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FROM VOLUNTARY ADOPTION TO COMPELLED ACCEPTANCE: REFRAMING DIGITAL PAYMENT BEHAVIOUR THROUGH INDIA'S UPI ECOSYSTEM

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Abstract

In FY2024-25, India's UPI ecosystem processed 185.8 billion transactions, accounting for 48.5% of the global volume of real-time payments. However, this scale may reflect structural necessity in part as well as voluntary preference, especially in a post-demonetization environment where digital payments have become firmly integrated into everyday commerce. The 2016 demonetization removed 86% of the currency in circulation, pushing cash-dependent users toward digital payments in the absence of alternatives. The subsequent concentration of the platform among two dominant providers institutionalised this dependence within the architecture of everyday commerce. This study theorises compelled acceptance: continued platform use shaped by structural obligation rather than voluntary trust, a phenomenon that has received limited theoretical attention in digital payment adoption research. Conventional adoption models, including TAM and UTAUT, assume voluntary choice and therefore cannot account for UPI dynamics after demonetization. This study develops a Dual-Factor Reliability–Trust Framework that integrates three pathways: enabling (availability → reliability → institutional trust), inhibiting (fraud anxiety and resistance to use), and contextual (perceived necessity →compelled acceptance). Structural equation modelling involving 550 Chennai-based high-frequency UPI users confirmed the mediation effects. Institutional trust was identified as the central mechanism connecting enabling and inhibiting forces with acceptance. Recovery assurance emerged as the strongest factor. It was an enabling antecedent, while fraud anxiety independently suppressed trust. Perceived necessity of use positively predicted acceptance, even after trust and resistance were controlled for, which supports treating compelled acceptance as a distinct construct. The study extends theories of IS adoption in two ways: first, it treats compelled acceptance as a post-adoption state; second, it positions availability as a sequential antecedent of reliability and introduces enabling–inhibiting pathways within the setting of mandatory digital payments.

Keywords: Compelled acceptance, digital payment adoption, institutional trust, dual-factor framework, service recovery, mandatory use, fintech adoption.

1.Introduction

In FY2024-25, UPI had a 48.5% share in global real-time payment volume valued at USD 4.73 trillion (RBI, 2025) and handled 185.8 billion transactions worth ₹261 lakh crore (NPCI, 2025). But this scale since it is not necessarily the result of voluntary choice. Thereafter, in November 2016, cash-dependent people were suddenly displaced while 86% of all cash was picked up, as the government implemented the demonetization policy, which left the user base without any feasible substitute for cash-based transactions (Chodorow-Reich *et al.,* 2020). The digital payments institutionalisation resulting from the proliferation of QR codes in all merchant categories and the use of UPI in all commercial transactions, with more than 80% of the UPI transaction volume, are

two of these. (NPCI, 2025) The present study theorises continued platform use in this context as compulsion due to structural obligation (rather than user preference) for an important segment of users, posited as compulsion through "sustained UPI engagement". To date, this construct has not been theorised within IS adoption research. Behavioural intention has been the key construct in linking cognitive antecedents and observed use in both technology acceptance models: the Technology Acceptance Model (TAM) (Davis, 1989) and the UTAUT (Venkatesh *et al.,* 2003), which both assume that adoption is voluntary.

Studies that exist model enabling constructs as the main factors of acceptance, such as performance expectancy, effort expectancy, and social influence, in the absence of an active role of voluntary intention, while the situation surrounding the use of the application makes it difficult to meaningfully exit the application. (Kuriakose *et al.,* 2022; Saha & Kiran, 2022; Razi-Ur-Rahim *et al.,* 2024) For the case of demonetization, Agarwal *et al*. (2024) found empirical evidence that there was an induced change towards digital payments even with the reintroduction of cash, and that this behavioural shift was the major factor in driving digital adoption in this setting rather than a preference shift. This process is not yet embedded in IS adoption models based on theory in the post-demonetization environment of UPI.

There are three key research gaps have been identified in the literature. First, prior UPI studies often equate system availability and system reliability as if they are synonymous, whereas they are actually different. The distinction is between availability (can access the system) and reliability (can make transactions consistently and accurately). Second, the inhibiting factors like fraud anxiety and resistance to use have not been explored adequately as independent influencing factors that limit trust and acceptance; while the number of reported cases of UPI fraud increased from 96,500 in FY2022-23 to 1.342 million in FY2023-24 (Ministry of Finance, 2024), these mechanisms have not been widely modelled as separate inhibiting pathways. Third, past digital payment adoption studies often rely on the assumption that the use of digital payments is voluntary, and hardly theorise the perceived necessity of using digital payments conceptually as separate from the intention to use, which is the present study's term for compelled acceptance (ongoing platform engagement because of structural obligation rather than preference). To bridge these three gaps, this study wants to suggest a Dual-Factor Reliability Trust Framework that incorporates enabling, inhibiting and contextual UPI payment acceptance. The present study empirically tests this framework using the structural equation modelling approach with a sample of Chennai (Tamil Nadu) post-adoption, high -frequency UPI users. The framework comprises three pathways: availability → reliability → institutional trust, fraud anxiety, resistance to use, and perceived necessity → compelled acceptance. This study makes a contribution by posing a theoretical view of compelled acceptance as a post-adoption phenomenon, where continued digital payment use is not only due to voluntary issues of trust or preference but is also influenced by structural necessity, which has been overlooked in previous studies on UPI adoption. To date, few studies have differentiated between the concepts of availability and reliability as distinct factors related to institutional trust in the UPI ecosystem in an empirical manner.

Table 1: Abbreviations and Acronyms

Abbreviation	Full Form
AV	Availability
PR	Perceived Reliability
IT	Institutional Trust
RA	Recovery Assurance
FA	Fraud Anxiety
RTU	Resistance to Use
PNU	Perceived Necessity to Use
DPA	Digital Payment Acceptance
TAM	Technology Acceptance Model

UTAUT	Unified Theory of Acceptance and Use of Technology
IS	Information Systems
UPI	Unified Payments Interface
NPCI	National Payments Corporation of India
SEM	Structural Equation Modelling
CB-SEM	Covariance-Based Structural Equation Modelling
CFA	Confirmatory Factor Analysis
EFA	Exploratory Factor Analysis

2.Theoretical framework & Hypothesis

2.0 Framework Overview

Although significant research has explored the enablers and barriers to digital payment adoption, there are three apparent gaps in the UPI literature. First, previous research often equates the terms availability and reliability without giving due consideration to their theoretical meanings. Second, the influence of inhibiting factors like fear of fraud and resistance to use has been studied comparatively little in comparison to the influence of enabling factors. Third, the other models for adoption primarily focus on the voluntary use by the adopters and offer little insight into ongoing adoption because of structural need. The present study aims to overcome these limitations by creating a Dual-Factor Reliability-Trust Framework (Cenfetelli, 2004) with enabling and inhibiting pathways, as well as contextual pathways. The enabling pathway sheds light on the link between availability, perceived reliability, and recovery assurance and institutional trust and acceptance of digital payments. The inhibiting pathway reflects effects of fraud anxiety and resistance to use as suppressors of trust and acceptance. The contextual pathway includes perceived necessity to use, reflecting how much continued interaction with digital payment systems may be influenced by structural rather than just voluntary choices. The study attempts to combine all these pathways into one and offers a broader understanding of the acceptance of digital payments, and extends the studies on digital payment adoption by adding both inhibitor effects and structurally conditioned usage for the UPI ecosystem.

2.1 Dual Factor Theory

According to Cenfetelli (2004), enablers and inhibitors of technology use are not opposites on one scale; they are opposites in action and on different scales. Enablers can't be replaced by increasing inhibitors, and inhibitors can't be replaced by decreasing inhibitors. This was confirmed by Cenfetelli and Schwarz (2011). Reliability and recovery assurance are enablers of trust in the UPI context, while fraud anxiety and resistance to use are inhibitors. Previous UPI studies have primarily focused on the modelling of enablers and excluded fraud anxiety and resistance as separate barriers, despite the reporting of 1.342 million fraud cases between FY2023-24 (Ministry of Finance, 2024). This research study thus estimates both sets of forces simultaneously in a single model.

2.2 Service Quality and Reliability Theory

According to Nelson *et al.* (2005), the concepts of system availability and system reliability are actually two separate measures of an information system. Availability is how accessible a system is when needed, while reliability is how consistent, accurate and dependable a system will be while in use. The two constructs are related but have distinct roles in technology assessment. A system can be very accessible but not be effective, resulting in users doubting its effectiveness. User confidence in the payment system is not likely to grow as a result of having the payment infrastructure. In digital payment environments, it will not be enough that the payment system exists for the users to become confident in it. Instead, trust can be built through many transactions that are reliable and system behaviour that is expected. Higher reliability means less uncertainty

and an indicator that institutions are competent, which further builds confidence in the overall payment system (Stewart, 2003). In this regard, it is expected that availability will help to create perceptions of reliability, which then enables the formation of institutional trust.

2.3 Service Recovery and Justice Theory

Service recovery and Service justice theory describe how users evaluate the service recovery of an organisation. Tax *et al.* (1998) identified three dimensions of justice: distributive which refers to the fairness of the results; procedural which refers to the ease and fairness of the grievance process; and interactional which refers to the respectful and honest treatment. They discovered that a service failure can be compensated for by good recovery so that satisfaction and trust can be restored. These dimensions are interrelated, and a lack in one of these aspects lowers the users' confidence. In the UPI arena, in which fraud and transactions that fail are prevalent, users trust not just in the performance of the system, but also in how failures are resolved fairly. This study thus considers recovery assurance to be a process of trust-building, separate from the performance of the system. Very little work has been done on it in earlier UPI studies.

2.4 Mandatory Use Theory

Brown *et al*. (2002) established that mandatory technology contexts produce fundamentally different adoption dynamics. Perceived necessity to use, awareness that engagement is behaviourally non-discretionary, independently predicts usage beyond voluntary adoption mechanisms. Brown *et al.* 's framework has been applied in organisational IS contexts but never to consumer digital payment acceptance in post-demonetization India. TAM and UTAUT presuppose voluntary adoption; this presupposition is violated where structural withdrawal of cash alternatives, near-universal QR-code acceptance, and platform duopoly have rendered UPI engagement behaviourally non-discretionary. The present study grounds the perceived necessity to use as an independent direct predictor of acceptance via Mandatory Use Theory, operationalising compelled acceptance as a theoretically distinct condition from voluntary trust-driven adoption.

2.5 Constructs and Mechanisms

Table 2: Constructs and Theoretical Roles

Constructs	Theoretical Roles
Availability (AV)	Accessibility of the UPI infrastructure, enabling users to evaluate system performance
Perceived Reliability (PR)	Consistent and dependable transaction performance that signals institutional competence
Recovery Assurance (RA)	Confidence that service failures, disputes, and fraud incidents will be resolved fairly and efficiently
Institutional Trust (IT)	Confidence in the integrity, dependability, and credibility of the UPI ecosystem
Fraud Anxiety (FA)	Perceived vulnerability to fraud, financial loss, and security threats within digital payment systems
Resistance to Use (RTU)	Psychological reluctance toward digital payment usage despite continued participation
Perceived Necessity to Use (PNU)	Perception that UPI usage is increasingly necessary for participation in everyday transactions
Digital Payment Acceptance (DPA)	Positive post-adoption engagement and continued use of digital payment systems

The proposed framework includes enabling, inhibiting, contextual and outcome constructs. Enabling mechanisms linked to digital payment acceptance are availability, perceived reliability, recovery assurance and institutional trust. Fears of fraud and reluctance to use are inhibiting factors that hinder trust and engagement. Perceived necessity to use reflects structural conditions which can facilitate continued use beyond voluntary preference. The post-adoption stage of these interplaying factors in the UPI ecosystem is the acceptance of digital payments.

2.6 Hypothesis Development and Mediation

Enabling Pathway:

H1 proposes availability → perceived reliability (precondition for functional evaluation);
H2 proposes perceived reliability → institutional trust (competence signalling);
H3 proposes institutional trust → digital payment acceptance (post-adoption engagement);
H4 proposes recovery assurance → institutional trust (justice-based strengthening).

Inhibiting Pathway:

H5 proposes that fraud anxiety negatively → institutional trust (threat appraisal exceeding coping capacity);
H6 proposes resistance to use negatively → digital payment acceptance (attitudinal suppression despite structural compliance).

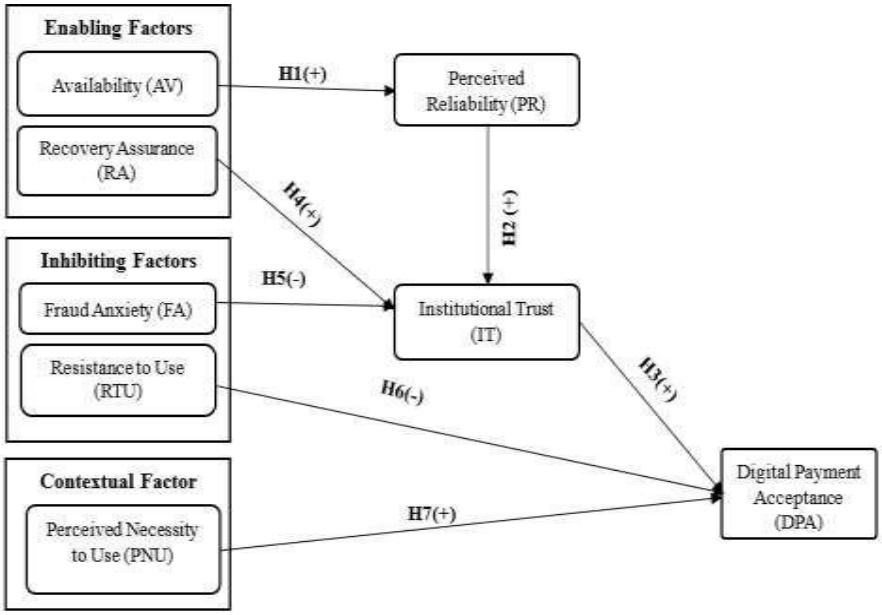
Contextual Pathway:

H7 proposes perceived necessity to use directly → digital payment acceptance (independent of trust and resistance mechanisms), operationalising behavioural obligation as distinct from voluntary belief formation.

Mediation Propositions:

M1a indicates full sequential mediation (Availability → Reliability → Trust → Acceptance); M1b indicates partial mediation within the construct of recovery assurance → Trust → Acceptance (inhibiting suppression through trust convergence); M2 indicates that institutional trust is the centre of convergence where enabling and inhibiting processes of suppressing and accepting the acceptance are happening simultaneously. Figure 1. Two-Factor Safe Enabling of Digital Payments in Post-Demonetization India. Enabling and contextual pathways are represented by solid arrows; inhibiting pathways are represented by dashed arrows.

Figure 1: Dual-Factor Reliability Trust Framework



3 Research Methodology

3.1 Research Design and Data Collection

The study uses a quantitative research design based on positivist epistemology and follows a deductive approach in which theoretically developed hypotheses are empirically examined through structural equation modelling (Anderson & Gerbing, 1988). Primary data were obtained from 550 active UPI users in Chennai, India, through a structured, self-administered questionnaire circulated via Google Forms.

Convenience sampling was employed because no accessible sampling frame or public registry of UPI account holders exists, and NPCI does not disclose user-level demographic information. To minimise the potential for self-selection bias, data were collected across different locations and demographic groups, including university campuses, commercial districts and residential neighbourhoods, while incorporating varied respondent profiles. This sampling approach is theoretically appropriate for the post-adoption stage, in which users have completed sufficient transactions to form meaningful perceptions of UPI's functional performance.

Respondents had to be at least 18 years old and must have completed at least one UPI transaction during the 30 days preceding data collection; accordingly, only technology adopters were included, consistent with IS Continuance Theory (Bhattacharjee, 2001). The sample consists primarily of highly educated and frequent UPI users who are closely associated with an urban metropolitan setting. It is important to acknowledge that the findings cannot be generalised to all UPI users, particularly rural residents, individuals with low literacy, older adults and digitally marginalised groups, for whom institutional trust and compelled acceptance may operate quite differently. These findings can be considered applicable to UPI users residing in Chennai who use the service frequently.

3.2 Ethical Standards and Data Integrity

Data collection took place only after ethical approval had been secured from the relevant IRBs. Participation was entirely voluntary, informed consent was obtained, and respondents' anonymity and confidentiality were maintained throughout the study.

3.2 Measurement Instrument

The following constructs were measured using a five-point Likert scale (1 = Strongly Disagree, 5= Strongly Agree), which is common in research on digital payment adoption in India. The instrument was made up of 32 items under 8 constructs, which were adapted from validated instruments in previous literature on IS and digital payment.

Table 3: Construct Sources and Item Adaptation

Construct	Items	Primary Source(s)
Availability (AV)	4	Gupta & Arora (2020); Parasuraman *et al*. (2005)
Perceived Reliability (PR)	4	Nelson *et al*. (2005); Kim *et al*. (2010)
Institutional Trust (IT)	4	McKnight *et al.* (2002); Kim *et al.* (2010)
Recovery Assurance (RA)	4	Tax *et al.* (1998); Patil *et al*. (2020)
Fraud Anxiety (FA)	4	Rogers (1975); Herath & Rao (2009)
Resistance to Use (RTU)	4	Ram & Sheth (1989); Bhattacharjee & Hikmet (2007)
Perceived Necessity to Use (PNU)	4	Brown *et al.* (2002); Limayem *et al.* (2007); Venkatesh *et al*. (2012)
Digital Payment Acceptance (DPA)	4	Bhattacharjee (2001); Limayem *et al.* (2007)

3.3 Analytical Strategy

The data analysis was done in two stages as advised by Anderson and Gerbing (1988). The first stage involved confirmatory factor analysis to examine the convergent and discriminant validity. Average variance extracted (AVE) was used to validate convergent validity through the mean of the average variance extracted (AVE).> The composite reliability (CR) values were obtained based on the criteria of Fornell and Larcker (1981), which range from .50 to .80. In the case of covariance-based SEM, discriminant validity was measured via the Heterotrait-Monotrait criterion (Henseler *et al.,* 2015), which is more conservative than Fornell-Larcker. All pairs of constructs were considered to have HTMT < .85, whereas the Institutions Trust-Digital Payment Acceptance pair was considered to have HTMT < .90, on the grounds of their known theoretical overlap. Stage two involved the estimation of the covariance-based structural equation model (SEM) in IBM AMOS using the maximum-likelihood method. CB-SEM was chosen as it is a reflective measurement model and the aim of the study was confirmatory theory testing, as well as having a sample size of 550 that met the requirements for maximum likelihood estimation. Model fit was evaluated using $\chi^2/df < 3.00$, CFI > .95, RMSEA < .06, and PCLOSE > .05 (Hu & Bentler, 1999; Hair *et al.*, 2019). Hair *et al*. (2019) suggest that values of CFI from .90-95 are acceptable for complex models containing eight or more latent constructs. Within-construct correlated residuals were freed when modification indices indicated theoretical justification for the freeing of such residuals, as per Byrne (2010). The mediation was tested by using bootstrapped indirect effects with 5000 resamples estimated within IBM AMOS, and bias-corrected confidence intervals that do not include zero values suggest mediation at the .05 level.

3.4 Sample Adequacy

A sample of 550 people meets recognized benchmarks of adequacy for CB-SEM. There are about 73 free parameters estimated in the model, which gives an observations-to-parameters ratio of 7.5:1, which is higher than Hair *et al*'s (2019) recommended minimum of 5:1 for maximum likelihood estimation. Comrey and Lee (1992) consider samples of 500 to be very good for factor analytic procedures. The sample size is sufficiently large to detect medium-sized effects at $\alpha = .05$ (Cohen, 1992).

4 Results

4.1 Sample Profile

The sample is representative of the desired characteristics of post-adoption research. The 18-35 age group (72.0%) is in line with NPCI's definition of the age group as the biggest contributor to UPI volume growth. High educational attainment (85.0 % undergraduate or above) shows that there is a well-documented positive relationship between education and adoption of digital payments. Most importantly, 46.2% of them used UPI every day, and 34.2% used it at least once a week, which means they used it very frequently and thus fit the criteria for IS Continuance Theory to provide grounding for the use of UPI. The top two UPI applications, PhonePe (44.7%) and Google Pay (37.3%), account for 82.0% of the sample, indicating that a few apps dominate the UPI market, and the perceived necessity of use relates more to the overall UPI market. The post-adoption profile was confirmed, with 64.9% reporting UPI experience for more than 3 years. The results are applicable to the sample, a group of educated, high-frequency urban UPI users, and cannot be extrapolated to other populations, such as low-literacy, rural, or elderly and digitally marginalized.

Table 4: Demographic and Usage Profile of Respondents (N = 550)

Gender	Male	317	57.6 %
	Female	233	42.4%
Age	18-25 years	178	32.4%
	26-35 years	218	39.6%
	36-45 years	102	18.5%
	46 years and above	52	9.5%
Education	School level	63	11.5%
	Undergraduate	250	45.5%
	Postgraduate	217	39.5%
	Doctoral	20	3.6%
Occupation	Employed	270	49.1%
	Student	142	25.8%
	Self-employed	102	18.5%
	Other	36	6.5%
Monthly Income (INR)	Below ₹20,000	121	22.0%
	₹20,001-₹40,000	203	36.9%
	₹40,001-₹60,000	162	29.5%
	Above ₹60,000	64	11.6%
UPI Usage Frequency	Daily	254	46.2%
	Weekly	188	34.2%
	Monthly	77	14.0%
	Rarely	31	5.6%
Primary UPI Application	PhonePe	246	44.7%
	Google Pay	205	37.3%

	Paytm	54	9.8%
	Other	45	8.2%
UPI Experience	Less than 1 year	41	7.5%
	1-3 years	152	27.6%
	3-5 years	179	32.5%
	More than 5 years	178	32.4%

4.2 Measurement Model Validity

Exploratory Factor Analysis and Reliability Assessment

Exploratory factor analysis using principal component analysis with Varimax rotation was conducted before confirmatory factor analysis. Kaiser-Meyer-Olkin measure of sampling adequacy was .777 (exceeding the .60 threshold), and Bartlett's Test of Sphericity was significant (χ^2 = 11,227.188, df = 496, p < .001), confirming factorability of the correlation matrix. Eight factors were extracted based on the eigenvalue-greater-than-one criterion, collectively accounting for 73.187% of total variance, substantially exceeding the 60% benchmark for behavioural science research. All 32 items loaded cleanly on theoretically designated factors with no cross-loadings exceeding .50, confirming factorial validity.

Table 5: Construct Reliability Summary

Construct	Abbreviation	Items	Cronbach's α
Availability	AV	4	.879
Perceived Reliability	PR	4	.829
Institutional Trust	IT	4	.790
Recovery Assurance	RA	4	.888
Fraud Anxiety	FA	4	.878
Resistance to Use	RTU	4	.890
Perceived Necessity to Use	PNU	4	.875
Digital Payment Acceptance	DPA	4	.871

Note. All α values exceed the .70 threshold recommended by Hair *et al*. (2019).

4.3 Structural Model Results and Hypothesis Testing: Measurement Model Fit

The eight-factor measurement model estimated in IBM AMOS using maximum likelihood estimation yielded acceptable fit indices. Three theoretically justified correlated residual pairs within constructs were freed following Byrne (2010).

Table 6: CFA Model Fit Indices

Fit Index	Value	Threshold	Assessment
χ^2/df (CMIN/DF)	2.495	< 3.00	Acceptable
CFI	0.941	> 0.95	Marginally below threshold
RMR	0.032	< 0.08	Acceptable
RMSEA	0.052	< 0.06	Acceptable
PCLOSE	0.175	> 0.05	Acceptable

CFI = 0.941 is marginally below the conventional .95 threshold but acceptable for complex

models with 8 latent constructs and 32 indicators, wherein CFI between .90–.95 is considered adequate (Hair *et al.*, 2019).
All fit indices supported measurement model adequacy. Chi-square to degrees of freedom ratio, RMSEA, RMR, and PCLOSE all met recommended thresholds. CFI was marginally below the conventional threshold but acceptable for complex models per Hair *et al*. (2019).

Convergent and Discriminant Validity
Convergent validity assessed via average variance extracted (AVE) and composite reliability (CR) confirmed all constructs satisfied AVE > .50 (range .519- .690) and CR > .80 (range .790-.893). Discriminant validity assessed exclusively via the Heterotrait-Monotrait criterion confirmed that all HTMT values fell below respective thresholds. All constructs demonstrated validity with no concerns identified.

4.4 Structural Model Results and Hypothesis Testing: Structural Model Fit
Following measurement model validation, the structural model was estimated using maximum likelihood estimation in IBM AMOS.

Table 7: Discriminant Validity Matrix CR, AVE, MSV, MaxR(H), and Inter-Construct Correlations

	CR	AVE	MSV	MaxR(H)	AV	PR	IT	RA	FA	RTU	PNU	DPA
AV	.892	.690	.019	1.001	.831							
PR	.829	.548	.030	.831	.136**	.740						
IT	.803	.519	.069	.880	-.081†	.167**	.720					
RA	.892	.675	.274	.901	-.045	.086†	.222***	.821				
FA	.893	.684	.024	.957	.109*	.032	-.125**	-.108*	.827			
RTU	.888	.666	.030	.898	.043	.173***	.120*	-.018	.076	.816		
PNU	.878	.647	.019	.925	-.034	-.025	-.001	.122*	-.040	-.013	.804	
DPA	.873	.642	.274	.964	.033	.072	.262***	.524***	-.156***	-.086†	.137**	.801

Table 8: Structural Model Fit Indices

Fit Index	Value	Threshold	Assessment
χ^2/df (CMIN/DF)	2.780	< 3.00	Acceptable
CFI	0.927	> 0.90	Acceptable
RMR	0.049	< 0.08	Acceptable
RMSEA	0.057	< 0.06	Acceptable
PCLOSE	0.001	> 0.05	Not Supported

Failure of PCLOSE due to sensitivity of N=550 and does not represent model misfit (Hair *et al.,* 2019). Adequacy of the structural model was supported by all fit indices. CFI = 0.927 met the .90 threshold for complex models. All the indices (RMSEA, RMR, and CMIN/DF) are within acceptable limits.

Table 9: Structural Path Coefficients and Hypothesis Testing Results

Hypothesis	Path	β	C.R.	P value	Result
H1	AV → PR	.334	2.779	.005	Supported
H2	PR → IT	.179	3.185	.001	Supported
H3	IT → DPA	.273	6.393	<.001	Supported
H4	RA → IT	.233	4.609	<.001	Supported
H5	FA → IT	-.163	-2.498	.012	Supported
H6	RTU → DPA	-.081	-2.668	.008	Supported
H7	PNU → DPA	.169	3.197	.001	Supported

There was support for all seven direct hypotheses. The availability of H1 is a positive predictor of perceived reliability (β = .334, p = .005), which demonstrates that infrastructure accessibility allows the evaluation of functional dependability. The perceived reliability is positively predicted by institutional trust (β = .179, p = .001), which means that perceived reliability acts as a competence signal. The findings for H3 (β = .273, p < .001) indicated that institutional trust has a positive impact on digital payment acceptance, thus supporting IS Continuance Theory's hypothesis. The highest enabling antecedent of institutional trust was recovery assurance (H4: β = .233, p < .001).

The relationship between H5 and institutional trust was negatively suppressed such that institutional trust was lower when the level of fraud anxiety was higher (β = -.163, p = .012). Critically, this inhibitory effect was in concert with considerable enabling pathways, lending support to the dual-pathway asymmetry in which inhibiting and enabling forces do not cancel out. The finding of psychological resistance reducing the quality of engagement, independently of forced use, was confirmed by H6: digital payment use was significantly less accepted when it was being used to pay for products or services (β = -.081, p = .008). After adjusting for institutional trust and resistance, the authors found that using positively predicted digital payment acceptance was empirically verified as being structurally driven by perceived necessity (H7: β = .169, p = .001).

A preliminary finding that seemed counterintuitive is that there was a positive bivariate correlation between resistance to Use and Institutional Trust (r = .120, p = .050). This is a suppression effect, and users knowing that UPI is an institution may have resistance just because it is an institution, generating what Storbeck calls “dual awareness” of capabilities and resistance. RTU has an expected significant negative effect on DPA when estimated simultaneously with all predictors in the structural model, which verifies the inhibitory effect of RTU on DPA.

Table 10: Mediation Results - Bootstrapped Indirect Effects (IBM AMOS v23, 5,000 Resamples)

Mediation Path	Indirect Effect	Lower CI (2.5%)	Upper CI (97.5%)	p-value	Supported
M1a: AV→PR→IT→DPA	.044	.002	.044	.002	Yes
M1b: RA→IT→DPA	.122	.026	.122	.000	Yes
M2: FA→IT→DPA	-.070	-.070	-.013	.005	Yes

M1a (Full Mediation): The serial indirect effect of availability on digital payment acceptance through perceived reliability and institutional trust (indirect effect = .044, 95% BC CI [.002, .044], p = .002) was statistically significant. The entire sequential enabling chain of infrastructure access (technical) was important, as would be the full chain of functional reliability (impact) into institutional trust (acceptance), based on Trust Transfer Theory.

M1b (Partial Mediation): Indirect effect of recovery assurance on digital payment. This resulted in partial mediation with $p < .001$. Users' awareness of fair recovery independently elevates acceptance comfort beyond trust effects alone, reflecting the behavioural dimension of service recovery justice.

M2 (Partial Mediation): The indirect effect of fraud anxiety on digital payment acceptance through institutional trust (indirect effect = -.070, 95% BC CI [-.070, -.013], p = .005) was statistically significant. Both the indirect path (via trust erosion) and direct effect (β = -.079, p =.009) remained significant, confirming that partial mediation of fraud anxiety suppresses acceptance both through institutional trust and through independent behavioural avoidance.

Collectively, these three mediation pathways establish institutional trust as the central convergence point through which enabling forces (perceived reliability and recovery assurance) simultaneously construct acceptance, and inhibiting forces (fraud anxiety) simultaneously suppress acceptance, confirming institutional trust as the pivotal mechanism of the Dual-Factor Reliability Trust Framework.

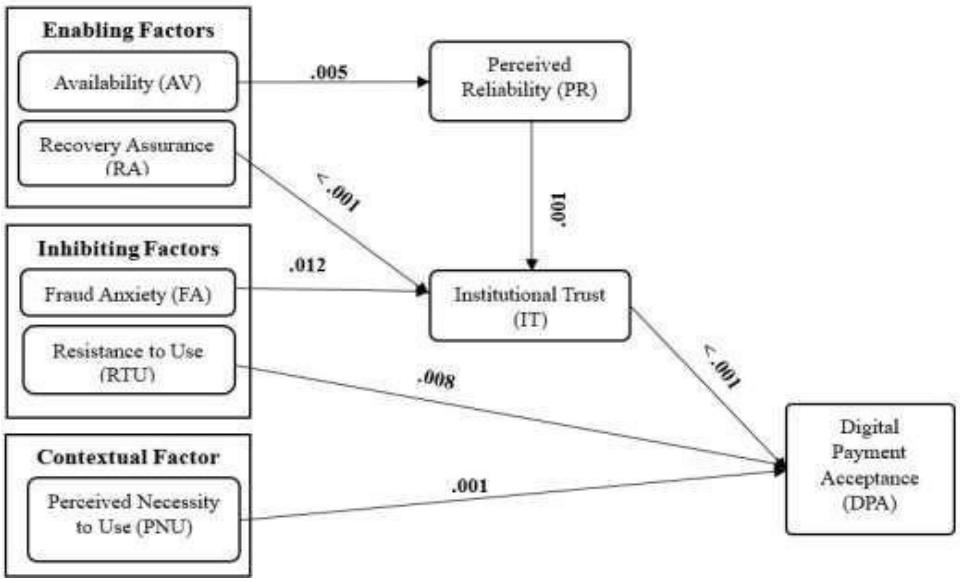


Figure 2 Dual-Factor Reliability Trust Framework - Sem path values

5. Discussion

5.1 Overview of Findings

Dual-Factor Reliability Trust Framework suggests three theoretically different pathways that account for the acceptance of digital payments in post-demonetization India: the enabling, the inhibiting, and the contextual. All of the seven direct hypotheses were supported, and all three mediation propositions were confirmed. The outcome of the structures shows that the constructs of enabling-side UPI alone do not capture the attitude towards UPI, and that the voluntary adoption logic is not reduced to the constructs of enabling-side UPI alone. This section explores the interpretation of each pathway's findings based on the theoretical literature along with the Indian digital payment landscape.

5.2 The Enabling Pathway: Availability- Reliability-Trust Chain

This is the first significant theoretical contribution: Availability – Perceived Reliability – Institutional Trust – Digital Payment Acceptance. One contribution of the study to the theory is the sequential chain of Availability, Perceived Reliability, Institutional Trust and Digital Payment Acceptance. The results of H1 can be seen that there is a significant relationship between availability and perceived reliability ($\beta = .334$, $p = .005$); meanwhile, the results of H2 can be seen that there is a significant relationship between perceived reliability and institutional trust ($\beta = .179$, $p = .001$). The mediation proposition M1a was found to be accepted (indirect effect = .044, 95% BC CI [.002, .044], $p = .002$).

This is directly related to a previous UPI study of the topic, which assumes infrastructure is sufficient for acceptance, a systematic conflation of the topic. Nelson *et al*. (2005) separated the concept of availability from that of reliability, and it seems that very few UPI studies have kept the distinction between availability and reliability. The present study, the first empirical analysis that shows availability and reliability are in a sequential relationship, is of great interest. However, infrastructure access is required to assess reliability, but not enough to establish the feeling of functionality that is relevant to trust and thus acceptance of the infrastructure. Contextually important is that while things have improved a lot, the failure rate has not reduced since 2016, and the settlement timings were also poor; hence, the trust of the users who are facing some issues has been lost. This is a paradox that is explained by the availability-reliability chain.

Recovery assurance was the most positive enabling antecedent of institutional trust (H4: $\beta = .233$, $p < .001$), outweighing perceived reliability. This relates to the service recovery justice framework of Tax *et al*. (1998), who found that service recovery is more effective in improving trust than is just service performance. In addition to Usage, UX and other primary factors, institutional response quality is also a key consideration in the development of trust in UPI fraud cases, which are growing by 85% in FY2023-24. The results of the M1b mediation analysis (indirect effect = .122, 95% BC CI [.026, .122], $p < .001$) with partial mediation (direct effect $\beta = .331$, $p < .001$) suggest that the effects of recovery assurance can be accomplished both indirectly through trust and directly through willingness to re-engage. The finding puts the spotlight on the performance of the system rather than its institutional accountability and grievance redressal capabilities as the space for digital payment trust formation. Users appear to be OK with the occasional failure if there is a viable mechanism to recover.

5.3 The Inhibiting Pathway: Independent Suppression Effects

The anxiety of fraud significantly reduces trust in the institution (H5; $\beta = -.163$; $p = .012$) and resistance to use significantly reduces digital payment acceptance (H6; $\beta = -.081$; $p = .008$) were confirmed. Most importantly, suppression of fraud anxiety co-occurred with a variety of pathways from perceived reliability and recovery assurance, in that the suppressing and enabling processes were independent and did not cancel each other out, as posited by Cenfetelli and Schwarz (2011). However, in the previous studies conducted by Prior UPI (Kuriakose *et al*., 2022; Saha & Kiran, 2022; Patil *et al*., 2020), the modelling of enabling constructs was done without taking into consideration the inhibiting forces as a separate theoretical construct. The present results show that these models have incomplete structures: If Users have a high level of confidence in UPI and a

high level of trust in their recovery capacity, then they also have high anxiety towards fraud, and vice versa. These effects are not exclusive and are concurrent. Beyond the individual, fraud anxiety is associated with Protection Motivation Theory (PMT) (Rogers, 1975), and the anxiety caused by the fear of fraud is greater than perceived institutional coping. Transaction Risk to ecosystem-level trustworthiness. The indirect pathway to the mediation result was partially mediated (M2 = Mediation result was not significant), with a significant direct effect (β = -.079, p = .009).
Resistance to use (H6: β = -.081, p = .008) was found to be an independent inhibitor of acceptance depth, and Bhattacharjee and Hikmet (2007) reported that resistance to use, a non-adoption phenomenon, is actually an attitudinal resistance on limited compliance phenomenon in mandatory IS settings. The engagement has been limited in depth, and in many transactions, it has been difficult not to use UPI when users do not wish to do so. They use what they have to, and no features, and don't accept compliance. The structural use/genuine acceptance distinction is a shift from binary models of adoption, such as the one here.

5.4 The contextual pathway: Compelled acceptance

When digital payment acceptance was controlled for institutional trust and resistance to use, perceived necessity to use was also a significant and positive predictor (β = .169, p = .001) of digital payment acceptance. The most theoretically interesting result of the study is that it doesn't contradict anything known. The path coefficient of .169 is not as large as recovery assurance (β = .331) and institutional trust (β = .273), but in theory, it is not dependent on the other two variables. Even after all the enabling and inhibiting factors are controlled for, though, perceived necessity plays an important part, suggesting that perceived necessity is not just a part of a trust or resistance relationship, but also a structural necessity.
The Indian scenario after demonetization is not conducive to voluntary adoption, as the majority of merchants and even the entire ecosystem are increasingly unwilling to be part of this, as the QR-code universality and the need for cash withdrawals have made it difficult. The present study does not provide any refutation of these frameworks but simply adds the condition for forced acceptance, which was not anticipated by these frameworks. When the forces of enabling and inhibiting were removed, this coefficient was β = .169, which was statistically significant and supported the hypothesis of Brown *et al*. (2002), that compelled acceptance is an independent acceptance mechanism, not just a function of increased trust and decreased resistance.
This discovery is drawing attention as it is not a full example of a preference-driven payment engagement, but is rather structurally conditioned as well. The users will keep on using UPI not only due to complete trust, but also because UPI is a payment system which is becoming a bare necessity for any normal shopping. This goes against a common belief amongst voluntary adopters.

5.5 Behavioural Usage versus Psychological Acceptance

The results showed that in digital payment systems, the two constructs ‘behavioural usage’ and ‘psychological acceptance' are not synonymous. High-frequency transactional engagement and anxiety about fraud among users are noted, as well as non-use or distrust of institutions. Compulsed acceptance is when it is accepted physically, but not mentally. This separation has theoretical importance as it may be a high volume of use that overestimates the extent of trust among users of platformed payment systems.

5.6 Theoretical synthesis: four core contributions:

Three measurable conditions, namely cash withdrawal, QR code universality and platform duopoly, are theorized and psychometrically supported, indicating the need to use the platform to withdraw money, not just as a preferred platform. The first of the three is theorised and psychometrically supported as the basis of compelled acceptance, which is sustained platform

engagement as a result of structural obligation but not preference, which is exhibited in the three measurable conditions: cash withdrawal, QR code universality and platform duopoly. To address a systematic validity threat in previous UPI adoption models that use unequivocal commitment in attitudes, the authors propose a new model. In response to a systematic validity threat in previous models of UPI adoption in which the use of something is always a positive attitudinal commitment, a new model is proposed. Brown *et al*. (2002) extended their set of mandatory use to the structural non-voluntary domain and then enlarged the domain to the voluntary-adoption domain for the acceptance of digital payments.

Second, it offers a dual-pathway model, estimated concurrently with the consideration of the enabling and inhibiting conditions, as independent causal structures, to answer the call of Cenfetelli and Schwarz (2011) for IS adoption models that take into account inhibitors.

Third, it decomposes and subsequently ranks infrastructure access and perceived reliability, bringing the first empirical construct showing that functional dependability lies between infrastructure access and institutional trust to the UPI literature.

Fourthly, it relates each construct to the precise theoretical mechanisms of the transfer of trust (Trust Transfer Theory, Stewart 2003), the recovery from a failure (Service Recovery and Justice Theory, Tax *et al*., 1998), the assurance of recovery (recovery assurance), the anxiety of fraud (fraud anxiety), the resistance to change (Innovation Resistance Theory, Ram and Sheth, 1989 extended by Bhattacharjee and Hikmet, 2007), and the framing of the post-adoption outcomes (IS Continuance Theory, Bhattacharjee, 2001).

6 Practical Implications

6.1 Implications for NPCI and Policymakers

Functionally speaking, the biggest enabling antecedent of institutional trust is recovery assurance, which has a direct impact on NPCI and the Reserve Bank of India (RBI) (β = .233). These ongoing discrepancies between fraud and complaint resolution due to cumbersome procedures, lack of awareness about redressal options, and perceived futility of pursuing formal avenues are not just consumer protection gaps; they are the single most important factor that defines institutional trust in the UPI, which is the basis for long-term acceptance. The assurance for recovery must be implemented in all three facets of Tax *et al*. 's (1998) justice paradigm. A key objective of distributive justice is to have shorter recovery times for fraud and consistent satisfactory results. Procedural justice entails that complaints be made through a simplified pathway within the UPI application interface (as a one-step process). Interactional justice is related to the creation of news communication that is transparent, personal and timely, with the involvement of the users who are affected. Increased transactions do not necessarily mean that the public can trust the service completely, as structural dependence can maintain the use of the service even in the face of worry about fraud handling and institutional trustworthiness. The intensity of the policy focus needs to be broadened beyond transaction growth to include greater transparency in the process of dispute resolution, more responsiveness to recovery, and greater mechanisms for consumer protection. The results of the study indicate that digitally marginalized groups, rural users, low-literacy users and elderly users are likely to experience structural compulsion at much higher levels than educated, high-frequency users, with much less solid voluntary trust bases.

6.2 Implications for Payment Service Providers

The findings show that among the four components of the fraud communication process, the effects of fraud anxiety on institutional trust are negative (β = -.163), meaning that the strategies of fraud communication at the platform level should be adapted. What is happening now is that PhonePe, Google Pay and Paytm are taking a step towards responding to alerts of fraud. The key to better ways forward is to communicate the capacity of the institutional system to cope and the specific measures taken to protect and detect a problem, as well as recovery options at the point of

the transaction, according to Protection Motivation Theory. Transactionally efficient, long-term ecosystem legitimacy, however, relies on transactional efficiency and also recovery assurances (which are easily observed). For digitally mediated interactions, user-friendly complaints processing, ease of refunds, and fraud resolution support are effective ways of establishing trust with the user. Helping with complaints, enabling refunds and dealing with fraud is a positive method for fostering confidence in online interactions. Dependent payment environments. In the case of users who cannot structure their way out of the system (resistance to use), however, resistance is negatively related to acceptance depth ($\beta = -.081$) and identifies an important segment: Users who structure their way out of the system but do not really accept. This segment could be reached with a frictionless feature discovery of UPI; the effort savings and attitudinal buy-in may be gained.

6.3 Implications for IS Research Practice

This study is important from a methodological perspective due to the capacity to identify enabling and inhibiting pathways in a single structural model that offers a practical model for future studies of IS adoption. This study is a full working out of the argument for models that include inhibitors, which Cenfetelli and Schwarz (2011) made 10 years ago. According to the theory, the perceived necessity to use and the cognitive burden and resistance to use are two separate inhibiting factors and should be considered as such in the mandatory digital service adoption (such as EHR, government digital service portals, compulsory fintech platforms) in the UTAUT / TAM extension to mandatory digital service adoption.

7. Limitations and Future Research

7.1 Limitations

First of all, the study used a convenience sampling method and was restricted to users of UPI who are active in Chennai. Therefore, the results are not necessarily applicable to the general Indian population, especially low-literacy users, elderly users, the digitally marginalised, and rural users who might have different experiences in their adaptation of digital payments and in how they trust institutional services.

Second, the study used a cross-sectional research design, and it is difficult to use this design to make causal inferences between the constructs. The proposed relationships are based on well-supported theory, but longitudinal studies would yield more evidence of changes in the level of trust, fraud anxiety, resistance to use, and perceived necessity over time.

Third, the study was based on self-reported responses to surveys. Common method variance, recall bias, and social desirability bias are possible biases with perceptual measures, as with all perceptual measures. Self-reported measures could be complemented with behavioural measures (transaction frequency, use of features, etc., digital payment usage records) in future studies.

Lastly, the study targeted urban, educated and high-frequency users of the UPI. This population is suitable for studying the parameters of post-adoption behaviour, but the results might not reflect the experiences of digital users with lower levels of digital literacy and limited access to digital infrastructure. Further studies are needed to investigate the proposed relationships with demographic and socio-economic differences.

7.2 Future Research Directions

Equity-Sensitive Digital Divide Research: Stratified rural and low-literacy sampling would test whether perceived necessity to use, fraud anxiety, and resistance to use exhibit significantly different magnitudes and structural relationships, providing an empirical foundation for equity-sensitive digital financial inclusion policy design.

Longitudinal Dynamics: Panel design tracking users across 12-24 months would capture temporal dynamics of trust formation and compulsion perception, enabling causal modelling of enabling and inhibiting pathways that cross-sectional designs can only correlate.

Cross-National Generalization: Comparative extension testing of the compelled acceptance

mechanism generalization beyond India to Kenya's M-PESA, China's Alipay/WeChat duopoly, and Brazil's PIX instant payment infrastructure, where structurally analogous mandatory adoption conditions exist.

Qualitative Phenomenology: Phenomenological or grounded theory approaches would complement structural findings by illuminating users' subjective interpretations of structural compulsion, its emotional valence, and effects on long-term digital payment identity.

Future research may decompose fraud anxiety into separate threat-appraisal and coping-appraisal dimensions to provide a more nuanced understanding of how perceived risk influences institutional trust and digital payment acceptance.

8. Conclusion

The UPI system in India is a system of research that is theoretically productive in two ways: It sees 185.8 billion transactions annually, and yet it also encounters 1.342 million frauds annually, institutional dependency on infrastructure, and documented institutional trust deficits. The current IS adoption models (TAM, UTAUT, and their extensions) target voluntary adoption contexts, which are characterized by availability, which translates as reliability, and where the users have a real choice. No one of these conditions is present in its entirety in post-demonetization India. This study develops and tests a theoretically grounded set of three innovations in the Dual-Factor Reliability Trust Framework, which helps meet this explanatory gap. First, it empirically decomposes and sequentially correlates availability and perceived reliability, and finds that accessibility is a necessary but not sufficient condition for functional experience that is relevant to trust and leads to real acceptance. Second, it also captures enabling and inhibiting forces as independent causal pathways, corroborating the idea that the feelings of fraud risk do not reduce institutional trust but rather do so independently. Third, it generalises Mandatory Use Theory to the adoption of digital payment acceptance, where perceived necessity to use is an independent direct influence on the adoption. The indicator of UPI's adoption rate may not have accurately reflected actual acceptance. They assess a mixture of both voluntary trust-based engagement and structurally forced participation. While the trust deficit that stems from the incidence of fraud and the lack of recovery, and the dependence of the ecosystem on UPI infrastructure, are still a threat, the digital payment ecosystem will not be able to withstand the attack until the policymakers, regulators and platform operators distinguish between these components and measure and design for genuine institutional trust. Willing, confident, full-depth engagement requires the perception of reliability, fair institutional response to failure, and a systematic effort to lower the fraud anxiety that blocks trust and creates the need for digital financial inclusion. This requires more than simply creating the availability of infrastructure, as India has done at scale; it requires converting that availability into perception of reliability, making institutional response to failure fair and accessible, and systematically lowering the fear of fraud.

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