Section A-Research paper

Technological Innovation in Services: Indian Perspective on Recently Launched Digital e-RUPI

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Abstract

In the present age of FinTech, many nations are investigating the possibility of their own digital currencies because of its enormous potential in terms of efficiency, security, and accessibility. India recently introduced its official digital currency, e-RUPI, a pioneering initiative to bridge the gap between service providers and beneficiaries by leveraging cutting-edge technology. Success of this new technological innovation in services will depend heavily on the public's willingness to adopt digital currencies.

With this background, the aim of the present research is to find perspective of Indians towards recently launched digital e-RUPI by RBI. This study will shed light on the awareness of people towards e-RUPI, official digital currency of India and determine the factors that will lead to its successful adoption. An exploratory factor analysis is conducted to identify the factors and a conceptual framework is constructed for the same. The findings of the study can be used by government agencies or FinTech firms to enhance consumers' perceptions and create efficient tactics for raising their desire to use digital currency.

Keywords: Consumers', digital currency, e-RUPI, FinTech, innovation, perspective, services, technological.

INTRODUCTION

The FinTech industry has experienced explosive expansion in recent years, inspiring many countries to investigate the possibilities of digital currencies as a quick, safe, and convenient means of financial transactions. In order to revolutionise the way financial services are provided, India, a nation that has been at the forefront of the digital transition, recently launched its official digital currency, e-RUPI. The success of e-RUPI, however, is highly dependent on public acceptance and adoption. As a result, the current study intends to examine how Indians perceive this recently introduced digital currency from the Reserve

Bank of India (RBI). In addition to examining level of awareness of Indians towards e-RUPI, the study will employ an exploratory factor analysis to identify the key determinants that will lead to e-RUPI's successful adoption, a technological innovation in services and a conceptual framework will be constructed for the same. The knowledge gained from this study will help government organisations and FinTech firms to understand consumers' perceptions on digital currency and devise effective strategies for boosting their adoption and promoting the growth of the FinTech industry in India.

BACKGROUND

The rapid growth of technology has drastically altered how services are delivered and utilised. Recent technology developments that provide unprecedented potential for efficiency, convenience, and improved satisfaction for customers have changed the service industry. The introduction of e-RUPI, a digital payment system by the government, is one such ground-breaking technological innovation in the Indian context. By doing away with physical money and traditional payment methods, e-RUPI aims to simplify and secure digital transactions. It allows customers to pay service providers directly, fostering openness and reducing the likelihood of fraud. A lot of interest has been generated in India over the potential of e-RUPI to enhance service delivery and develop a cashless society. Even while e-RUPI appears to have advantages, its acceptance and integration into the service sector are dependent on a number of factors, including how its intended consumers view it and accept it as a mode of payment. Understanding how e-RUPI is perceived in India and any potential barriers to its adoption is crucial for educating policymakers, service providers, and other stakeholders about its usage and how to obtain the intended advantages. Exploring the factors influencing e-RUPI's acceptability and adoption as well as its potential economic advantages will provide illuminating information for supporting its wider use and accomplishing the envisioned digital revolution in India's service industry.

LITERATURE REVIEW

The factors influencing consumers' adoption of new information technology advances were examined by **Venkatesh *et al.* (2003).** They came up with a concept of the Unified Theory of Acceptance and Use of Technology (UTAUT) and proposed that how people react to using technology directly affects their intentions to use it, which in turn affects their actually use. **Cao *et al.*, 2016** found that perceived trust is the strongest predictor of intention to use mobile payment services followed by perceived ease of use, perceived enjoyment, perceived behavioural control, perceived usefulness and subjective norm, respectively. **Garg and Panchal (2017)** argued cashless economy will eliminate robberies using cash, fake currency, and black money while also promoting our nation's economic progress. Main issues that might obstruct the adoption include cyber fraud, a high percentage of illiteracy among the populace, and a lack of openness and effectiveness in the digital payment system.

Surging internet penetration, rise in number of smartphones and changing demographics of Indian population **(Dulloo, 2018)** favour government's, Digital India Program, which aims to transform India into a knowledge-based society and economy **(Singh, 2022)** however, for digital money to prosper, more people need to be aware of it **(Shah, 2017).** India's fintech

sector represents an immense opportunity **(Dulloo, 2021)** for the financial services industry **(Dulloo, 2022)**. According to **Arun and Dulloo (2023)**, "digital disruption" brought on by rapid developments in technology has profoundly changed how businesses function and deliver value. Real time shopping through mobiles appears to create way for mobile business **(Dulloo, 2018)** and the advent of digital transformation has opened up new possibilities for commercial transactions using mobile devices from any location at any time **(Dulloo and Rajeswari, 2018)**. The notion of digital money, its numerous forms, evolution were underlined by **Narayanan (2020)**. **Dwivedi and Arora (2021)** stated India has emerged as a leader in digital payments, with a manifold increase in such transactions in recent times.

According to **Ozili (2022)**, several central banks are contemplating issuing CBDCs for positive reasons. **Dhamija *et al.* (2022)** researched the e-Rupi platform's intricate function and conducted an empirical evaluation and comparison of e-Rupi with other digital payment systems. **Dulloo (2022)** noted IT has enabled easy access to services by means of affordable devices and technology, greater internet penetration. **Singh, 2022** observed that more people are making digital payments, which is excellent for businesses that provide payment systems like PhonePe, Google Pay, Paytm, Amazon Pay, and others. **Una (2023)** covered the three main fintech payment platforms—digital money, web based fintech payments and mobile money and talked about the risks that each confront in terms of operations and finances.

By examining the factors leading to successful adoption of e-RUPI and their influence on consumers' intention to use, our research intends to contribute to the body of knowledge on technological innovation in services. This would make it easier for researchers to learn more about the worries, preferences, and expectations of potential users by examining how Indians view e-RUPI. This information will also help policymakers create efficient strategies and laws to remove the obstacles and promote the use of e-RUPI among various demographic segments. Therefore, *"**Technological Innovation in Services: Indian Perspective on Recently Launched Digital e-RUPI**"* has been chosen as the problem statement for the study.

RESEARCH FRAMEWORK

The relationship between factors that will lead to successful adoption of e-RUPI, i.e, perceived usefulness, perceived ease of use, perceived trust and intention to use is shown in the conceptual framework in Fig. 1 below.

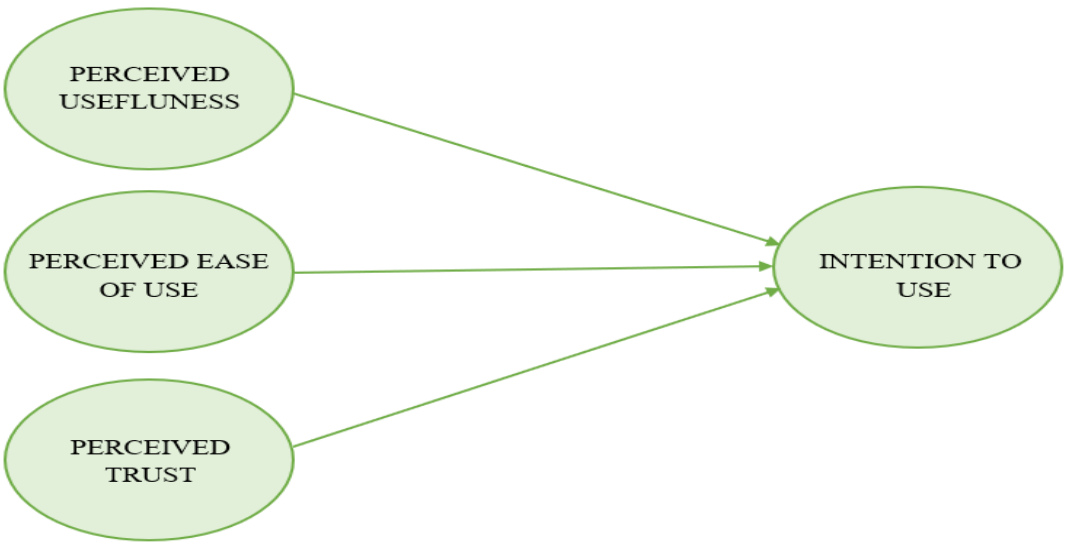


Fig.1 Conceptual model of Factors Influencing Adoption of digital e-RUPI

RESEARCH OBJECTIVES

1. To study demographic profile of the respondents.
2. To shed light on the awareness level of people towards e-RUPI, the official digital currency of India.
3. To determine the factors that will lead to successful adoption of e-RUPI, recent technological innovation in services.
4. To study the strength of relationship between variables perceived usefulness, perceived ease of use, perceive trust and intention to use.
5. To study the impact of independent variables like perceived usefulness, perceived ease of use, and perceive trust on dependent variable intention to use.

RESEARCH METHODOLOGY

The study makes use of a cross-sectional descriptive research design since it allows the researcher to look at a problem from the perspective of the target population at a given point of time. Primary research is employed to assemble data for the study. A survey questionnaire is used to collect data for the study, which is a method of qualitative research. The survey will include two sections: the first will gather participant demographic information, and the second will focus on the factors that will make e-RUPI adoption successful. Data will be collected from a sample of 287 participants. The convenience sampling method will be used to select participants who have knowledge of e-RUPI. The results will be summarised and presented using descriptive statistics, giving demographic profile of respondents and awareness level of respondents towards digital e-RUPI. An exploratory factor analysis will be performed to investigate the factors leading to successful adoption of e-RUPI. Likert scale with the options "strongly disagree" and "strongly agree" will be used to measure participants' perception towards e-RUPI. The associations between variables will be examined and their overall impact will be determined using inferential statistics like correlation and regression analysis.

RESULTS AND DISCUSSION

The goal of e-RUPI is to offer a simple, safe, and practical payment system that can be utilised by all facets of society, including those who lack access to conventional banking services. e-RUPI aims to decrease the usage of cash in the economy by encouraging digital services. India's equivalent of cryptocurrency is said to be e-RUPI. The digital e-RUPI might be used in the same way as actual currency since it is a digital representation of physical money. As digital e-RUPI is still in its infancy it becomes crucial to understand the awareness level towards this newly launched digital e-RUPI by RBI in India and the factors leading to its successful adoption. For this purpose, surveys are distributed to respondents in the process of examining the factors impacting the adoption of digital e-RUPI, and the replies are gathered. Statistical Package for Social Science (SPSS v23) is used in this section to

examine the responses from the customers to determine their degree of awareness and perception of digital e-RUPI. A total of 287 respondents from all around India make up the informative sample. Responses are recorded and estimated using nominal and Likert scales.

Table I Demographic profile of respondents

Criteria	Frequency	Percent	Cumulative%
AGE			
18-29 yrs	105	36.6%	36.6%
29-40 yrs	94	32.8%	69.4%
40-51 yrs	74	25.8%	95.2%
Above 51 yrs	14	4.8%	100.0%
GENDER			
Male	169	58.9%	58.9%
Female	118	41.1%	100.0%
EDUCATIONAL QUALIFICATION			
UG	101	35.19%	35.19%
PG	121	42.17%	77.36%
Professional Degree	51	17.77%	95.13%
Others	14	4.87%	100.0%
OCCUPATION			
Student	36	10.5	10.5%
Private Sector Employee	122	35.6	46.1%
Public Sector Employee	113	32.9	79.0%
Business Owner	72	21.0	100.0%

The demographic distribution of the respondents is shown in Table I. 58.9% men and 41.1% females participated in the research. The majority of respondents, 36.6%, are in the 18 to 29 year age bracket. This is followed by the 29 to 40 year age bracket, i.e., 37.6%, and the remaining respondents are beyond the age of 40. The majority of respondents, i.e., 42.17% are postgraduates. Private Sector employees make up 35.6% of the respondents, it is followed by public sector employees, i.e., 32.9%.

Table II. Mean Analysis on Awareness level of people towards e-Rupi

	A1	A2	A3	A4	A5	A6

N	287	287	287	287	287	287
Mean	**3.35**	**3.46**	**3.65**	**4.01**	**3.88**	**3.84**
Std. Deviation	0.843	0.865	0.884	0.904	1.007	0.946

As can be seen from the Table II all the mean values are above 3, which indicates there is moderate level of awareness towards e-RUPI among respondents towards recently launched digital currency by RBI in India.

Exploratory Factor Analysis: What are the factors leading to successful adoption of digital e-RUPI, recent technological innovation in services ?

In order to investigate factors influencing user adoption in the context of digital e-RUPI, responses from respondents have been analysed using a factor analysis method utilising principal component methodology with varimax rotation. Tests are run to determine whether there is sufficient data to use factor analysis **(Stewart, 1981)**.

Table III - KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.898
Bartlett's Test of Sphericity	Approx. Chi-Square	2500.631
	df	136
	Sig.	0.000

When analysing sample adequacy, the Kaiser-Meyer-Okin (KMO) score is estimated to be 0.898, which is significantly higher than the recommended 0.5 limit. Additionally, the value of the Bartlett's test of sphericity, is found to be 2500.631 which is also significant ($p < 0.001$). Table IV displays the total Variance. In the end, the latent root criterion - variables with eigen values larger than 1 and the scree plot described in Table V are used to determine the number of components to be retained. In addition, variables with loadings larger than or equal to 0.50 have been taken into account.

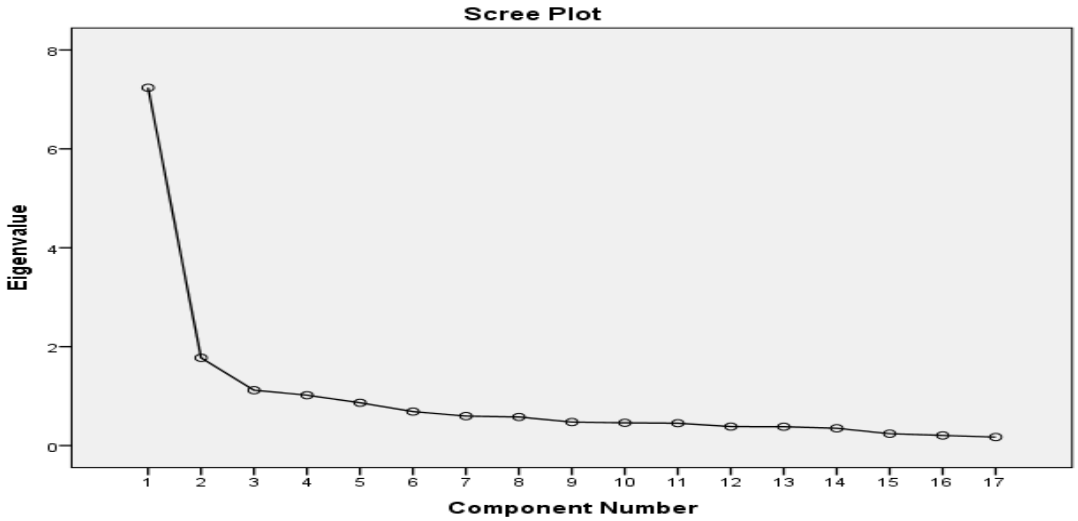
Table IV - Total Variance Explained

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**		
	Total	***% of Variance***	***Cumulative %***	***Total***	***% of Variance***	***Cumulative %***
1	7.236	42.567	42.567	7.236	42.567	42.567
2	1.774	10.437	53.004	1.774	10.437	53.004
3	1.119	6.583	59.586	1.119	6.583	59.586

4	1.019	5.997	65.583	1.019	5.997	65.583

Table IV illustrates four rotated factors which together explain 65.583% of the total variance. Eigen values for factors F1 to F4 are 39.69, 10.437, 6.583, and 5.997 respectively. Additionally, suitable names have been allotted to all the four factors extracted.

Fig. 2 Scree Plot



Principal Component Analysis under the rotation method (Varimax with Kaiser Normalization), rotation converged in 6 iterations. The result of rotated component matrix is in Table V, which shows FOUR factors may be extracted:

Table V - Rotated Component Matrix

	Component			
	1 PERCEIVED USEFULNESS	**2 PERCEIVED EASE OF USE**	**3 PERCEIVED TRUST**	**4 INTENTION TO USE**
PU_2	0.851			
PU_3	0.800			
PU_4	0.753			
PU_1	0.746			
PEU_4		0.828		
PEU_3		0.805		
PEU_1		0.790		
PEU_2		0.714		
PT_5			0.729	
PT_2			0.699	
PT_4			0.676	
PT_1			0.650	
PT_3			0.630	
IU_2				0.750

IU_3				0.700
IU_1				0.675
IU_4				0.642

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Factor 1 : PERCEIVED USEFULNESS

Perceived Usefulness is found to be one of the vital variables in context of digital e-RUPI acceptance. Perceived Usefulness (PU) is generally associated with convenience **(Dulloo, 2020)**. The degree to which a person thinks employing a certain technology will improve their ability to accomplish their jobs is known as perceived usefulness **(Davis, 1989)**. The range of factor loadings for all the four statements is from 0.851 to 0.746. This factor accounted for a reliability of 88%.

Factor 2 : PERCEIVED EASE OF USE

It has been determined that Perceived Ease of Use is a significant predicate of adoption intention. The degree to which a person thinks utilising a system would be effortless is referred to as perceived ease of use **(Davis, 1989)**. If functioning of digitl e-RUPI is simple for users to comprehend and operate, they will be more widely adopted. The range of factor loadings for all the four statements making up this factor is from 0.828 to 0.714. This factor accounted for a reliability of 74.5%.

Factor 3 : PERCEIVED TRUST

Trust increases loyalty of users and is necessary for effective economic interactions. Trust is identified as an important factor leading to successful adoption of e-RUPI. According to **Gefen *et al.* (2003),** Trust is the conviction that the technology one interacts with won't take unfair advantage of their reliance on them. Variations in factor loadings for trust for all 5 statements ranged from 0.729 to 0.630. This factor accounted for a reliability of 88.1%.

Factor 4 : INTENTION TO USE

The level of a person's propensity to engage in a particular behaviour is reflected in their intention to use **(Davis *et al.*, 1989).** Consumers that have a stronger propensity to accept a new technology are more likely to become adopters and recommend the technology to others **(Miltgen *et al.*, 2013).** In the field of financial technology (FinTech), many researchers have identified intention to use as an important factor. The range of factor loadings for all four statements is from 0.750 to 0.642. This factor accounted for a reliability of 78.6%.

Correlation Test: To study the relationship between Intention to Use and Perceived Usefulness, Perceived Ease of Use, Perceived Trust

Null hypothesis: There is no significant positive relationship between Intention to Use and perceived usefulness, perceived ease of use, perceived trust.

Table VI – Correlation Test

	IU	**PU**	**PEU**	**PT**

IU	**Pearson Correlation**	1	0.664**	0.631**	0.799**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
	N	287			

It is inferred that the value correlation coefficient between intention to use and all three factors leading to adoption of digital e-RUPI is above 0.600, and is significant at a 1% level of significance (Table VI). Thus, it may be inferred that all three 3 factors have a highly significant positive role in the intention to purchase, hence null hypothesis is rejected.

Regression Test: To study the impact of independent variables like perceived usefulness, perceived ease of use and perceive trust on dependent variable intention to use.

Null hypothesis – There is no significant positive impact of perceived usefulness, perceived ease of use and perceived trust on intention to use.

Model Summary shows the value of R^2 and adjusted R^2 (Table VII). Here, R^2 is 0.671 with standard error of estimate equal to 0.477. The value of coefficient of determination (R^2) is significant and therefore the association can be considered as significant. Further it is seen for the table that the significant value (p-value) of F-test are 0.000, which means that all the three explanatory variables are highly significant with respect to the explained factor, intention to use.

Table VII - Model Summary (ANOVA)

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	157.445	3	52.482	230.498	0.000[b]
Residual	77.186	339	0.228		
Total	234.631	342			
R Square	0.671	**Adjusted R Square**	0.668	**Std. Error of Estimate**	0.477

a. Dependent Variable: IU

b. Predictors: (Constant), PU, PEU, PT

The results of the multiple regression coefficient analysis are shown in Table VIII. The significance level of the model is not over 0.05, indicating an acceptable outcome. As a result, the research's model is sound.

Table VIII – Multiple Regression Coefficient Analysis

Model	**Unstandardized Coefficients**		Standardized Coefficients	**T**	**Sig.**	**Collinearity Statistics**	
	B	**Std. Error**	Beta			**Tolerance**	**VIF**
(Constant)	**0.092**	0.148		**5.824**	**0.000**		

PU	**0.360**	0.064	0.318	**5.607**	**0.000**	0.301	3.319
PEU	**0.229**	0.051	0.247	**4.453**	**0.000**	0.598	1.672
PT	**0.615**	0.051	0.570	**12.162**	**0.000**	0.442	2.261

a. Dependent Variable: IU
b. Predictors: (Constant), PU, PEU, PT

Based on the multiple regression output tables, the following equation can drive:

$$\mathbf{M(Y) = 0.092+0.360PU+0.229PEU+0.615PT}$$

Perceived Trust is the most influential factor that determines intention to use digital e-RUPI according to the aforementioned table. It has the greatest coefficient of independent variable (PT) at 0.615, followed by perceived usefulness at 0.360 and perceived ease of use at 0.229. Additionally, it can be observed from the table that all of the significant values (p-values) for the t-tests for the items are less than 0.01, indicating that all three drivers of digital e-RUPI, Perceived Usefulness (PU), Perceived Ease of Use (PEU) and Perceived Trust (PT) are very important with regard to the component that is being explained, i.e., "Intention to Use (IU)". So, the null hypothesis is rejected.

CONCLUSION

The findings of the study can be used by government agencies or FinTech firms to enhance consumers' perceptions, increase the awareness among the people on digital currency, e-RUPI and create efficient tactics for raising their desire to use digital currency. To increase the awareness of e-RUPI, training programs on financial literacy can be designed to sensitize the advisors of Financial Literacy Centers **(Dulloo, 2021).** People can be educated about the operation of the e-RUPI system by organizing awareness campaigns, rallies, gram sabhas, Digi Melas, Garib Kalyan Melas, Nukkad Natak, bike rallies, digital marathon, etc. Self-Help Groups (SHGs) and NGOs can assist in conducting door-to-door campaigns and surveys to educate and raise awareness about digital payments, especially in villages and rural regions. DigiRath and digital LED vans can be utilised for training as audio-visual methods of information dissemination being quick and effective medium. Across all social groups, print media (pamphlets, brochures, slogans, leaflets, booklets, banners and posters), electronic media (TV, radio jingles), and social media (Facebook, Twitter, WhatsApp) may be employed to increase the public's knowledge of digital e-RUPI. Further, results also show that Trust is critical to the success of user acceptance of digital e-RUPI. Lack of trust is a major barrier to acceptance of digital e-RUPI. Thus, efforts to increase consumer confidence by including strong data governance standards into the e-rupee's design principles should be made. Perceived usefulness and perceived ease of use are the motivators leading to adoption of digital e-RUPI. Ultimately, the success of e-Rupi will depend on how well it is marketed, how easy it is to use, and how effective it is in addressing the needs of the people.

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