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Research Article

Evaluating User Engagement and the Influence of UPI on Digital Payment Systems in India

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ABSTRACT

Purpose- Unified Payments Interface has revolutionized the landscape of digital payments ecosystem in India, providing a seamless and instantaneous payment mechanism that enhances financial inclusion and user convenience. This research survey seeks to evaluate the rates of adoption, usage behaviours, & overall influence of UPI services. The study explores many factors that resulted in the broad acceptance of UPI, including Perceived Ease of Use (PEOU), Perceived Usefulness (PU), security, government regulations. Furthermore, the research addresses the impact of behavioural intentions results to actual usage.

Design/methodology/approach- This research is underpinned by the conceptual framework of the Technology Acceptance Model (TAM) and the Diffusion of Innovation (DoI). A study was conducted involving a sample of 202 participants. The validation of the framework & subsequent analysis was carried out by the Structural Equation Modeling (SEM) technique.

Findings and managerial implications- The findings underscore UPI's significance in fostering cashless transactions, its role in advancing the digital economy, and its potential to serve as a benchmark for digital payment systems.

Originality- The paper also explores policy implications and offers recommendations aimed at enhancing UPI's accessibility and effectiveness within India's varied socio-economic landscape.

Keywords: Unified Payments Interface; Cashless Transaction; Digital Payment; Banking.

INTRODUCTION

India has predominantly operated as a cash-based economy, with over 90% of personal expenditures conducted through cash transactions (Chandra, 2017). The demonetization initiative of 2016 laid the groundwork for the UPI, enabling smooth “inter-bank fund transfers.” The UPI is a platform that consolidates various bank accounts within a single application, integrating numerous banking functionalities, efficient fund transfers, & merchant transactions into one platform. Additionally, it facilitates collection requests on a "Peer to Peer" basis, allowing for arrangements and settlements according to individual needs and preferences. It was launched on 11th April 2016 and as of October 2024, there are 632 banks live on UPI. The Nielsen Report (2016) reveals that the declaration of demonetization resulted in a significant rise in the utilization of electronic payment systems, especially digital wallets. Such measures executed by the “Government of India” (GoI) are likely to encourage the widespread acceptance of all forms of electronic payment systems, such as e-wallets, & assist in the shift from cash-dependent economy to a cashless economy.

The UPI was introduced by the “National Payments Corporation of India” (NCPI), in April 2016. This innovative system allows users to transfer funds utilizing a virtual ID, eliminating the necessity for sharing details of bank account. Presently, thirty-six banks are participating in the UPI framework. According to data from NPCI, there have been a total of 70.3 million transactions, amounting to Rs 25.94 billion since the system's inception. The “Bharat Interface for Money” (BHIM), an app, launched by the Indian government in December 2016, designed specifically for facilitating money transfers from bank accounts via UPI. The next iteration of the BHIM app is integrated with the Aadhaar card, enabling users to send and receive funds using the twelve-digit Aadhaar number. Furthermore,

there are plans to enhance the app by linking it with the “Unique Identification Authority of India” (UIDAI), Aadhaar database, thereby introducing a biometric-based payment option.

There have been instances where certain innovations encountered challenges in gaining acceptance among consumers (Danneels, 2003; Moore, 2002), as the decision to resist innovation is a deliberate choice made by the consumer (Szmigin and Foxall, 1998).

Incidents involving security flaws or breaches of data privacy greatly diminish the trust that users place in these services (Gandhi & Kar, 2024; Buckley et al., 2019). When financial services align with consumer expectations, yet the technology lacks user-friendliness, usability, or tangible benefits, consumers may be reluctant to engage with it (Rupeika-Apoga & Wendt, 2022). As smartphone ownership continues to rise and mobile applications become more user-friendly, the ease of conducting digital transactions has markedly improved for the Indian populace. (ETBFSI, 2021). The study conducted to address the questions:

1. Do higher security features, perceived ease of use, perceived useful, government regulations play an active role in behavioral intention to adopt UPI services?
2. Does behavioral intention to adopt UPI services result in actual usage?
3. Do higher security features, perceived ease of use, perceived useful, government regulations positively or negatively influence actual usage?

The objectives for the study were to:

1. To investigate external factors like the impact of security and government regulations on consumer and country’s behavioral intention to use UPI services.
2. To assess the internal factors like effect of user’s PEOU and PU like compatibility on behavioral intention to use.
3. To understand if the behavioral intentions to use result in actual usage of UPI services.

REVIEW OF LITERATURE

In 1989, Davis put forth the TAM which is based on the “Theory of Reasoned Action” (TRA) and investigates an individual's inclination to participate in technology-related activities. The TAM has been utilized in studies exploring user adoption of diverse technologies, such as spreadsheet applications, word processing software and websites. This model was proposed by Davis in 1989, is frequently employed in various studies to assess user engagement and their intentions to recommend technology (Singh and Srivastava, 2020; Malaquias and Silva, 2020). Numerous investigations into technology utilization are based on established frameworks like TAM, which may neglect external factors that affect user behavior. The DOI theory, developed by American scholar Everett Rogers in 1962, aims to examine the trends associated with the adoption of innovations, highlighting the essential factors that can predict both the success and the pace of innovation adoption within a social framework.

PEOU is the degree to which an individual believes that using a particular system would necessitate minimal effort. This concept highlights the user's viewpoint regarding the effort required to engage with technology and is instrumental in forecasting the likelihood of embracing new technological advancements. The significance of PEOU is especially evident in evaluating the acceptance of “Computer-Based Learning Technologies” (CLT), as it acts as a fundamental and often cited precursor. PU is characterized by the level of belief an individual holds regarding the potential of a specific system to improve their job performance (Davis, 1989). This belief leads users to acknowledge the added value of adopting innovative technologies (Lisana, 2021). In this context, perceived usefulness evaluates how an individual perceives the efficiency of a cashless transaction method relative to cash transactions. The term "Behavioural Intention” (BI) pertains to an individual's perceived likelihood or readiness to perform a specific behaviour, such as the implementation of CLT. Additionally, previous studies have revealed a significant relationship between Behavioural Intention & actual behaviour (Shin, 2009; Patil et al., 2020).

Resistance to mobile and e-banking is primarily linked to significant security & privacy issues (Kuisma et al., 2007; Thakur and Srivastava, 2014). The importance of security was highlighted by the observation that users tend to perceive a service as advantageous when they trust its capacity to protect their financial data. The regulatory landscape can affect innovation in both positive and negative manners (Baker, 2012). Governments establish regulations aimed at encouraging technological advancement while requiring organizations to comply with certain technology standards (Zhu et al., 2003). These regulations are established as laws designed to assist and safeguard

organizations engaged in innovative pursuits (Makena, 2013; Nkhoma and Dang, 2013). The theory of Diffusion of Innovation is frequently employed in various research to examine users' intentions regarding the utilization and recommendation of mobile payment systems. In our research, we have adopted a synergistic approach that integrates the TAM along with the DOI model. This combination facilitates a comprehensive understanding of both macro and micro-level variables that facilitate the adoption of the UPI system.

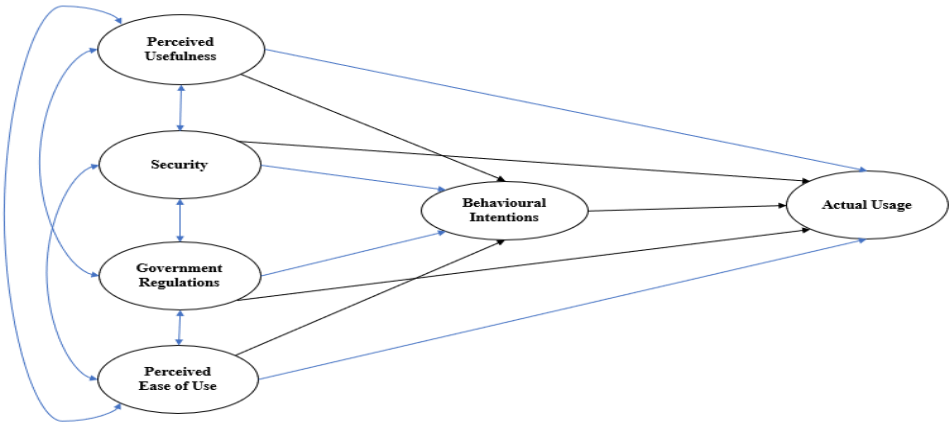

Figure-1: Conceptual Model

The conceptual model was developed with the amalgamation of TAM and DoI model. The Figure 1 shows how external factors (like security or regulations), and internal perceptions (like usefulness or ease of use) converge to drive both user intention and the eventual adoption of technology. As per the research question, objectives & review of literature, the below hypothesis was developed:

H1: PU is positively correlated with BI for using UPI services (PU→BI)

H2: Knowledge of UPI security is positively correlated with BI for using UPI services (Security→BI)

H3: Knowledge of UPI government regulations is positively correlated with the BI for using UPI services (GR→BI)

H4: PEOU is positively correlated with the BI for using UPI services (PEOU→BI)

H5: User's BI is positively correlated with the Actual Usage of UPI services (BI→AU)

H6: PU is positively correlated with Actual Usage for using UPI services (PU→AU)

H7: Knowledge of UPI security is positively correlated with Actual usage for using UPI services (Security→AU)

H8: Knowledge of UPI Government Regulations is positively correlated with the actual usage for using UPI services (GR→AU)

H9: PEOU is positively correlated with the Actual Usage for using UPI services (PEOU→AU)

METHODOLOGY

An estimated sample size determination for Structural Equation Models is crucial for establishing the necessary minimum sample size, which is suggested to be 150. The survey was conducted from September 2024-October 2024. A total of 202 respondents were surveyed. As indicated by Gerbing and Anderson (1992), a minimum sample size of 200 is suggested when utilizing the SEM approach. Additionally, Baker (1994) suggests that for pilot studies, it is generally sufficient to use 10 to 20% of the planned main sample size. A pilot study was done with 47 respondents, and the complete sample was analyzed through the SEM technique. Considering the uncertainty related to this group, the investigation utilized convenience sampling to acquire the necessary responses (Al-Saedi et al., 2020). The decision to implement a five-point scale was based on the understanding that respondents generally prefer numerical choices that are divisible by "five," thus improving the quality of data collection and accuracy (Saris and Gallhofer, 2007). In this context, the value "1" signifies "strongly disagree," whereas the value "5" indicates "strongly agree."

A systematic, self-completed questionnaire was created consisting of two primary sections. The initial part of the questionnaire collected demographic data from participants utilizing a nominal scale. The second section employed

a “five-point Likert scale,” A score of one reflects a significant level of disagreement, whereas a score of five represents a high level of agreement. The study's design and parameters presented in Table 1 which were based on the previous research and were also self-developed. Due to the simultaneous collection of data, which rendered it non-longitudinal in nature and structural equation modelling was deemed the most suitable methodological approach.

Karim et al. (2022)	“I consider UPI services to be beneficial for my everyday financial transactions.”
	“The adoption of UPI services significantly boosts my productivity in handling financial matters.”
	“UPI services boost my efficiency”
Kersten and Koch (2010)	“I am assured of the security associated with my transactions when utilizing the UPI service.”
	“I am assured that UPI services protect my financial information with adequate security measures.”
	“I trust that UPI services ensure my privacy and confidentiality are maintained.”
Self-developed	“Government regulations are important to trust UPI services.”
	“I have encountered information or guidance provided by the government regarding UPI usage.”
	“I am confident in the effectiveness of government regulations in ensuring the security of UPI transactions.”
Jangir et al. (2022)	“I consider UPI services to be user-friendly.”
	“I find it quite simple to learn how to utilize UPI services.”
	“Utilizing UPI services is simple and demands very little effort from me.”
	“The UPI application offers a simple and intuitive interface that is easy to follow.”
Rauniar et al. (2014)	“I make consistent use of UPI services to perform financial transactions in my day-to-day life.”
	“I depend on UPI services for a variety of my financial transactions.”
	“My utilization of UPI services has grown progressively over time.”

Table 1: Measurement items

RESULTS AND DISCUSSION

Chart 1 illustrates that the sample consisted of 55.4 per cent of males and 44.6 per cent of females. Chart 2 presents the age distribution, indicating that 89.6 per cent of participants belong to the 18-25 age group, 4 per cent are in the 26-35 age range, 5.4 per cent fall within the 36-45 age group, while 0.5 per cent are aged 46-60 years, and another 0.5 per cent are over 60 years. As depicted in Chart 3, educational attainment reveals that 3 per cent have completed high school, 34.2 per cent hold undergraduate degrees, 61.9 per cent are postgraduates, and 1 per cent possess doctoral degrees. Chart 4 outlines the occupational status of the sample population, showing that 88.6 per cent are students, 0.5 per cent are employed in the public sector, 5.9 per cent work in the private sector, 3 per cent are self-employed, and 2 per cent are homemakers. Chart 5 indicates that 74.8 per cent of the population does not earn an income, primarily comprising students and homemakers. Approximately 6.9 per cent earn up to 20,000 rupees per month, 8.9 per cent earn between 20,001 and 50,000 rupees, 5 per cent earn between 50,001 and 100,000 rupees, and 4.5 per cent earn above 100,000 rupees per month. Finally, Chart 6 reveals that 35.1 per cent of respondents are from Tier-I cities, 29.7 per cent from Tier-II cities, 10.4 per cent from Tier-III cities, 16.8 per cent from towns, and 7.9 per cent from rural areas.

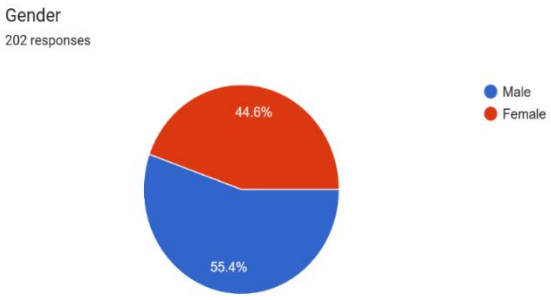

Chart 1: Sample Population's Gender

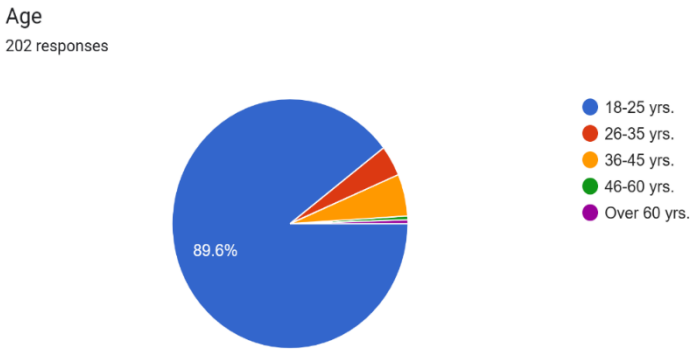

Chart 2: Sample Population's Age

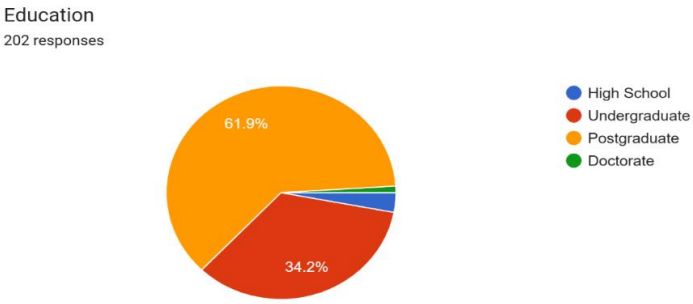

Chart 3: Sample Population's Education

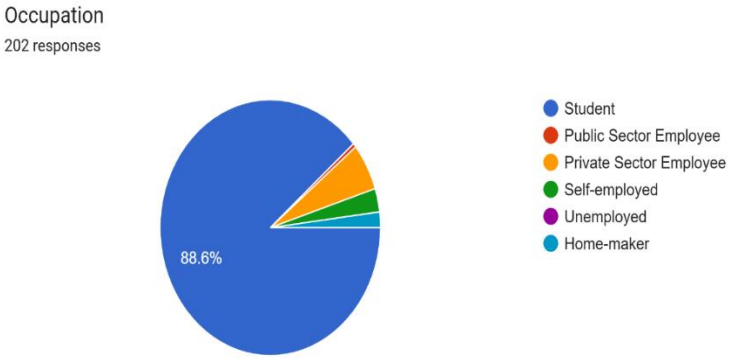

Chart 4: Sample Population's Occupation

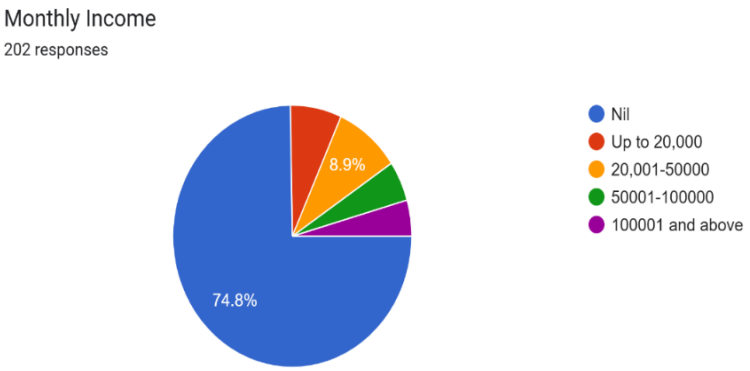

Chart 5: Sample Population's monthly income

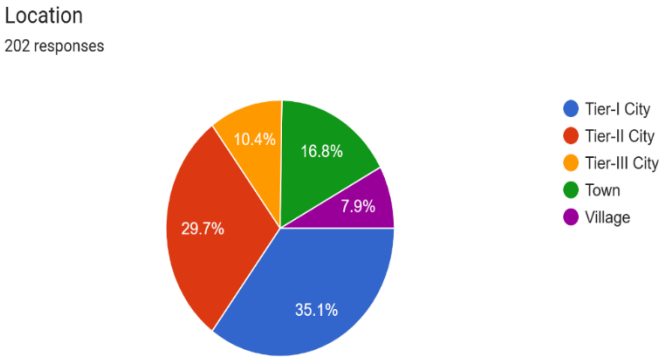

Chart 6: Sample Population's location

The Table 2 shows the reliability or internal consistency. The Cronbach's alpha values for all constructs exceeded 0.70, indicating a strong internal consistency among the research constructs employed (Nunnally, 1978)

Classification	Cronbach's α
PU1	0.811
PU2	0.811
PU3	0.811
S1	0.828
S2	0.828
S3	0.828
GR1	0.8
GR2	0.8
GR3	0.8
PEOU1	0.909
PEOU2	0.909
PEOU3	0.909
PEOU4	0.909
BI1	0.863
BI2	0.863
BI3	0.863

Table 2: Internal Consistency

Note: PEOU-Perceived Ease of Use; PU-Perceived Usefulness; BI-Behavioural Intention; GR-Government Regulation; SEC-Security.

Table 3: Principal Component Analysis

Dimension	Cronbach's α	Eigenvalue	% of variance
1	0.937	3.498	21.865
2	0.905	2.836	17.725
3	0.925	2.724	17.026
4	0.906	2.345	14.657
5	0.907	1.934	12.095
Total	0.987	13.339	83.368

Table 3 exhibits the Total variance explained by all 5 groups is measured by Cronbach's alpha (0.987), measures reliability or internal consistency. Totally 83.368 % of Variance explained by all 5 components. Calculated Cronbach's Alpha 0.987 shows data have Excellent Internal Consistency.

KMO measure of sampling adequacy		0.945
Barlett's test of sphericity	Approx. Chi-Square	2168.27
	Df.	120
	Sig.	0

Table 4: Factor Analysis

In the above Table 4 output KMO measure of sampling adequacy statistics is 0.945, this measure suggests the variables are correlated and data is well-suited for EFA. Bartlett's Test of Sphericity significant result is 0.000 (Sig. < 0.05) indicates matrix is not an identity matrix, i.e., variables do relate to one another and enough to run a meaningful EFA.

Communalities		
Variable	Initial	Extraction
1	1	0.732
2	1	0.774
3	1	0.788
4	1	0.677
5	1	0.779
6	1	0.744
7	1	0.800
8	1	0.696
9	1	0.876
10	1	0.842
11	1	0.829
12	1	0.780
13	1	0.732
14	1	0.747

15	1	0.831
16	1	0.766

Extraction method: “Principal Component Analysis”

Table 5: Communalities

Table 5 shows all Extraction communalities are above 0.4, this indicates items or variables correlate with all other items or variables and variables may not struggle to load significantly on any factor.

		Initial eigenvalue		Extraction Sums of Squared Loadings			Rotation sums of squared loadings
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	8.856	55.348	55.348	8.856	55.348	55.348	7.106
2	1.309	8.179	63.527	1.309	8.179	63.527	6.496
3	0.891	5.568	69.094	0.891	5.568	69.094	5.835
4	0.749	4.682	73.776	0.749	4.682	73.776	6.397
5	0.589	3.683	77.459	0.589	3.683	77.459	3.228
6	0.520	3.252	80.712				
7	0.432	2.698	83.410				
8	0.416	2.599	86.009				
9	0.409	2.556	88.565				
10	0.357	2.234	90.799				
11	0.306	1.913	92.712				
12	0.291	1.821	94.534				
13	0.259	1.618	96.152				
14	0.224	1.398	97.550				
15	0.203	1.270	98.819				
16	0.189	1.181	100				

Table 6: Total Variance

From the Table 6, it can be seen that 5 components explain nearly 77% of variability in the original 16 variables. The extraction method followed was “Principal component analysis” (PCA).

Pattern Matrix					
	1	2	3	4	5
PU1			0.613		
PU2			0.922		
PU3			0.844		
S1					
S2				0.899	
S3				0.776	
GR1	0.708				
GR2				0.658	
GR3					0.817
PEOU1	0.992				
PEOU2	0.843				
PEOU3	0.643				
PEOU4					
BI1		0.66			

BI2		0.923			
BI3		0.927			

Table 7: Pattern Matrix

The Table 7 shows that all the Items have strong loadings (>0.6) on their respective components, indicating clear alignment with underlying latent variables. The extraction method followed was PCA and the method of rotation was "Promax with Kaiser Normalization".

Component Correlation Matrix					
Component	**1**	**2**	**3**	**4**	**5**
1	1.000	0.671	0.555	0.629	0.435
2	0.671	1.000	0.560	0.571	0.339
3	0.555	0.560	1.000	0.632	0.366
4	0.629	0.571	0.632	1.000	0.482
5	0.435	0.339	0.366	0.482	1.000

Table 8: Component Correlation Matrix

The data presented in Table 8, Pattern Matrix, illustrates a robust factor structure characterized by clear evidence of convergent and discriminant validity, as indicated by high loadings within the respective factors and the absence of significant cross-loadings among them. Factor Correlation Matrix shows correlation between factors are below 0.70. Confirmatory Factor Analysis done through Structural Equation Model using SPSS AMOS to see Causal relationships among 5 groups or constructs and regression estimates / path coefficients for significantly measured variables. The Figure 2 shows that PU1 and PU3 strongly contribute to the PU construct, while PU2 has a weaker contribution. All three indicators namely S1, S2, S3 contribute significantly to the security construct, with S2 being the strongest contributor. GR1 is the strongest indicator of government regulations, followed by GR2, while GR3 is the weakest. All four indicators from PEOU1-PEOU 4 have strong contributions to PEOU, with PEOU3 being the strongest. Among BI1-BI3, BI2 is the most important indicator of behavioural intentions, suggesting it captures more variance than the others.

The data in Table 9 showing the relationships between several latent constructs & observed variables. It shows that behavioural intentions are positively influenced by PEOU & security & negatively influenced by government regulations. The adoption use is significantly influenced by behavioural intentions & government regulations is negatively influenced by PEOU & security. Also, PU has a weaker negative effect on behavioural intentions & adoption use, with PEOU being more consistently significant. From Table 10, it can be inferred that government regulations appear to have a significant impact on both behavioural intentions & adoption. A more regulatory environment seems to reduce intentions to use and adopt the system, but paradoxically, its direct effect on adoption is positive.

Security concerns also affect behavioural intentions and adoption negatively, but it is a stronger negative factor in the case of adoption, suggesting that security issues may be a key barrier to actual use. PEOU & PU both seem to play key roles in influencing behavioural intentions but have opposite effects on adoption (PEOU negatively affects AU, while PU positively influences AU). This could imply that while ease of use is important for intention, real-world adoption might depend more on PU and the regulatory environment. Table 11 shows that the covariances among the latent variables (e.g., PEOU, Security, Government Regulations, & PU) are all positive and significant, which implies that the constructs are interrelated. This could suggest that perceptions of ease of use, usefulness, & security are influenced by similar underlying factors, such as regulatory constraints.

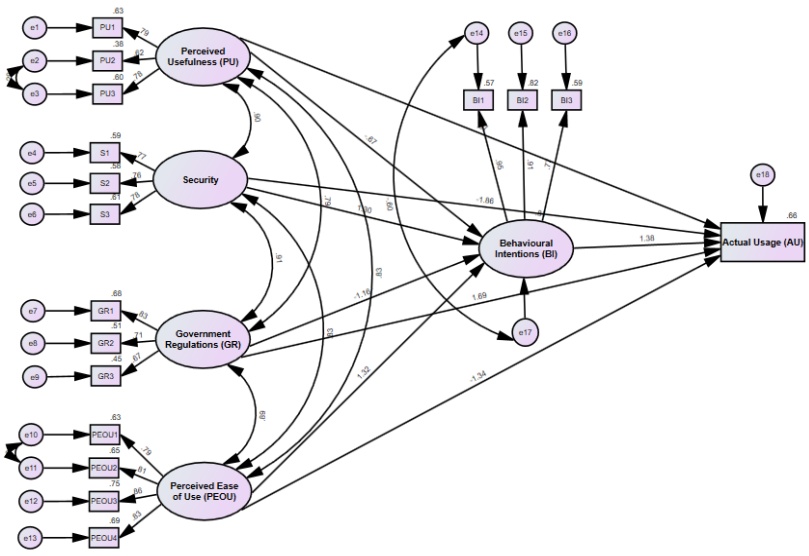

Figure 2: SPSS AMOS Path Diagram Output with Standardized Estimates

	Estimate	S.E.	C.R	P
BI <---PEOU	1.427	0.347	4.111	***
BI <---GR	-1.295	0.492	-2.633	0.008
BI<---Security	1.532	0.602	2.543	0.011
BI<---PU	-0.705	0.399	-1.765	0.078
PU1<---PU	1			
PU2<---PU	0.881	0.105	8.379	***
PU3<---PU	0.963	0.089	10.886	***
S1<---Security	1			
S2<---Security	1.027	0.093	11.059	***
S3<---Security	1.066	0.094	11.335	***
GR1<---GR	1			
GR2<---GR	0.887	0.082	10.813	***
GR3<---GR	0.820	0.082	9.972	***
BI1<---BI	1			
BI2<---BI	0.937	0.069	13.512	***
BI3<---BI	0.829	0.077	10.827	***
PEOU1<---PEOU	1			
PEOU2<---PEOU	0.972	0.063	15.341	***
PEOU3<---PEOU	1.039	0.075	13.787	***
PEOU4<---PEOU	0.930	0.071	13.066	***
AU<---BI	1.498	0.456	3.283	0.001
AU <---PEOU	-1.571	0.845	-1.859	0.063
AU<---GR	2.042	1.003	2.035	0.042
AU<---Security	-2.380	1.233	-1.930	0.054
AU<---PU	1.107	0.719	1.540	0.124

Table 9: Regression Weights

It can be seen from Table 12 that there is a consistent and strong relationship between security, government regulations, & PU or PEOU. These factors seem to influence each other heavily. From Table 13, almost all variables, both latent (PU, Security, etc.) and observed (e1, e2, e3, etc.), show statistically significant results (p-values are very small, often denoted by ***). The observed variables like e2 and e9 have high variances, suggesting greater variability and likely greater importance in explaining the latent variables. e17 and e15 have lower variances, implying that these variables show less variation within the dataset but still significantly contribute to the model. The model seems robust, with significant relationships and variances across both latent & the observed variables. The latent variables related to technology perceptions (e.g., PU, Security, Government Regulations) show substantial variability, as do the observed variables.

	Estimate
BI <---PEOU	1.324
BI <---GR	-1.163
BI<---Security	1.302
BI<---PU	-0.672
PU1<---PU	0.793
PU2<---PU	0.619
PU3<---PU	0.775
S1<---Security	0.768
S2<---Security	0.763
S3<---Security	0.780
GR1<---GR	0.827
GR2<---GR	0.712
GR3<---GR	0.668
BI1<---BI	0.950
BI2<---BI	0.908
BI3<---BI	0.766
PEOU1<---PEOU	0.794
PEOU2<---PEOU	0.808
PEOU3<---PEOU	0.864
PEOU4<---PEOU	0.829
AU<---BI	1.378
AU <---PEOU	-1.342
AU<---GR	1.686
AU<---Security	-1.860
AU<---PU	0.970

Table 10: Standardized Regression weights

Covariances	**Estimate**	**S.E**	**C.R**	**P**
GR<-->PEOU	0.503	0.067	7.495	***
Security<-->PEOU	0.444	0.063	7.006	***
Security<-->GR	0.469	0.063	7.384	***
PU<-->Security	0.493	0.069	7.143	***
PU<-->GR	0.457	0.067	6.846	***
PU<-->PEOU	0.493	0.070	6.995	***
e10<-->e11	0.099	0.029	3.444	***
e14<-->e17	-0.123	0.046	-2.654	0.008
e3<-->e2	0.157	0.052	2.986	0.003

Table 11: Covariances

Covariances	Estimate
GR<-->PEOU	0.894
Security<-->PEOU	0.834
Security<-->GR	0.910
PU<-->Security	0.902
PU<-->GR	0.791
PU<-->PEOU	0.826
e10<-->e11	0.314
e14<-->e17	-0.604
e3<-->e2	0.291

Table 12: Correlations

	Estimate	S.E.	C.R.	P
Perceived Usefulness	0.613	0.098	6.232	***
Security	0.487	0.079	6.177	***
Government Regulations	0.544	0.080	6.806	***
Perceived Ease of Use	0.582	0.089	6.558	***
e17	0.130	0.059	2.226	0.026
e3	0.377	0.052	7.188	***
e2	0.765	0.088	8.681	***
e1	0.362	0.052	6.932	***
e6	0.357	0.044	8.199	***
e5	0.368	0.044	8.391	***
e4	0.338	0.041	8.337	***
e10	0.342	0.040	8.506	***
e9	0.454	0.051	8.962	***
e8	0.416	0.048	8.670	***
e7	0.251	0.036	7.000	***
e18	0.272	0.106	2.565	0.01
e14	0.320	0.050	6.351	***
e16	0.326	0.038	8.492	***
e13	0.228	0.028	8.221	***
e12	0.214	0.028	7.608	***
e11	0.293	0.035	8.375	***
e15	0.126	0.028	4.435	***

Table 13: Variance

Table 14 shows that item, Behavioural Intentions (0.807), appears to have a high factor loading, suggesting a strong association with the latent construct of behavioural intentions. These are different items measuring PEOU (e.g., PEOU2, PEOU3), with values ranging from 0.653 to 0.746, indicating a moderate to strong association with the latent construct of PEOU. Items like PU1 (0.629), PU2 (0.383), and PU3 (0.601) are moderately associated with PU. PU2 has a notably lower value, which might suggest it is a weaker indicator of the construct. AU (0.658) indicates a moderate level of association with the attitude toward using the technology or system. Items GR1, GR2, and GR3

range from 0.446 to 0.685, showing varying levels of association with the group construct. GR3 is the weakest indicator here. S1, S2, S3): These seem to correspond to satisfaction or other similar constructs, with values ranging from 0.582 to 0.608.

	Estimate
PEOU1	0.630
PEOU2	0.653
PEOU3	0.746
PEOU4	0.688
S1	0.590
S2	0.582
S3	0.608
GR1	0.685
GR2	0.507
GR3	0.446
BI1	0.572
BI2	0.824
BI3	0.587
Behavioral Intentations	0.807
AU	0.658

Table 14: Squared Multiple Correlations

Table 15 shows that “Chi-Square” to “Degrees of Freedom” ratio of 1.846 suggests that the model has an acceptable fit. “Root Mean Square” value of 0.038 considered acceptable. “Goodness of Fit Index” of 0.85 and above is still considered acceptable. “Adjusted Goodness of Fit” value of 0.842 considered acceptable. “Parsimony Goodness of Fit Index” value of 0.596 is acceptable. “Normed Fit Index” value of 0.920 is excellent, as values above 0.90 indicate good fit. “Relative Fit Index” of 0.893 is slightly below the 0.90 threshold but still acceptable.

Measures	**Value**
$\chi 2$	188.296
df.	102
P value	0.000
$\chi 2 \div df$	1.846
RMR	0.038
GFI	0.895
AGFI	0.842
PGFI	0.596
NFI	0.920
RFI	0.893
IFI	0.962
TLI	0.948
CFI	0.961
P Ratio	0.750
PNFI	0.690
PCFI	0.721
RMSEA	0.065

Table 15: Model Fit Summary

Note: df - Degree of Freedom; RMR - Root Mean Square Residual; GFI - Goodness of Fit Indices; AGFI - Adjusted Goodness of Fit Indices; PGFI - Parsimony Goodness of Fit Indices; NFI - Normed Fit Index; RFI - Relative Fit Index; IFI - Incremental Fit Index; TLI - Tucker-Lewis Fit Index; CFI - Comparative Fit Index; PNFI - Parsimonious Normed Fit Index; PCFI - Parsimonious Comparative Fit Index; RMSEA - Root Mean Square Error of Approximation

CONCLUSION

It can be interpreted that PU strongly influences users' behavioural intentions. Hence, when users find a system useful, their intention to use it increases substantially. Security has a strong negative influence on behavioural intentions. This could imply that higher security measures may be perceived as barriers or overly restrictive. Government regulations negatively influence behavioural intentions, possibly indicating that stricter regulations reduce users' willingness to engage with the system. PEOU strongly influences BI, indicating that when users find the system easy to use, their intention to adopt it increases significantly. BI has a direct and substantial positive influence on actual usage. This indicates that users' intention to use the system is the most important predictor of actual usage behavior. PU and PEOU positively influence actual usage, reinforcing their indirect effects via BI. Security moderately increases actual usage, indicating that a certain level of security is appreciated by users. Government regulations directly reduce actual usage, potentially reflecting restrictions that deter users.

Theoretical contribution

The UPI platform is projected to become an essential payment medium. This study has enriched the current understanding of UPI in India. To analyse the enablers and obstacles associated with UPI, we have introduced two significant factors: government regulations and security, which have not been previously examined in the literature. These factors are critical for establishing user trust in such applications. Additionally, our research integrates both the "Diffusion of Innovations" & the "Technology Acceptance Model" facilitating a deeper insight into user intentions and behaviours regarding innovation. Our study confirms that behavioural intention is a key factor of actual usage behavior, emphasizing the importance of intentions as an antecedent to the adoption of UPI services.

Practical implications

The conclusions drawn from our research highlight the significance of user satisfaction in influencing the intention to recommend services. Thus, it is suggested that UPI service providers adopt a proactive approach to marketing, ensuring that they clearly present the unique benefits of their offerings. They should focus on promoting essential features such as complete security, 24/7 availability, and reliability. Moreover, the decision-making of young adults is deemed critical in the acceptance & the use of emerging technologies. The ramifications of this investigation are significant for UPI service providers, as they provide insights into the perceptions and behaviours of young adult users. This research has identified key factors that are associated with participants' intentions to adopt, utilize, and recommend UPI services. Therefore, it is suggested that UPI service providers prioritize understanding these factors to encourage potential customers to adopt and engage with their services.

Limitations and Future Scope

This study offers significant insights; however, it is essential to understand certain limitations that may inform future research directions. The application of qualitative methods, like interviews and focus groups, could provide a richer understanding of users' perceptions and their experiences concerning UPI engagement and its effects. The sample size is confined to 202 individuals, suggesting that future research should aim to increase this number to bolster the generalizability of the findings & improve accuracy in statistical analysis. Furthermore, additional variables like service quality & user satisfaction could be examined in future investigations. The use of convenience sampling may limit the generalizability of the results to the wider population, indicating that the findings may not completely represents the population, at large.

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