IJISEM
INTERNATIONAL JOURNAL OF INNOVATIONS IN SCIENCE ENGINEERING AND MANAGEMENT

What makes it Green for the Unified Payment Interface (UPI)? A Study

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OPEN ACCESS

Volume: 3

Issue: Special

Month: May

Year: 2024

ISSN: 2583-7117

Published: 07.05.2024

Citation:

Udita Kujur1, Sanskrity Joseph2, S. K. Indurkar3. "What makes it Green for the Unified Payment Interface (UPI)? A Study" International Journal of Innovations In Science Engineering And Management, vol. 3, Issue: Special, 2024, pp. 133–139.

Abstract

A unified payment system has become the need of the hour in India. The inclination of the consumer after demonetization and government promotion of virtual payment systems to cater to the needs of the scarcity of real money supply in the markets has increased manifold. The global digital payment market is expected to grow at a compound annual growth rate of 19.2% from 2016 to 2022 by reaching 168.6 billion US dollars, based on the report issued by Allied Market Research (Allied Market Research, 2017). This demonstrates the increasing popularity and acceptance of digital payment methods worldwide. The National Payment Corporation of India serves as an umbrella Organisation responsible for functioning retail payment system and settlement systems within the country. The Unified Payment Interface (UPI), introduced and implemented by NPCI in 2016, has emerged as a highly favored payment system in India, facilitating over a billion transactions monthly.

Consumer adoption refers to the process by which consumers start using a new product or service. It involves the decision-making process where consumers become aware of the product, gather information, evaluate its benefits, and make a choice to purchase and use it. It is an important area of research to understand what will prompt a user to adopt UPI. The researchers have tried to identify the impact of the theory of reasoned approach and planned behavior and Technology acceptance model on the adoption and usage of UPI in India.

Keyword: Unified payment Interface, Reasoned approach, planned behavior, Technology acceptance.

1. INTRODUCTION

The government of India announced the demonetization of Rs 500 and Rs 1000 banknotes of the Mahatma Gandhi series on 8th Nov 2016. The move of demonetization was justified with the stated objectives like seizing undeclared currency, controlling terrorism, moving to the digital economy, and strengthening Indian banking systems. Lahiri (2020) stated that 80 percent of workers, 45 percent of GDP, and a large number of firms work in the informal sector. This informality leads to untraced transactions, untapped revenues, and untaxed corporates and individuals. The drive towards a digital economy will lead to the usage of more digital modes of payments creating digital footprints that will help in regularizing informal transactions. Srivastava (2023) highlighted that digitalization is progressing slowly in India covering the urban population, then the semi-urban population followed by rural areas. The acceptance of digital modes of transaction can be underlined by the fact that real-time payments in India were at 48.6 billion in India in comparison to 18.5 billion in China. The Ministry of Electronics and Information Technology formulated Digital Economy Group (2024) and highlighted that the volume of digital transactions increased by 650% in the financial year 2022-23 in comparison to the financial year 2017-18. Similarly, the value of digital transactions increased by 170.43 % in the financial year 2022-23 in comparison to the financial year 2017-18

India as a Digital Economy

Year	Digital Transaction Volume in Crores	Digital Transaction Value in Lakhs Crores
2017-18	2071	1962
2018-19	3134	2482
2019-20	4572	2953
2020-21	5554	3000
2021-22	8840	3021
2022-23	13462	3344

(Source RBI, DigiDhan Dashboard)

The figures emphasized by various researchers highlight the success of digitalization of the Indian economy. Therefore, it becomes increasingly important to investigate the factors that have led to the adoption and usage of digital modes of transaction. In Addition, It is also important to understand whether the figures are an eye wash that is pleasing to the eyes or whether the usage of digital modes of transaction has penetrated the informal sectors of the economy and is even being used by all groups of people. In the above backdrop, the paper wishes to examine the following issue:

(i) The Factors that support the adoption of selected Real-Time Payment Methods supported by UPI.

Theoretical Background of the Study

In order to identify the basis for the adoption and usage of Real-Time Payment Methods supported by UPI in India, researchers have applied three theories:

Theory of Reasoned Action: Fishbein and Ajzen (1975) highlighted that an individual's belief and the evaluation of an outcome of an action based on the belief form the attitude of an individual. further subjective norms which are a combination of motivation to perform an action coupled with the normative belief together with an attitude of a person shape the behavioural intention of an Individual. The Intention of an individual directs a person to take a specified action.

Theory of Planned Behaviour: By focusing on how an individual's purpose shapes his or her attitude, subjective norms, and perception of behaviour control, Ajzen (1985) has made a difference in the theory of reasoned action. Perceived behavior control can be brought about by self-efficacy and estimation of expectations related to an outcome. Further intentions shape the actions of an individual.

Technology Acceptance Model: The theory suggests that consumer attitudes, their perception of ease of use, and the extent to which they think technology is useful depend upon acceptance (Davis 1989, Davis, Warshaw, and Bagozzi, (1989)

Unified Payment Interface

Studying all digital transaction modes can be a formidable task, which is why researchers have focused on studying the UPI supported by the National Payment Corporation of India. UPI has been granted significant attention as an innovative solution within the payment system, offering a unified platform for transactions. The UPI is an innovative platform that integrates numerous bank accounts into one mobile app, irrespective of the bank involved. Through the integration of diverse banking functionalities, smooth fund transfers, and merchant transactions, UPI offers a holistic solution. Additionally, it facilitates "peer-to-peer" collection requirements, empowering them to manage payments efficiently based on their needs and suitability.

The UPI is an innovative and user-friendly payment solution that enables real-time inter-bank transactions, promoting the widespread adoption of digital payments in the country. Established and introduced by the National Payment Corporation of India in 2016, UPI has quickly become one of the most favored payment methods in India, with over a billion successful transactions every month. Unified Payments Interface supports financial transactions like payment and collection of funds and non-financial transactions like registration for banking services, balance inquiry, password generation customer support, etc.

Literature Review:

In order to study the factors that affect the adoption and use of UPI in India, the researcher examined studies based on these models. Baghla (2018) highlighted that the adoption of UPI has been driven by perceptions of ease of

use, innovation, and incentives. According to Pratap, Saroy, and Dhal (2021), the role of perception and trust is crucial in shaping the behavioural intention to utilize digital payment systems. Thakur (2013) also found that performance expectations, effort expectations, and social influences have a significant impact on the adoption of digital payment applications. Chauhan's (2015) perceived usefulness, trust, and attitude of an individual directs a person to adopt and use a digital payment technology. Patil. Rana and Raghvan (2020) Innovativeness of an application, trust in the service provider, grievance redressal systems for frauds, anxiety to use new technology, and performance expectancy help in the adoption and usage of UPI. Gupta and Arora (2020) Performance expectation, effort expectation, and habits of consumers influence the adoption decisions of consumers of mobile payment applications. Sivathanu (2019) stickiness to use cash and innovation resistance are major hindrances that block the adoption of digital modes of payments. Kesharwani and Bisth (2012) highlighted that perceived risk affects adoption. Sobti (2019) studied the adoption of cashless methods of transaction just post-demonetization. His findings highlighted that perceived cost and perceived risk affect the adoption of cashless payment systems.

Research Methodology:

All users registered with the UPI database are part of the study population. Rathore (2023) highlighted those 260 million registered consumers are using the service of UPI in India. The sample size for the study was determined by Yamane's formula: n = N/(1+N(e)2 (Yamane 1967). The calculated sample size for the study was 385 with a confidence level of 95%. The sample unit for the study was registered users on UPI. The user of UPI who was registered with at least one service provider of the UPI ecosystem was taken as a sample unit. The data was gathered through the utilization of a structured questionnaire implemented via Survey Monkey.

Findings of the Study

(i) Most Preferred UPI Application Amongst Consumers

Garret's ranking method was used to find the most used UPI applications amongst selected respondents. The following formula was used:

Percent position = 100 (Rij - 0.5) / N j

Where Rij is the rank given for i th variable by j th respondent and Nj is the number of variables ranked by j th respondent. The results are summarized in the table below:

Ranking Table of Most Preferred UPI Applications

Applications	1st Rank	2nd Rank	3rd Rank	4th Rank	5th Rank	6th Rank	7th Rank	8th Rank
Phone Pay	44	25	16	5	6	2	1	1
Google Pay	28	33	18	10	6	3	1	1
Paytm	7	28	34	11	7	7	4	2
BHIM	5	10	22	31	12	10	8	2
Amazon Pay	7	1	6	27	36	16	5	2
CRED	2	1	2	11	27	38	11	8
Mobiwik	5	1	1	3	3	15	49	23
Tata Neu	2	1	1	2	3	9	21	61

Percent Positions and Garret values

Sr.No:	Percent Position	Calculated Value	Garret Value
1	100 (1 - 0.5) / 8	6.25	80
2	100 (2 - 0.5) / 8	18.75	68
3	100 (3 - 0.5) / 8	31.25	60

4	100 (4 - 0.5) / 8	48.75	51
5	100 (5 - 0.5) / 8	56.25	47
6	100 (6 - 0.5) / 8	68.75	40
7	100 (7 - 0.5) / 8	81.25	32
8	100 (8 - 0.5) / 8	93.75	20

Calculation of Garret Value

Applications	1st Rank* 80	2nd Rank* 68	3rd Rank* 60	4th Rank* 51	5th Rank* 47	6th Rank* 40	7th Rank* 32	8th Rank* 20	Total
Phone Pay	3520	1700	960	255	282	80	32	20	6849
Google Pay	2240	2244	1080	510	282	120	32	20	6528
Paytm	560	1904	2040	561	329	280	128	40	5842
BHIM	400	680	1320	1581	564	400	256	40	5241
Amazon Pay	560	68	360	1377	1692	640	160	40	4897
CRED	160	68	120	561	1269	1520	352	160	4210
Mobiwik	400	68	60	153	141	600	1568	460	3450
Tata Neu	160	68	60	102	141	360	672	1220	2783

Garret Ranking

Applications	Total	Mean=Total/385	Ranking
Phone Pay	6849	17.78961	1
Google Pay	6528	16.95584	2
Paytm	5842	15.17403	3
BHIM	5241	13.61299	4
Amazon Pay	4897	12.71948	5
CRED	4210	10.93506	6
Mobiwik	3450	8.961039	7
Tata Neu	2783	7.228571	8

It can be seen from the above table that Phone pay with a mean score of 17.78 is the most preferred UPI application amongst consumers. It is followed by Google Pay (16.95) Paytm (15.17) BHIM (13.61) Amazon (12.71) CRED (10.93) Mobiwik (8.96) and Tata Neu (7.22)

(ii) Reasons for adoption of UPI Applications

The researchers have used regression analysis to understand the relationships between variables by formulating a regression model.

Model summary

Model	R	R Square	Adjusted R Square	Std. error of Estimate
1	.761	.578	.559	5.66
a. Predictor Intention: Constant, attitude, social influence, perceived expectancy, motivation				

In the above table, the calculated value of R 0.761 shows a good value of prediction. It indicates that constant attitude, social influence, perceived expectancy, and motivation are good predictors of Intention. According to the calculation of R square .578, 57.8% variability in our dependent variable is explained by an independent variable.

ANOVA

Model	Sum of Squares	df	Mean square	F	Sig.
1 Regression Residual Total	4183.411 3061.214 7244.625	4 95 99	1139.121 31.386	31.393	00

The above table shows that independent variables are strongly predictive of independent variables, where p is less than 0.005, as the calculated value for F (4,95) is 31.393, the data is well suited to the regression model 1.

Coefficients

	Unstandardized Coefficients		Std. Coefficient	t	Sig	95% Confidence Interval	
Model	B	Std. error	Beta			Lower Bound	Upper Bound

1 Constant	89.381	6.194	-.176	13.001	0.00	72.115	100.321
Attitude	-.121	0.031	-.456	-2.432	0.00	-.242	-.031
Social Influence	-.286	0.064	-.211	-7.002	0.00	-.134	-.024
Performance expectancy	-.111	0.028	.645	-3.345	0.00	-.142	-.041
Motivation	13.11	1.211		8.456	0.00	10.593	15.114

In order to establish a relationship between attitude, societal influence, performance expectancy, and motivation for predicting behavioural intentions multiple regression analyses have been performed. These variables have been shown to be statistically important indicators of behavioural intent, according to the analysis results $F(4,95) = 31.393$, $p < 0.0005$, $R2 = 0.578$. Additionally, all four significantly contributed to the prediction ($p < 0.05$).

Discussions:

The results of the study highlight that digital payment applications like Phone Pay, Google Pay formally known as Tez, and Paytm are the most used preferred digital payment applications amongst consumers. These companies are seeking the advantages of being early sellers amongst customers and they have evolved in the market with the adoption diffusion curve of the consumers. On the other part, BHIM was promoted by the government, so it also enjoys customer approvals. Mobile applications like Amazon Pay and CRED are enjoying the goodwill of their promotors namely Amazon and AXIS Bank.

Further, the combined effect of societal influence, performance expectations, motivation, and positive attitudes has led to the adoption of applications under the UPI. the adoption of applications based on UPI has been the result of the combined effect of social influence, performance expectancy, motivation, and positive attitude. Social influence studies the impact of recommendations, suggestions, and expectations of reference persons and groups on the adoption of UPI applications. The findings revealed that reference persons and groups had a huge influence on consumers to try an innovative product like UPI. Positive reaffirmations have prompted individuals to adopt UPI. Factors related to Performance expectancy like Perceived Usefulness, relative advantage, and Perceived ease of use matched with the consumers' expectations prompting them to adopt UPI. The shortage of cash during demonetization and contactless payments during the pandemic helped consumers understand the usefulness of UPI applications. Further convenience, time-saving, and no relative charges also helped consumers to make adoption decisions. The easy operations on mobile phones coupled with curiosity and relative no challenge to understanding the transfer and scanning procedures also led to the adoption of UPI applications. The customer's positive belief about the safety and security of UPI applications with its positive confirmations also helped the adoption process of UPI applications.

The volume of transactions happening on UPI applications along with its value confirms that the color has become green for UPI applications in India. The NCPI and the third-party financial institutions have successfully managed the transition from Red to orange to green. Further, it can be concluded that Intention has taken an appositive step of adoption which has converted to usage making it green for digital payment ecosystems in India.

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