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Article

Technology Adoption in Rural and Urban Gujarat: A UTAUT Study with Risk and Anxiety as Moderators.

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Abstract: Digital payment systems have rapidly evolved over the past decade, particularly in developing country like India offering new levels of convenience, speed and efficiency. National Payments Corporation of India (NPCI) in 2016 introduced Unified Payment Interface (UPI) which has been a gamechanger in shifting the financial habits of millions of Indian consumers. UPI is widely used in India offering ease of use, security, and reduces dependency on cash or card-based payments. Innovative features like the All-in-One QR code system and have constantly shaped the evolution of UPI technology, especially in urban areas. However, in rural regions, anxiety and perceived risk continue to limit its widespread adoption. The present study tries to understand the psychological factors contributing to this divide. The study tried to examine the factors influencing the adoption and usage behavior of unified Payment Interface (UPI) among respondents in rural and urban areas. Using the UTAUT model, including behavioral intention (BI), use behavior (UB), performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), and perceived risk (PR) and anxiety (ANX) as moderating factors. The findings of the study confirm the effectiveness of the UTAUT constructs on the adoption of technology in both urban and rural respondents of Anand district in Gujarat. The research also revealed some unique finding that neither PR nor ANX significantly moderated the relationship, indicates a strong link between BI and UB among the rural and urban UPI users of Anand district of Gujarat.
Keywords: UTAUT, Unified Payment Interface (UPI), digital payment, rural, urban, Perceived Risk and Anxiety

1. Introduction:

Digital payment systems have rapidly evolved over the past decade, particularly in developing country like India offering new levels of convenience, speed and efficiency (Vishwakarma et al., 2024). Of these, National Payments Corporation of India (NPCI) in 2016 introduced Unified Payment Interface (UPI) which has been a gamechanger in shifting the financial habits of millions of Indian consumers (Khairnar & Malgikar, 2025). UPI allows real-time bank-to-bank transfer using smartphones and integrates various banking services into a single interface, enhancing accessibility and user convenience (Lakshmi & Saranya, 2025). India uses a number of mobile applications that enables UPI including Paytm, Amazon Pay, Google Pay, BHIM UPI, PhonePe and others (Sharma et al., 2023).

UPI is widely used in India and offers security and ease of use (Sakhiya et al., 2024). In addition, UPI decreases transaction costs and reduces dependency on cash or card-based payments, especially in urban areas where smartphones and internet penetration are higher (Khairnar & Malgikar, 2025; Vishwakarma et al., 2024) also Bhavsar and Samanta (2022) examined how cashless transactions support environmental sustainability in India.

In May 2025 alone, UPI processed 18.67 billion transactions valued at ₹25.14 trillion (approximately 293 billion USD), averaging nearly 7,000 transactions per second making India's position as the world leader in instant digital payments (NPCI) the platform has also become a soft power asset for India, contributing to global recognition of its digital innovation capabilities (Khairnar & Malgikar, 2025; NPCI).

In spite of its revolutionary advantages, not all Indians have adopted UPI equally (Gupta & Priya, 2025). Studies show that rural populations still face difficulties such as anxiety about digital transactions, perceived risk, and limited technological infrastructure, which generally force them to depend on traditional payment methods like cash or cheques (Gupta & Priya, 2025; Bhardwaj & Baruah, 2023). Urban populations are generally more comfortable using mobile-based financial services, but in rural regions, anxiety and perceived risk continue to limit widespread adoption (Indoria & Devi, 2021; Kaur et al., 2023). This differences in technology access, trust, and financial literacy reflects adoption behavior gap between urban-rural areas.

It is important to understand the psychological and infrastructural factors contributing to this divide to raise inclusive digital finance (Lakshmi & Saranya, 2025). Thus, the current study aims to examine and compare the key factors affecting UPI adoption behavior among rural and urban users in Anand District of Gujarat**,** focusing on elements such as performance expectancy, effort expectancy, social influence, facilitating conditions, and the moderating roles of anxiety and perceived risk.

1.1 Objectives:

1. To assess the impact **of behavioral cognitive factors on** Behavioral Intention
2. To assess the impact **of behavioral cognitive factors on** Use Behavior.
3. To assess the moderating effect of Anxiety and Perceived Risk between Behavioral Intention and Use Behavior.
4. To determine whether geographic location influence differences in BI and UB.

2. Literature Review:

India's banking industry has undergone a revolution due to digital payment technology, especially the Unified Payments Interface (UPI), which facilitates cashless transactions and streamlines user experiences (Sharma et al., 2023). Although Venkatesh et al. (2003), studied a notable differences in adoption trends between rural and urban populations because of differences in infrastructure, socioeconomic background, and psychological condition. Pal et al. (2025) state that although urban users enjoy the advantages of better infrastructure and a greater degree of digital engagement, rural users encounter obstacles such as poor internet access, low digital literacy, and high perceived risk. Differences in UPI adoption patterns across India's various regions have also been noted by a number of studies. Bharadwaj & Baruah (2023) pointed out that although digital transactions have increased locally rural and urban areas usage of UPI differs greatly. Urban users believe UPI to be quick, safe, and simple to use, but even within this group, cybersecurity issues and a lack of digital literacy continue to be obstacles (Lakshmi & Saranya, 2024).

UPI is extensively used for everyday transactions like grocery and electricity bills, it has also introduced innovative features in 2023 such as autopay for seamless recurring transactions and UPI lite for small value offline transactions (Verma et al., 2024) however people ignore it for financial decisions like investments and savings, as observed by Zohmingthanga et al. (2024), in their study on UPI usage in Mizoram. This finding highlights the continued relevance of perceived risk.

User demographic factors such as age and prior exposure to digital tools also play an important role. According to Shahiya et al. (2024), younger people with greater digital experience are more likely to use UPI than older users with less experience. This is further verified by Bharadwaj & Baruah (2024), who found that while rural users are aware of the advantages of UPI, they frequently hesitate because of anxiety and mistrust, while urban users expressed more satisfaction with the UPI service.

In the research on digital payments, psychological concepts like anxiety and perceived risk have also been investigated. According to Rashid et al. (2024), who used the Technology Acceptance Model (TAM) found perceived risk considerably lowers the perceived benefit of digital payments in rural Uttar Pradesh. Vidhya & Sankar (2023) found server failures issues among UPI users while Wang et al. (2022) in their study on cross-national adoption patterns found differences between rural and urban intentions to adopt UPI. Klapper (2017) studied small business and entreprenuers, Naeem et al. (2019) studied convenience of UPI in emerging ecomonies observing regional and demographic disparities.

Mobile technology adoption has been widely studied using models like TAM and UTAUT (Chhonker et al., 2018; Rahim & Uddin, 2021; Rahim et al., 2024), TAM has been criticised for not taking context-specific aspects and user diversity into consideration (Jimenez et al., 2020). In contrast UTAUT includes theoretical framework and combines core constructs such as Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC) (Venkatesh et al., 2003). The current study adds Anxiety (Anx) and Perceived Risk (PR)

as moderating variable in UTAUT model to investigate psychological barriers to UPI adoption in both rural and urban areas for thorough understanding in the Anand district of Gujarat.

2.1 UTAUT

The UTAUT model, which incorporates eight well-known theories—TRA, TPB, TAM, motivational model, combined TPB-TAM, diffusion of innovation, the model of PC utilization, and social cognitive theory—was created by Venkatesh et al. (2003) in response to the need for a unified model that brings together different theories of technology adoption. It accounts for up to 70% of the variance in adoption behavior (Venkatesh et al. 2003; Tarhini et al. 2016). The model includes four exogenous constructs—Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) and two endogenous constructs—Behavioral Intention (BI) and Use Behavior (UB) (Namahoot, 2022).

2.2 Performance Expectancy (PE)

Performance Expectancy (PE) is the trust that a system will help individual's to improve their performance (Sancaka & Subagio, 2014). In digital payments PE provides the advantages that users expect most such as efficiency, time savings, accessibility and convenience (Alalwan et al., 2018). According to earlier research, people are quite inclined to adopt mobile technologies like UPI when their PE is greater, particularly if they think the technology would improve their everyday transactions (Pal et al., 2025).

H1: Performance Expectancy (PE) has a positive effect on Behavioral Intention (BI) to use UPI.

2.3 Effort Expectancy (EE)

Effort Expectancy (EE) refers to the ease of use of the technology (Venkatesh et al., 2003). According to Wang (2017) and Farooq (2017) if a technology have both ease of use and convenience, it positively influences on user intention to adopt technology. EE is important for the adoption of UPI, particularly for older or less tech-savvy customers or first-time users. According to Al-Qeisi et al. (2015), EE has a greater influence in the early phases of adoption and may lessen as users gain system familiarity (Taiwo & Downe, 2013).

H2: Effort Expectancy (EE) has a positive effect on Behavioral Intention (BI) to use UPI.

2.4 Social Influence (SI)

The degree to which someone feels that significant individuals around them think they should adopt new system is measured by Social Influence (SI) (Venkatesh et al., 2003). According to Rogers (2003), these important people include the impact of peers, family, and friends on the adoption of technology. This is particularly important in societies like India where community dynamics are strong. According to Farah (2018) and Jha & Kumar (2021), SI has a greater impact on younger users and those in educational settings, such first-time UPI users.

H3: Social Influence (SI) has a positive effect on Behavioral Intention (BI) to use UPI.

2.5 Facilitating Conditions (FC)

According to Venkatesh et al. (2012), "facilitating conditions" (FC) are the resources and assistance that enable users to carry out desired actions. Digital literacy, internet connectivity, hardware availability, and technical support are all included in FC (Joshua & Koshy, 2011). It has been proved that FC has a major influence on Use Behaviour in the context of UPI, particularly for users in rural areas with less access to technology (Singh & Malik, 2019; Sivathanu, 2019). However, some research indicates that this association is context-dependent and is statistically non-significant (Baptista & Oliveira, 2015; Slade et al., 2015).

H4: Facilitating Conditions (FC) have a positive effect on UPI Use Behavior (UB).

2.6 Relationship between Behavioral Intentions (BI) and use behavior (UB)

Several models, such as TAM, TPB, and UTAUT, have shown that Behavioural Intention (BI) is a significant predictor of Use Behaviour (UB) (Ajzen, 1991; Venkatesh et al., 2003). While UB shows the actual implementation of technology adoption, BI records a user's motive or plan to use a particular technology. UB is strongly predicted by the degree of BI, especially in technological instances such as digital payments (Venkatesh et al., 2012) also supported by Patil et al. (2020) and Sivathanu (2019) in their research on digital payment systems. Rahim et al. (2024)

highlighted BI's predictive power in technology adoption research, while Patel et al. (2023) also discovered that BI acted as a mediator factor between attitude and UPI usage.

H5: Behavioral Intention (BI) has a positive effect on UPI Use Behavior (UB).

2.7 Anxiety:

According to Simonson et al. (1987) and Igbaria (1990), anxiety in context of technology use is the fear, tension, or discomfort people experience when using digital systems. In particular, it symbolizes a user's reluctance to engage in digital financial transactions, which is often driven by concerns about technical difficulty, data loss, or fraud (Venkatesh & Davis, 2000; Kaur et al., 2023). Anxiety has been shown to have a major impact on user behaviour. Singh & Srivastava (2020) discovered a negative association between anxiety and UPI adoption, while Korobili et al. (2010) identified a negative correlation between anxiety and user attitude towards technology. Patel et al. (2023) in their study found that anxiety may act as a primary psychological barrier for Indian users. However, no prior research on UPI has used anxiety as a moderating variable between behavioural intention and actual usage, although a fact that anxiety has frequently been examined as an independent predictor or mediator in few studies (Rana et al., 2017; Venkatesh & Bala, 2008). This study presents anxiety as a moderator in the UTAUT-1 framework, arguing that people with high anxiety are less likely to convert their intention into usage, even if they initially intend to use UPI, given its observed impact on user perceptions and trust (Indoria & Devi, 2021).

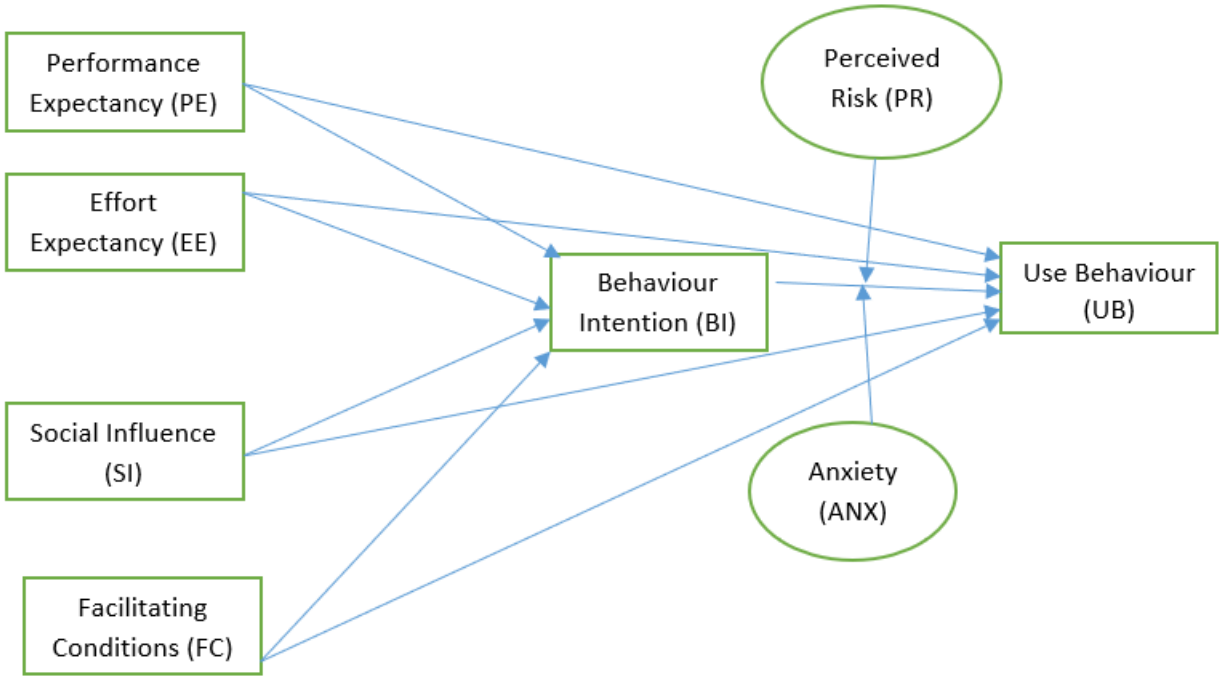
H6: Anxiety negatively moderates the relationship between behavioral intention and UPI use behavior.

2.8 Perceived Risk (PR):

According to Kim et al. (2008), perceived risk (PR) in digital transactions is the user's perception of possible unfavourable outcomes including money loss, data theft, or transaction failure. According to Bauer (1960) and Peter and Ryan (1976), risk is a combination of uncertainty and the magnitude of potential negative outcomes. This definition is based on traditional consumer behaviour literature. Previous studies have repeatedly demonstrated that PR decreases the intention to use digital technology (Kim & Kang, 2023; Yang et al., 2015). According to Rashid et al. (2024) and Indoria & Devi (2021), financial and data privacy issues considerably lower trust and perceived risk in the context of UPI, especially among rural users. Additionally, increasing PR may reduce rural women's effort expectation, which would further limit adoption, according to Swapna & Kanthimathinathan (2021). Even though PR has been extensively studied as an important variable, UPI adoption theories have rarely included PR as a moderator. From the studies on PR it can be stated that a high level of PR can decrease the correlation between behavioural intention (BI) and actual use particularly in rural areas, and therefore this study expands UTAUT model by adding PR as a moderating variable. This study hypothesis as under:

H7: Perceived risk negatively moderates the relationship between behavioural intention and UPI use behavior.

Figure 1 Conceptual Framework



3. Research Methodology

3.1 Research Design:

A research design defines the structure or framework within which the research is conducted. For this study, descriptive and explanatory research design is adopted. The objective is to provide a comprehensive understanding of the factors influencing behavioral intention and actual use behavior among the users of UPI.

3.2 Area of the study:

The study is conducted in the Anand city of Gujarat state, which represents a diverse range of the consumers uses and is a key value of cashless economy.

3.3 Sampling:

The present study uses both primary and secondary data to meet the objectives effectively. A structured questionnaire created using Google forms generated 103 responses in total. Upon screening some responses were found incomplete or not properly filled, and were discarded to maintain the reliability of the data. Such data screening is a standard practice in survey-based research to ensure accuracy and robustness of results (Hair et al., 2019). The primary data includes responses of closed ended questions on 5-point Likert's scale ranging from strongly Disagree =1 to strongly Agree = 5. The statements are taken from already developed scale. Secondary data were used to support the creation of the study's instruments and reinforce its conceptual framework. Sources included peer-reviewed journals, academic publications, online news articles, and scholarly database. Data collection was carried online using digital platform using email, WhatsApp to reach respondents efficiently.

4.Data Analysis and Interpretation

Table 1 Demographic profile of respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	48	51.6
	Female	45	48.4
Age	Below 18	1	1.1
	18–24 years	26	28.0

	25–34 years	24	25.8
	35–44 years	25	26.9
	45–54 years	14	15.1
	Above 55 years	3	3.2
Education Level	No Formal Education	9	9.7
	S.S.C or Below	20	21.5
	H.S.C / Diploma	12	12.9
	Bachelor's Degree	28	30.1
	Master's Degree	20	21.5
	Doctorate	2	2.2
	Post Doctorate	2	2.2
Occupation	Student	23	24.7
	Business / Self-employed	25	26.9
	Government Job	1	1.1
	Private Sector Job	34	36.6
	Retired	2	2.2
	Homemaker/Other	8	8.6
Marital Status	Unmarried	39	41.9
	Married	53	57.0
	Separated	1	1.1
Monthly Family Income	Less than ₹10,000	13	14.0
	₹10,000–25,000	38	40.9
	₹25,001–50,000	17	18.3
	₹50,001–1,00,000	9	9.7
	Above ₹1,00,000	16	17.2
Place of Residence	Rural	38	40.9
	Urban	55	59.1

(Source: SPSS)

Table 1 presents the demographic distribution of the respondents that reveals a balanced gender representation, with 51.6% of respondents being men and 48.4% being women. The majority of participants (28.0%) were between the ages of 18 and 24, followed by those between the ages of 35 and 44 (26.7%) and 25 and 34 (25.7%), indicating that the majority were young to middle-aged people. Only 9.7% of respondents reported having no formal education, while 30.1% of respondents had bachelor's degrees and 21.5% had master's degrees, indicating a high level of literacy. In terms of occupation, the highest percentage consisted of private sector employees (36.6%), business/self-employed respondents (26.7%), then students (24.7%), and the proportion of a housewife, retired, or employed by the government was lower. 57.0% of respondents were married, 41.9% were single, and a very small percentage were separated. The majority of families (40.9%) earned between ₹10,000 and ₹25,000 a month, followed by those who made between ₹25,001 and 50,000 (18.3%), and 17.2% reported making over ₹1,00,000, indicating a mix of households with lower and higher incomes. 59.1% of respondents lived in urban areas, while 40.9% in rural areas.

Table 2: Descriptive Statistics of Constructs

	N	Minimum	Maximum	Mean	Std. Deviation
BI Mean	93	1	5	3.92	.912
PR Mean	93	1	5	2.48	1.085
ANX Mean	93	1	5	2.40	1.095
PE Mean	93	1	5	4.32	.820
EE Mean	93	1	5	4.24	.851
SI Mean	93	1	5	4.09	.848
FC Mean	93	1	5	4.25	.867

UB Mean	93	1	5	3.96	.944

(Source: SPSS output)

In Table 2 the descriptive statistics show the general pattern of responses to the various constructs. Both Behavioral Intention (M = 3.93, SD = 0.91) and Use Behavior (M = 3.96, SD = 0.94) had comparatively high mean values, indicating a generally positive tendency toward the actual use of the system under study. Performance Expectancy (M = 4.33, SD = 0.82) and Effort Expectancy (M = 4.25, SD = 0.85) received the most positive reviews, indicating that respondents considered the system was both practical and simple to use. Similarly, social influence (M = 4.09, SD = 0.84) and facilitating conditions (M = 4.25, SD = 0.86) both received favorable ratings, showing peer and societal impact as well as significant enabling support. The moderating factors of anxiety (M = 2.40, SD = 1.09) and perceived risk (M = 2.49, SD = 1.08), on the other hand, displayed relatively lower mean values. This implies that most respondents did not think using the system was dangerous or caused a lot of anxiety, similar to Cristina (2022). Overall, the descriptive results indicate PE, EE, SI and FC are strong drivers, perceived risk and anxiety are relatively low, which supports a positive behavioral intention and actual use behavior.

Table 3: Test of Normality

	Place of residence	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
PE Mean	Rural	.257	38	.000	.709	38	.000
	Urban	.236	55	.000	.779	55	.000
EE Mean	Rural	.300	38	.000	.762	38	.000
	Urban	.182	55	.000	.805	55	.000
SI Mean	Rural	.351	38	.000	.728	38	.000
	Urban	.184	55	.000	.874	55	.000
FC Mean	Rural	.284	38	.000	.743	38	.000
	Urban	.196	55	.000	.793	55	.000
PR Mean	Rural	.329	38	.000	.829	38	.000
	Urban	.182	55	.000	.936	55	.006
ANX Mean	Rural	.268	38	.000	.844	38	.000
	Urban	.142	55	.008	.940	55	.008
BI Mean	Rural	.237	38	.000	.853	38	.000
	Urban	.206	55	.000	.877	55	.000
UB Mean	Rural	.293	38	.000	.837	38	.000
	Urban	.192	55	.000	.869	55	.000

(Source: SPSS)

Table 3 shows the Kolmogorov-Smirnov and Shapiro-Wilk tests to evaluate the normality of the data in both rural and urban groups for all constructs PE, EE, SI, FC, PR, ANX, BI, and UB. The findings reveal a breach of the

normality assumption because the significance values for every variable were consistently less than 0.05. This result supports the use of non-parametric test such as the Mann–Whitney U test for two-group comparisons.

Table 4 Mann–Whitney U results

Construct	Group	N	Mean Rank	Mann–Whitney U	Z	p-value	Significance
PE	Rural	38	45.42	985.000	–0.498	0.618	Not significant
	Urban	55	48.09				
EE	Rural	38	46.21	1015.000	–0.245	0.806	Not significant
	Urban	55	47.55				
SI	Rural	38	47.47	1027.000	–0.146	0.884	Not significant
	Urban	55	46.67				
FC	Rural	38	47.08	1042.000	–0.025	0.980	Not significant
	Urban	55	46.95				
BI	Rural	38	49.09	965.500	–0.641	0.521	Not significant
	Urban	55	45.55				
UB	Rural	38	47.55	1024.000	–0.170	0.865	Not significant
	Urban	55	46.62				
PR	Rural	38	44.57	952.500	–0.744	0.457	Not significant
	Urban	55	48.68				
ANX	Rural	38	43.86	925.500	–0.949	0.343	Not significant (small effect, urban > rural)
	Urban	55	49.17				

(Source: SPSS)

Table 4 indicates there are no statistically significant differences between respondents from rural and urban areas across any concept ($p > 0.05$). With the notable exception of ANX, where the small impact suggests somewhat higher anxiety in urban respondents as opposed to rural ones, effect sizes (r) are insignificant for the majority of constructs, similar to the study of Cohen (1988). There are generally little distinctions between rural and urban areas, suggesting that both groups have comparable attitudes and habits.

Figure 2 Outer model with factor loadings

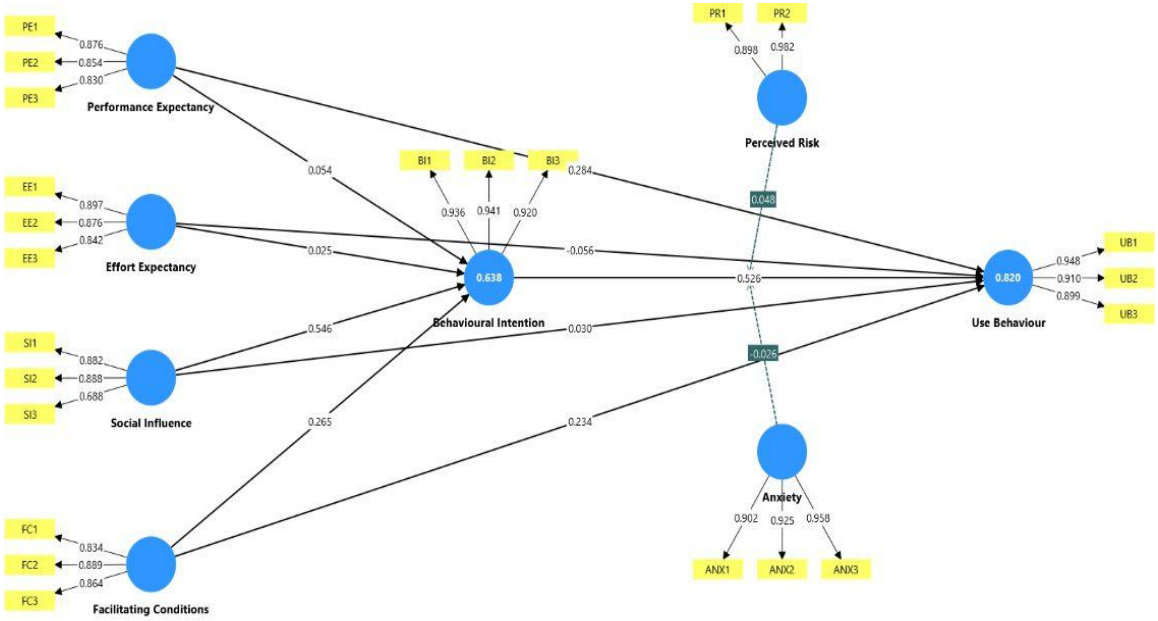


Figure 2 shows the final factor loadings of Indicators on their corresponding latent constructs

Table 5 Measurement Model

Items	Factor Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
PE1	0.876	0.814	0.890	0.729
PE2	0.854			
PE3	0.830			
EE1	0.897	0.842	0.905	0.760
EE2	0.876			
EE3	0.842			
SI1	0.882	0.755	0.863	0.680
SI2	0.888			
SI3	0.688			
FC1	0.834	0.828	0.905	0.760
FC2	0.889			
FC3	0.864			
PR1	0.898	0.887	0.939	0.885
PR2	0.982			
ANX1	0.902	0.926	0.949	0.862
ANX2	0.925			
ANX3	0.958			
BI1	0.936	0.925	0.952	0.869
BI2	0.941			
BI3	0.920			
UB1	0.948	0.908	0.943	0.845
UB2	0.910			
UB3	0.899			

In Table 5 all items factor loadings were above the recommended threshold of 0.70 (Hair et al., 2019), and ranged from 0.688 (SI3) to 0.982 (PR2). Factor SI3 provided a loading that was only slightly lower than this threshold (0.688); however, it was still above the minimum acceptable level of 0.60 and therefore was retained despite being a somewhat weaker indicator (Hair et al., 2017). The Cronbach's Alpha values for all constructs falls between 0.755 (SI) and 0.926 (ANX), as the suggested cutoff of 0.70 (Nunnally & Bernstein, 1994), and meeting the requirements that ensure the formation of internal consistency reliability. Reliability was further confirmed by Composite Reliability (CR) values, which ranged from 0.863 (SI) to 0.952 (BI), all of which were consistently over the suggested 0.70 cut-off (Fornell & Larcker, 1981). The Average Variance Extracted (AVE) values ranged from 0.680 (SI) to 0.885 (PR). These shows that the latent construct tested in the study account for the variation in their indicators (Hair et al., 2019).

Table 6: Structural Model Results for Predictors of Behavioral Intention (BI)

Path (Hypothesis)	β (Path Coefficient)	t-value	p-value	Significance
PE → BI	0.054	0.240	0.810	Not Significant
EE → BI	0.025	0.174	0.862	Not Significant
SI → BI	0.546	4.996	0.000	Significant
FC → BI	0.265	1.720	0.085	Not Significant (marginal)

According to the findings in Table 6, Social Influence was the most powerful and significant predictor of Behavioural Intention among the behavioural cognitive components ($\beta = 0.546$, $p < 0.001$). This demonstrates how social networks, peer groups, and cultural norms influence user intentions. Despite Behavioural Intention was not significantly predicted by Performance Expectancy (PE) or Effort Expectancy (EE) ($\beta = 0.054$, $p = 0.810$ and $\beta = 0.025$, $p = 0.862$, respectively), this finding is consistent with previous research that suggests a saturation or highest point effect, these criteria no longer adequately distinguish intention when users already believe a system to be both helpful and simple to use (Venkatesh et al., 2012). Furthermore, as users gain experience, the impact of effort expectancy decreases; this is a trend observed in technology adoption contexts where users take ease of use for granted (Rana et al., 2017). As a result, these constructions might be more significant in the early stages of adoption than in

the case of regular users. Facilitating Conditions (β = 0.265, p = 0.085) had a marginally significant beneficial impact on behavioral intention, although this was explained by the UPI ecosystem's development in India. According to earlier research, when a technology becomes widely used and seamlessly incorporated into daily life, the impact of enabling factors (like internet access, smartphone adoption, and banking infrastructure) tends to diminish because users already consider these resources to be normal (Venkatesh et al., 2012). In the case of UPI, widespread smartphone use and digital infrastructure supported by the government have normalized access, making it less useful for anticipating intention.

Table 7: Structural Model Results for Predictors of Use Behavior (UB)

Path (Hypothesis)	B (Path Coefficient)	t-value	p-value	Significance
BI → UB	0.526	5.052	0.000	Significant
PE → UB	0.284	2.173	0.030	Significant
EE → UB	-0.056	0.570	0.568	Not significant
SI → UB	0.030	0.345	0.730	Not significant
FC → UB	0.234	1.883	0.060	Marginal

According to the results of the structural model in table 7, the most significant factor influencing actual UPI usage is behavioral intention (β = 0.526, p < 0.001), supporting the UTAUT framework that states that intention greatly influences behavior. Performance Expectancy (β = 0.284, p = 0.030) was found to be a significant predictor, indicating that users predominantly use UPI due to its usefulness and performance-enhancing capabilities. The maturity of UPI acceptance in India explains why effort expectation and social influence are not significant factors in use behavior. Ease of use no longer influences actual usage decisions because UPI apps are usually considered to be easy to use. This is in accordance with research by Venkatesh et al. (2012) that shows EE declines after initial adoption. Similarly, social influence also plays a significant role in early adoption, helping to shape intention. However, once intention is set, sustained usage is more dependent on utility and habit as reported by (Alalwan et al., 2017; Dwivedi et al., 2019). Also, the normalization of UPI in Indian society has decreased dependence on peer pressure, which is in line with Gupta and Arora (2020), who point out that performance expectations and individual convenience exceed social impact in terms of sustained use. Overall, the results support the notion that purpose and perceived value are the primary drivers of UPI adoption, with additional environmental and cognitive factors serving as supporting variables.

Table 8: R Square Adjusted

	R-square	**R-square adjusted**
Behavioural Intention	0.638	0.622
Use Behaviour	0.820	0.801

Table 8 shows the PLS-SEM results demonstrate that the model accounts for a significant amount of variance in both use behavior (R^2 = 0.820, adjusted R^2 = 0.801) and behavioral intention (R^2 = 0.638, adjusted R^2 = 0.622). This suggests that behavioral intention significantly predicts use behavior, is strongly influenced by the suggested predictors. The results shows that UTAUT based model is the reliable way to explains respondents' adoption of technology.

Table 9: Fornell- Larcker Values

	ANX	**BI**	**EE**	**FC**	**PR**	**PE**	**SI**	**UB**
ANX	0.929							
BI	0.045	0.932						
EE	0.023	0.592	0.872					
FC	0.121	0.658	0.678	0.862				
PR	0.913	0.090	0.064	0.101	0.941			
PE	0.073	0.639	0.825	0.795	0.102	0.854		
SI	0.064	0.759	0.628	0.609	0.073	0.648	0.824	
UB	0.059	0.838	0.657	0.782	0.062	0.768	0.715	0.919

Table 9 evaluate discriminant validity in structural equation modelling, the Fornell–Larcker criterion results are reported in Table X (Fornell & Larcker, 1981). The consistently high diagonal values of AVE, indicates each construct shares more variance. Behavioural Intention (0.932), Perceived Risk (0.941), Performance Expectancy (0.854), and Use Behaviour (0.919) all show comparable patterns, however the square root of AVE for anxiety (0.929) is higher

than its correlations with the other variables. This indicates that the construct satisfies the threshold for discriminant validity and empirically distinct (Hair et al., 2019; Henseler et al., 2015).

Table 10: HTMT

Construct	ANX	BI	EE	FC	PR	PE	SI	UB	PR×BI	ANX×BI
ANX	–									
BI	0.075	–								
EE	0.067	0.667	–							
FC	0.120	0.739	0.814	–						
PR	0.996	0.109	0.074	0.114	–					
PE	0.085	0.732	0.998	0.969	0.130	–				
SI	0.081	0.906	0.791	0.764	0.095	0.830	–			
UB	0.068	0.910	0.749	0.898	0.091	0.891	0.865	–		
PR × BI	0.077	0.184	0.133	0.182	0.085	0.136	0.066	0.142	–	
ANX × BI	0.087	0.126	0.083	0.179	0.080	0.075	0.026	0.097	0.919	–

(Source: PLS-SEM)

Table 10 presents the HTMT values used to assess discriminant validity. The majority of HTMT ratios fall below the conservative threshold of 0.85 (Kline, 2011) and the more liberal threshold of 0.90 (Gold et al., 2001), thereby confirming strong discriminant validity across most constructs. A few relationships (e.g., PR–ANX = 0.996; PE–EE = 0.998; BI–UB = 0.910; BI–SI = 0.906) are observed to be marginally higher than the suggested thresholds. Such findings are not unusual in behavioural research, particularly when items capture overlapping dimensions or when constructs are conceptually connected (Henseler et al., 2015). Notably, the Fornell–Larcker criterion and cross-loadings continue to support the general pattern of results, which still shows adequate discriminant validity (Hair et al., 2019). Furthermore, rather than being a measurement defect, these somewhat higher numbers might be interpreted as a sign of theoretical proximity between constructs, which improves the interpretation of construct interactions (Henseler et al., 2015; Voorhees et al., 2016).

Table 11: Moderation Analysis

Path	β	t-value	p-value	Result
BI × PR → UB	0.048	0.201	0.841	Not Supported
BI × ANX → UB	-0.026	0.404	0.686	Not Supported

Perceived risk and anxiety do not significantly change the association between behavioral intention and use behavior, according to the moderation results in table 11. This implies that the BI–UB relationship is strong and constant across many mental states. It is possible that users who plan to use UPI will really utilize it, regardless of any fear or risk concerns. The findings are consistent with earlier studies that found behavioral intention to be the strongest indicator of usage behavior (Venkatesh et al., 2012). Additionally, psychological obstacles are less noticeable in emerging digital payment ecosystems like India's UPI because of trust, familiarity, and widespread use, which reduces the impact of perceived risk and anxiety (Oliveira et al., 2016; Alalwan et al., 2017). Lastly, UPI's great usefulness and convenience appear to overcome any persistent fears, guaranteeing that users' intentions are successfully converted into real usage (Slade et al., 2015).

5.Conclusion:

The study tried to examine the factors influencing the adoption and usage behavior of unified Payment Interface (UPI) among respondents in rural and urban areas. Using the UTAUT model, including behavioral intention (BI), use behavior (UB), performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), and perceived risk (PR) and anxiety (ANX) as moderating factors. The key findings of the study are:

A high degree of performance expectancy (M = 4.33, SD = 0.82), effort expectancy (M = 4.25, SD = 0.85), social influence (M = 4.09, SD = 0.85), and facilitating conditions (M = 4.25, SD = 0.87) were generally reported by respondents, suggesting a favorable opinion of the system's utility, usability, and support environment. In contrast, respondents' perceptions of perceived risk (M = 2.49, SD = 1.08) and anxiety (M = 2.41, SD = 1.09) were comparatively low, indicates that respondents do not have negative feelings related to digital payment system use.

For PE, EE, SI, FC, BI, UB, and PR, there were no statistically significant variations between respondents in rural and urban areas (all $p > 0.05$), overall, there was no variation among variables, indicating that rural and urban groups had similar adoption attitudes.

The model showed that the UTAUT framework is strong in understanding adoption behavior by explaining a significant amount of variance in behavioral intention ($R2 = 0.638$, adjusted $R2 = 0.622$) and use behavior ($R2 = 0.820$, adjusted $R2 = 0.801$).

The research revealed some unique finding, in SmartPLS, the moderating effects of PR and ANX on the BI → UB connection were examined. The findings revealed that neither PR nor ANX significantly moderated the relationship, indicates a strong link between BI and UB. Results similar to Sang and Cheng (2020). This could be due to high direct effect of independent variable on dependent variable (Hair et al., 2017; Gefen, 2000; Venkatesh et al., 2012). Again, despite the respondents were from both rural and urban locations, majority of them have similar perceptions towards the constructs (PE, EE, SI, and FC). Because the moderator does not differ sufficiently between groups, homogeneity lowers the statistical power to detect moderation (Henseler & Chin, 2010). Perceived risk and anxiety may not pose significant challenges when users perceive the technology as practical and easy to use, as their emphasis on its usefulness and convenience tends to diminish these concerns (Venkatesh et al., 2003) this shows, positive perceptions drive sustained UPI adoption and support its long-term sustainability through increased user trust and habitual participation in digital payments (Rastogi et al., 2021)

Overall, the findings of the study confirm the effectiveness of the UTAUT constructs on the adoption of technology in both urban and rural respondents of Anand district in Gujarat. The analysis confirms that behavioral intention is the key driver of technology usage, supported by Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. Rural and urban respondents share similar attitude towards digital payment technology, and moderating factors perceived risk and anxiety do not significantly change the behavioral intention and use behavior relationship. This indicates the effectiveness of UTAUT-based interventions in promoting technology adoption across diverse populations, as well as the innovativeness of the digital technology such as UPI among users.

Limitation

Although the study offers insightful information, some limitations should be noted. The study was conducted with a limited sample size collected from an Anand district of Gujarat which may not give the generalize result. The study focused on Perceived Risk and Anxiety as moderators, other psychological factors like trust, habit, digital literacy can also be examined. Future research can consider large sample to overcome these limitations.

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