied from 0.792 to 0.868, and Composite Reliability (CR) ranged from 0.868 to 0.906. All reliability coefficients exceeded the recommended threshold of 0.70, indicating satisfactory internal consistency. Regarding convergent validity, the Average Variance Extracted (AVE) values ranged between 0.624 and 0.707, exceeding the minimum acceptable threshold of 0.50. These findings confirm that each latent construct explains more than half of the variance of its associated indicators, thereby demonstrating satisfactory convergent validity. Overall, the refined measurement model satisfies the recommended criteria for indicator reliability, internal consistency reliability, and convergent validity, providing a sound basis for assessing discriminant validity and testing the structural relationships proposed in the conceptual framework.

3.5 Discriminant Validity Assessment

Following the assessment of convergent validity, discriminant validity was examined to determine whether each latent construct is empirically distinct from the other constructs included in the proposed model. According to (Fornell & Larcker, 1981), discriminant validity is established when the square root of the Average Variance Extracted (AVE) for each construct exceeds its correlations with all other constructs. The results of the Fornell–Larcker criterion are presented in Table 3.

Table 3. Discriminant Validity Assessment Using the Fornell–Larcker Criterion

	EOU	SEC	EFF	REL	ACC	RCD	DPA	DFI	FTT	RIE
EOU	**0.810**									
SEC	0.621	**0.796**								
EFF	0.653	0.598	**0.840**							
REL	0.612	0.641	0.667	**0.790**						
ACC	0.595	0.563	0.624	0.608	**0.835**					
RCD	0.488	0.455	0.521	0.497	0.534	**0.824**				
DPA	0.603	0.574	0.629	0.586	0.648	0.671	**0.841**			
DFI	0.516	0.548	0.572	0.561	0.603	0.612	0.657	**0.808**		
FTT	0.468	0.503	0.551	0.524	0.569	0.624	0.646	0.681	**0.834**	
RIE	0.439	0.472	0.537	0.511	0.553	0.641	0.662	0.618	0.687	**0.831**

Source: Calculated by the authors using SmartPLS 4.

Table 3 presents the results of the Fornell–Larcker criterion used to assess discriminant validity. As recommended by (Fornell & Larcker, 1981), discriminant validity is established when the square root of the Average Variance Extracted (AVE) for each construct, shown on the diagonal of the correlation matrix, is greater than its correlations with all other constructs.

The results indicate that the diagonal values range from 0.790 to 0.841, and all of them exceed the corresponding inter-construct correlation coefficients. These findings confirm that each construct shares more variance with its own indicators than with any other construct included in the model.

Accordingly, the proposed measurement model demonstrates satisfactory discriminant validity, indicating that the ten latent constructs are empirically distinct and capture different conceptual dimensions. Therefore, the Fornell–Larcker criterion provides additional evidence supporting the construct validity of the measurement model and confirms its suitability for evaluating the structural relationships proposed in the study.

Table 4. Discriminant Validity Assessment Using HTMT Criterion

	EOU	SEC	EFF	REL	ACC	RCD	DPA	DFI	FTT	RIE
EOU	-									
SEC	0.712	-								
EFF	0.748	0.689	-							
REL	0.701	0.734	0.769	-						
ACC	0.683	0.651	0.714	0.697	-					
RCD	0.554	0.522	0.598	0.571	0.612	-				
DPA	0.688	0.646	0.717	0.671	0.736	0.754	-			
DFI	0.589	0.621	0.647	0.635	0.682	0.701	0.758	-		
FTT	0.532	0.571	0.624	0.598	0.641	0.713	0.742	0.779	-	
RIE	0.503	0.538	0.603	0.577	0.626	0.728	0.749	0.703	0.781	-

Source: Calculated by the authors using SmartPLS 4.

The Heterotrait–Monotrait ratio (HTMT) was also examined to provide additional evidence of discriminant validity. As recommended by (Henseler, Ringle, & Sarstedt, 2015), all HTMT values were below the conservative threshold of 0.85, confirming satisfactory discriminant validity among all constructs. Therefore, the results obtained from both the Fornell–Larcker criterion and the HTMT criterion consistently support the discriminant validity of the measurement model.

Accordingly, both the Fornell–Larcker criterion and the HTMT criterion consistently confirm that the proposed measurement model possesses satisfactory discriminant validity.

3.6 Higher-Order Construct Assessment

Since both Digital Payment Systems and Readiness for Cashless Economy Transition were conceptualized as second-order reflective constructs and estimated using the repeated indicators approach, the higher-order measurement model was also evaluated. Following (Hair, Hult, Ringle, & Sarstedt, 2022), the assessment focused on internal consistency reliability and convergent validity by examining Composite Reliability (CR), rho_A, and Average Variance Extracted (AVE). The results are presented in Table 5.

Table 5. Reliability and Convergent Validity Assessment of the Higher-Order Constructs

Higher-Order Construct	Rho A	Composite Reliability (CR)	Average Variance Extracted (AVE)
Digital Payment Systems	0.924	0.931	0.729
Readiness for Cashless Economy Transition	0.937	0.943	0.748

Source: Calculated by the authors using SmartPLS 4.

The results indicate that both higher-order constructs satisfy the recommended reliability and convergent validity criteria. Specifically, Composite Reliability values exceed the recommended threshold of 0.70, while rho A values also demonstrate satisfactory internal consistency. Moreover, the AVE values are well above the minimum threshold of 0.50, confirming that both higher-order constructs explain more than half of the variance of their underlying first-order dimensions. These findings provide additional evidence supporting the adequacy of the hierarchical measurement model and justify proceeding to the structural model assessment.

3.7 Structural Model Assessment

After confirming the adequacy of the measurement model, the structural relationships among the higher-order constructs were evaluated using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach in SmartPLS 4. The significance of the hypothesized relationship was assessed through bootstrapping with 5,000 resamples based on the standardized path coefficient (β), standard error, t-value, and p-value. The results are presented in Table 6.

Table 6. Structural Model Results

Hypothesis	Structural Relationship	β	Std. Error	t-value	p-value	Decision	Adjusted R^2
H_1	Digital Payment Systems → Readiness for Cashless Economy Transition	0.728	0.049	14.86	<0.001	Supported	0.546

Source: Calculated by the authors using SmartPLS 4.

The structural model results indicate that Digital Payment Systems exert a positive and statistically significant effect on Readiness for Cashless Economy Transition ($\beta = 0.728$, $t = 14.860$, $p < 0.001$). Therefore, the proposed hypothesis (H1) is supported. Moreover, the adjusted coefficient of determination (Adjusted $R^2 = 0.546$) indicates that approximately 54.6% of the variance in Readiness for Cashless Economy Transition is explained by Digital Payment Systems, suggesting a moderate-to-high explanatory power of the proposed model.

3.8 Effect Size, Predictive Relevance, and Collinearity Assessment

Beyond assessing the statistical significance of the structural relationship, it is important to evaluate the practical contribution of the exogenous construct to the endogenous construct. Therefore, the effect size (f^2) was calculated to determine the contribution of Digital Payment Systems to the explained variance of Readiness for Cashless Economy Transition. According to Cohen (1988), f^2 values of 0.02, 0.15, and 0.35 indicate small, medium, and large effect sizes, respectively.

Furthermore, the predictive relevance of the structural model was assessed using the Stone–Geisser Q^2 value obtained through the blindfolding procedure. A Q^2 value greater than zero indicates predictive relevance for the endogenous construct. The results are presented in Table 7.

Table 7. Structural Model Quality Assessment

Measure	Value	Criterion	Interpretation
R^2	0.548	>0.50	Substantial explanatory power
Adjusted R^2	0.546	-	Consistent explanatory power after adjustment
Q^2	0.247	>0	Predictive relevance
f^2	1.212	>0.35	Large effect
VIF	1.000	<3.3	No collinearity concern

Source: Calculated by the authors based on the outputs of SmartPLS 4.

Beyond testing the statistical significance of the structural relationship, the structural model was further evaluated by examining the effect size (f^2), collinearity diagnostics, and predictive relevance (Q^2). As shown in Table 7, the effect size of Digital Payment Systems on Readiness for Cashless Economy Transition reached 1.212, exceeding the threshold of 0.35 proposed by (Cohen, 1988), thereby indicating a large effect size.

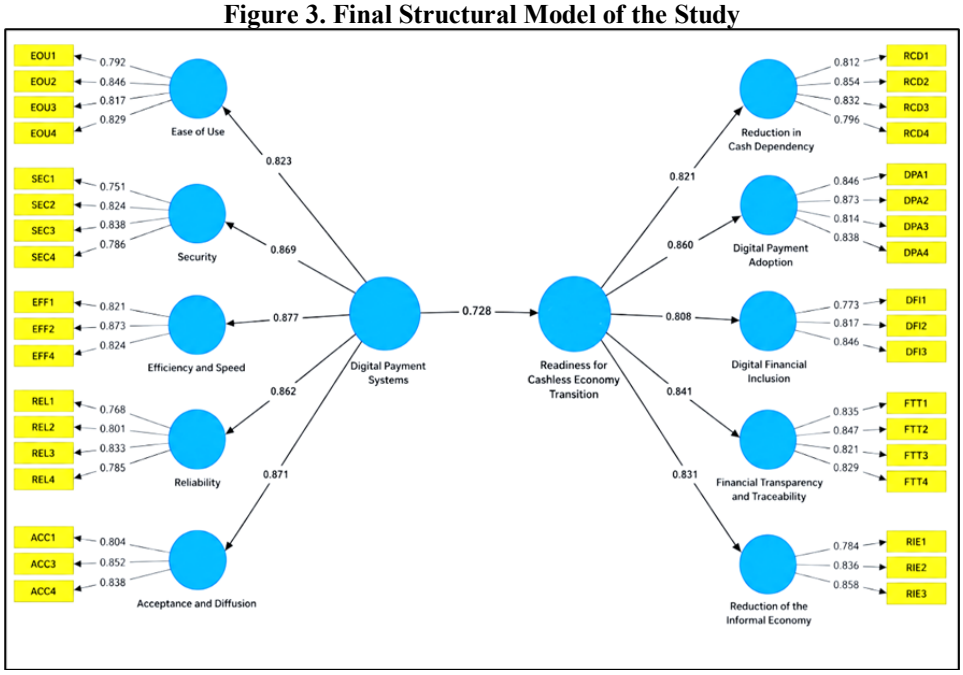
Furthermore, the inner Variance Inflation Factor (VIF = 1.000) indicates that multicollinearity does not pose a concern in the structural model. Because Digital Payment Systems represent the sole exogenous construct predicting Readiness for Cashless Economy Transition, an inner VIF of 1.000 is expected.

Regarding predictive relevance, the Stone–Geisser Q^2 value of 0.247 is greater than zero, indicating predictive relevance for the endogenous construct under the applied blindfolding procedure. This result should not, however, be interpreted as evidence of out-of-sample predictive performance.

Overall, these findings indicate that the proposed hierarchical PLS-SEM model demonstrates substantial explanatory power, predictive relevance, and a large effect size for the relationship between Digital Payment Systems and Readiness for Cashless Economy Transition. These findings provide further empirical support for the proposed research hypothesis.

The study's final structural model is presented in Figure 3

Figure 3. Final Structural Model of the Study



Source: Developed by the authors using SmartPLS 4.

Figure 2 presents the final hierarchical PLS-SEM model estimated in SmartPLS 4 after eliminating indicators with outer loadings below the recommended threshold. The model confirms the statistically significant positive influence of Digital Payment Systems on Readiness for Cashless Economy Transition while preserving the reflective–reflective higher-order component structure adopted in the study.

4. Results and Discussion

The structural model provides empirical support for the proposed relationship between FinTech-based Digital Payment Systems (DPS) and Readiness for Cashless Economy Transition (RCEC) in Algeria. The estimated path coefficient is positive and statistically significant ($\beta = 0.728$, $t = 14.860$, $p < 0.001$), indicating that higher levels of perceived digital payment-system quality are associated with higher readiness for a transition toward a less cash-dependent payment environment. Accordingly, H1 is supported.

The coefficient of determination ($R^2 = 0.548$) indicates that DPS explains approximately 54.8% of the variance in RCEC. The adjusted R^2 of 0.546 indicates that the explanatory power remains essentially unchanged after adjustment for sample size and model complexity. Together, these results provide substantial explanatory evidence within the surveyed sample and indicate that the characteristics incorporated into the DPS construct are strongly associated with users' readiness for a less cash-dependent payment environment. However, given the cross-sectional design and convenience sampling approach, the estimated relationship should be interpreted as an empirical association rather than as definitive evidence of causality.

The structural finding is also relevant to the broader development of Algeria's digital-payment environment. Official evidence documents continued expansion in payment infrastructure and digital-payment services. The Bank of Algeria reported 19,844,903 payment cards in circulation at the end of 2024, including CIB and Edahabia cards, while the number of electronic payment terminals (TPEs) reached 68,140. The same official reporting shows continued growth in both TPE and internet-payment activity. These indicators provide contextual evidence of the development of digital-payment infrastructure, but they do not directly measure individual users' readiness to reduce their reliance on cash.

The distinction between infrastructure development and user readiness is particularly important for interpreting the present findings. Aggregate national statistics describe the availability and observed use of payment instruments, whereas the present survey captures users' perceptions of digital payment systems and their readiness for a cashless-economy transition. The significant DPS–RCEC relationship therefore complements the aggregate evidence by demonstrating that, among the surveyed users, the perceived characteristics of digital payment systems are strongly associated with readiness for a less cash-dependent payment environment.

The multidimensional structure of DPS provides further interpretation of this relationship. Ease of use reflects the extent to which digital payment systems can be used without excessive effort; security concerns the protection of transactions and financial information; efficiency and speed capture the performance of payment processes; reliability reflects the consistency of system operation; and acceptance and diffusion capture the extent to which digital payment services are accepted and available within the payment environment. Taken together, these dimensions provide a user-oriented perspective on digital-payment systems that complements conventional indicators of payment infrastructure.

The institutional environment has also evolved in support of digital-payment development. In 2025, the Bank of Algeria established a regulatory framework for payment service providers, including rules governing payment accounts and digital payment services. This regulatory development forms part of the broader institutional infrastructure supporting the diversification and modernization of payment services in Algeria.

The effect-size analysis further supports the substantive importance of the structural relationship. The f^2 value of 1.212 exceeds Cohen's (1988) threshold of 0.35 for a large effect, indicating that the DPS construct makes a substantial contribution to the explained variance in RCEC. This result is consistent with the model's relatively high explained variance ($R^2 = 0.548$).

The Q^2 value of 0.247 is greater than zero, indicating predictive relevance for the endogenous construct under the applied blindfolding procedure. This result complements the explanatory evidence provided by R^2. However, the Q^2 value obtained through blindfolding should not be interpreted as evidence of out-of-sample predictive performance.

The structural model also presents no collinearity concern at the inner-model level. Because DPS is the sole exogenous construct predicting RCEC, the inner VIF is 1.000. This is consistent with the single-predictor structure of the final structural model.

Overall, the findings indicate that the transition toward a less cash-dependent payment environment involves not only expanding digital-payment infrastructure but also the characteristics of digital payment systems as perceived by users. The significant positive DPS–RCEC relationship, together with the substantial explanatory power and large effect size, provides empirical support for the proposed framework in the Algerian context. At the same time, the findings should be interpreted within the boundaries of the study design and should not be generalized beyond the surveyed population without further evidence.

5. Conclusion

This study examined the relationship between FinTech-based Digital Payment Systems and Readiness for Cashless Economy Transition in Algeria using a hierarchical PLS-SEM approach. The empirical results provide strong support for the proposed relationship, with Digital Payment Systems showing a positive and statistically significant association with Readiness for Cashless Economy Transition ($\beta = 0.728$, $t = 14.860$, $p < 0.001$). The model explains 54.8% of the variance in readiness ($R^2 = 0.548$), while the adjusted R^2 of 0.546 indicates that the explanatory power remains stable after adjustment for sample size and model complexity.

The measurement assessment provided satisfactory evidence of indicator reliability, internal consistency, convergent validity, and discriminant validity for the constructs examined. The higher-order constructs also demonstrated satisfactory reliability and convergent validity, supporting the proposed hierarchical structure of Digital Payment Systems and Readiness for Cashless Economy Transition. The structural results further indicate that the dimensions incorporated into the DPS construct ease of use, security, efficiency and speed, reliability, and acceptance and diffusion are relevant to understanding users' readiness for a less cash-dependent payment environment.

The findings have practical implications for the development of digital-payment services in Algeria. Improving usability and reliability, strengthening transaction security and consumer protection, expanding merchant acceptance, and supporting users' digital financial capabilities may contribute to a more supportive environment for cashless-payment adoption. These implications should be understood as policy and managerial considerations derived from the dimensions examined in the model rather than as directly tested causal effects.

The study nevertheless has several limitations. First, its cross-sectional design does not allow changes in users' readiness to be observed over time. Second, the use of convenience sampling and the absence of a comprehensive sampling frame limit the generalizability of the findings to the wider Algerian population. Third, the model focuses primarily on Digital Payment Systems as the explanatory construct and therefore does not incorporate other potentially relevant determinants, such as digital financial literacy, trust, perceived risk, regulatory conditions, and socioeconomic characteristics, into the structural relationship.

Future research could address these limitations through longitudinal and probability-based sampling designs and by extending the model to incorporate additional behavioural, institutional, and technological determinants of cashless-payment readiness. Comparative studies across Algerian regions or between Algeria and other emerging economies could also provide further evidence on how differences in digital-payment ecosystems and institutional environments shape users' readiness for a less cash-dependent payment system.

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