Identifying Factors Influencing Consumer Behavior towards Adoption of Card based Payment Methods in India

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Abstract: *Purpose.* This study aims to identify the factors influencing the adoption and rejection of card-based payment methods in India. *Research Methodology.* The literature review suggests factors of Technology Acceptance Model (TAM) i.e. perceived usefulness and perceived ease-of-use. Additionally, following factors under existing TAM model are incorporated as –ease of use, privacy & trust, perceived security, convenience, environmental influence, retailer's acceptance and e-loyalty. The research studies 399 responses based on quota sampling. Factor analysis is conducted to find the factors of technology adoption; later the research is extended to study predictive relationship of various factors with card based payment adoption. *Findings.* The study identifies perceived ease of use, privacy & trust, perceived security, convenience and customer satisfaction as important factors for technology adoption in India; the predictive relationship of these factors with card based payment adoption is also established. *Research Implications.* Factors influencing the adoption of card-based payment method as pervasive factors can be further analyzed and used to strategize the promotion of other FinTech tools to promote the cashless ecosystem in India. *Novelty / Originality.* This research is conducted to identify card based adoption factors allowing for socio-techno-economic conditions post the demonetization.

Keywords: credit/debit cards, card-based, fintech, technology acceptance model

INTRODUCTION

Revolution in the ICT industry has impacted the lives of individuals in a profound manner. Usage of information technology has increased the level of competition, promoted innovation and supported development of new strategies to enhance the customer experience. ATM's, Credit cards, Debit cards, Tele Banking and Internet Banking have emerged as efficient delivery channels of banking facilities

to the customer premises easily and effectively. Therefore banks are now able to deliver the product efficiently.

Cashless society is being predicted for decades; however, paper currency has dominated the Indian society for a long time now. Application of technology has transformed the lifestyles of people depending on it. Technology in the banking sector has transformed the banking industry from traditional manual to highly automated technology-driven industry. In this transformation, card-based payment mechanisms have gained much-needed popularity. There has been an increasing demand for credit and debit cards as a preferred method of payment after cash. This payment system is the most favored method for billing of food, travel, entertainment and retail.

India is the fastest growing economy in the world. However, credit card usage remains limited as compared to debit card. Most of the Indian banks offer credit and debit cards- namely HDFC bank, ICICI Bank, Kotak Mahindra Bank, Axis Bank with Gold, Silver and Platinum cards. There has been a steady increase in segmentation and targeting strategy by these banks to target the right customers. In addition to this, environmental factors like the influence of Government of India under the guidance of Prime Minister Narendra Modi is enabling the social inclusion of rural population in the mainstream banking and financial sector of the Indian economy. Some of these Government initiatives are 'Jan Dhan Yojna' and 'Mudra Yojna'. Due to above initiatives in the recent past, the adoption rate of digital mode of payment has increased with more number of people adopting the card-based payment mechanism.

Information Technology is the core on which Banking systems are thriving- which inturn increased the number of products that banking system can offer and market them more effectively. There are various products such as Internet Banking, Mobile Banking, ATM's, Credit Cards and Debit Cards that need to be marketed by the banks. Customer acceptance and Customer satisfaction being key factors for the bank on which the success of the above products can be quoted.

The key goal of this paper is to study the interplay between demand side (customers and merchants) and the supply side (financial institutes) - with the factors that affect the adoption of card-based payment methods. The model on which the paper is based is Technology Acceptance Model (TAM) which was proposed by (Davis, 1989). The Model has various factors on which one can define why the customers prefer 'Credit and Debit cards' as their preferred mode of payment. This research has been done across various metro cities across India namely Mumbai, Pune, Bangalore, Chennai, Delhi and some tier II cities. The survey was conducted in a span of four months i.e from April 2017 to July 2017 with 399 responses and Quota sampling as the survey methodology.

OBJECTIVES

This research aims to identify consumer behavior factors affecting the use of credit/debit cards and forming an modal for the adoption of card-based payment method.

METHODOLOGY

This study is primarily based on consumer perception for using card-based payment method. SCOPUS bibliographic database is used to identify literature in the area of 'FinTech industry'. The scope of the research is 'research papers' pertaining to TAM of various fintech tools across different countries. Initial

search resulted in 200 research papers; the research was further refined to 30 relevant research papers related to the topic of concern.

Based on the literature review questionnaire was formed. Some questions were reverse coded too in the questionnaire. After three rounds of review and pilot run, final questionnaire was formed. Primary research was then conducted in Pune, Mumbai, Bangalore, Delhi, Chennai and some tier II cities using both Pen and Paper and online survey using Question-Pro. The sampling technique used is quota sampling based on gender. Total people surveyed were 520, Out of which 399 respondents had credit/debit card as their preferred mode of payment. The analysis in the research is based on the responses of 399 respondents. Biases was removed and then the analysis is performed using IBM SPSS. Factor analysis is conducted to find the key factors which trigger adoption of card-based payment method. Later by applying multiple linear regression, the research is extended to study predictive relationship of various factors with card-based payment adoption.

LITERATURE REVIEW

The Banking and Finance Sector is the backbone of Indian Economy. Card-based payment system is one amongst the modern-day technologies that this sector has adopted. There have been many economic, social, technological and legal challenges; however continuous innovation has been the key for acceptance of the card-based payments.

The Indian banks have adopted technologies that compete with modern day banks of the world (J. Caskey, G. Sellon, 1994). Traditionally the transactions to banks were limited to savings account,current account, term deposits which required people to visit the bank- for debiting or crediting money. At present it has become very much necessary for banks to change this perception by taking into action customer needs, convenience and preferences (Zinman, 2004). Adoption of new technology such as card-based transaction mechanisms has always been an asset to a bank which reduces the cost in the long run by minimizing the losses and maximizing the Return on Investments (Habib, 2012).The services dependant on card-based payment are Internet Banking, Mobile Based Banking, Automated Tailor Machine (ATM) that are substitute to each other (F. Gumussoy, 2008). All the financial institutions, retilers, vendors etc accept card-based transaction mechanism as a viable alternative and a right replacement for cash in everyday exchange situations. (M. Hulland , Plouffee , Yandenbosch, 2000) Card-based payments provide new packages to attract the customers like tele-ticketing offers and reward points etc.According to RBI stats India has 30.86 million credit cards, 880.03 million debit cards as of May'17.The usage has spike has been seen post demonitisation.

One of the most useful models to study the factors driving intentions to use technology is the TAM model. This paper integrates and proposes the usefulness in adopting the card-based systems regarding timecostsavings and ease of learning the new technology (Davis, 1989). But the TAM model does not give serious weight to trust and security. There are other frameworks such as 'uses and gratification' and 'diffusion of innovation', 'Theory of Reasoned Action' (M. Fishbein, I. Ajzen, 1975), 'Extended Technology Acceptance Model' (TAM2) (V. Davis, 2000), 'Theory of Planned Behaviour'(TPB) (Madden, 1986)and UTAUT (Venkatesh, 2003) are considered as the most significant and influential theories under the modified TAM.Though most of them are derived from the original TAM model proposed by (Davis, 1989), they uniquely identified by the domain under which the research is carried out, for whch various factors hold

the TAM model true.This research explores the original TAM by incorporating additional constructs such as ease of use, privacy and trust, perceived security, convenience, environmental influence, retailer acceptance, e-loyalty and customer satisfaction. TAM model is inspired by the theory of action which relates to attitude of the action of a subject and the impact with the behavioral intention which in turn affects the behavioral action of the subject. Below are the constructs that are used to discuss how each of the factors is affecting the adoption of the credit and debit cards across the surveyed cities of India.

Perceived Usefulness: (Davis, 1989) defined perceived usefulness as 'the degree to which a person believes that using a card based payment would save his time and would be further useful'. People assume that adopting technology would help in enhancing their performance.

Perceived Ease fo Use: Defined as 'the degree to which a person believes that using a card based payment would be free of effort'. It is a critical factor in developing and delivering the final product with respect to ease of use.

Privacy and Trust: Defined as 'the extent to which the credit card customers believe that privacy and trust is maintained'

Perceived Security: Defined as 'the triats that enable a consumer in using card based payment system is secured'

Convenience: Defined as 'The perception of that card based payment systems is convenient in using'

Enviornmental Influence: Defined as 'the usage of credit and debit cards influenced by the internal or external environment'

Retailer Acceptance: Defined as 'the acceptance of credit and debit cards by retailers for transaction purposes'

E-loyalty. Defined as 'the factor that enables bank to earn loyalty from the customers'

The above factors act as core to major researches across the Banking and Finance industry below are the prime inputs taken for this research paper:

According to (E. Sharma, 1989) He proposes 'Lifestyle' as a concept plays a key role in the adoption of card based payment mechanism-where he compares the psych- as a contemporary state of mind in using credit and debit card. Here he tries to compare the 'luxury and necessity' based on the lifestyle of a person.

According to (Jung, 1992)– He compares the demographic factors like age, income, number of banks with the card holding fees as key factor to analyze the adoption of credit card.

According to (Punjavat, 1993)– He examines the attitude, knowledge, experience, practice, satisfaction for using card-based payment systems. There have been various researches based on the merchant's acceptance level,interest rate and returnson the pattern of spendingetc. There are various studies done in the field of acceptance of new card-based transaction systems.

According to (Jung, 1992) in his research focused on attitude and behavior of the credit card holder and the factors that influence him in using the cards with ease. His research focused on the factor that the cardholder needs to pay a certain amount as fee to carry out the transaction and willingness to pay the same.

According to (Parimala, 1993) in her findings suggested that there are not many merchants that accept card based payment mode and there are many issues that cause reluctance of acceptance- major ones among them are charges on penalty, interest and annual charges and less scope for growth and expansion of credit card mart.

According to (D. Goodhue, R.Thompson, 1997) they emphasized on individual impact of using technology. This refers to improved efficiency and effectiveness on using technology that impacts the usage patterns.

According to (Taylor, 1995) He introduced theory of planned behavior which consists of factors that influence behavior intention and actual behavior adoption attitude and perceived behavior control.

According to (S. Prabhu , R. Kazi, 2015) in their research focused on infusion of technology as an enabler to manage service gaps, their findings imply the exhaustive use to technology to minimize the service gaps that enable in creating seamless processes to the end customers.

The final version of TAM model i.e. TAM 2 proposed by (Davis , Venkatesh, 2000)provided detailed explanations why users found a given system useful pre-implementation, during implementation and post implementation. TAM 2 focuses majorly on the action of performing a task and the action to be taken against the task. The above TAM 2 model is tested against both the volunteer and non-volunteer environment. Thus according to the above literature review there have been various factors that have let to adoption and usefulness of card based payment systems in India.

RESEARCH ANALYSIS

Based on the literature review of 30 research papers, factors were identified from various paper. Dimension reduction analysis i.e. factor analysis is performed on the responses to come up with prominent factors based on the response of 399 customers who are using Credit Card/ Debit Card as their preferred mode of transaction.

Based on the literature review questionnaire were formed. After three rounds of review and one pilot run, final questionnaire was formed. Primary research was then conducted in few cities -Pune, Mumbai, Bangalore, Delhi, and Chennai and some tier-II cities. Total people surveyed were 520. Out of which, 399 respondents had credit/debit card as their preferred mode of payment. The analysis in the research is based on the responses of 399 respondents.

Principal component is set as the method of Extraction and eigen value is set greater than 1 in order to come up with only those factors which have an eigen value greater than 1. Principal component analysis (PCA) is a technique used to emphasize variation and bring out strong patterns in the respondent. Maximum iteration for convergence is set to 25. Rotation method is set as Varimax. Varimax rotation is a way of transforming the output so that rotated component matrix is relatively easy to understand. In the factor analysis, the coefficient is suppressed whose absolute value is below 0.20 in order to make the factor analysis output readable.

After configuring the settings for factor analysis, following is the output.

Table 1
Rotated Component Matrix

Rotated Component Matrix

Components

	1	2	3	4	5	6	7	8
Safety is high	.774	.234						
As secure as bank transaction	.762				.248	-.223		
Sufficient payment security	.734							
Quick & fast method		.781						
Easy to use credit/debit card		.779						
Easy learning and using		.738			.234			
Credit card/ Debit card helps track & control expenses		.306				-.248		
Worry about transaction failure			.782					
Technology problems while using			.761				-.211	
Worried about Id/Password	.430		.525	.269		.285		.268
Worried about information privacy	.408		.503	.247		.338		.261
Retailers do not accept credit/debit				-.833				
Retailers insist on cash payment				.802				
Cannot be used for all types of transactions	.252			.565		.228		
Retailers often charge extra		.281	.329	.428				-.220
Usage for all payments	.212				.698			
Very convenient		.251			.661			
Works well everywhere – every time		.283			.450			.396
Awareness of benefits					.409	-.358		.304
Credit/debit card is a good experience	.378	.268			.399			
Multiple methods as a backup plan			-.260			.643		
use because of discounts, gifts						-.590	.310	
Transaction fees for using is ok	-.225					.533		
Use because of discount, gifts	-.292		.225		.224	.414	-.352	
Started using after seeing everyone							.793	
Started after Government insists					.219		.699	
Confused and frustration while using	.222	.302	.333			.274	-.426	
Switch between payment methods								-.656
Transaction limit is sufficient					.206			.613

Extraction Method: Principal Component
Analysis. Rotation Method:
Varimax with Kaiser Normalization.

a. Rotation converged in 16 iterations.

Common questions under one categoryare given a factor name based on the understanding. Following factors are the output of Factor Analysis:

Perceived Security. This factor measures the perceived security amongst the users towards card-based payment system. Security factor is what this factor talks about.

Ease of Use. This factor emphasizes the impact of easiness in terms of use of card and learning required to get used to card-based payment mode.

Privacy and Trust. This factor emphasizes on consumer behavior in relation to card-based payment method, their reaction about Id/Password, information, privacy, trust related to transaction.

Retailer Acceptance. This factor deals with the retailer acceptance of card-based payment option.

Convenience. This factor measures the convenience which is generated because of applicability of debit and credit card. Benefits associated with the mode of payment and ease with which consumers can make use of this payment mode.

E-loyalty: This is a major factor both from the customer point of view as well as from the provider's point of view. In terms offintechtoolsgenerally people have backup with them in terms of other tools like – e-wallet government promoted BHIM cash or other means. But after the research analysis, this factor came as a prominent factor towards the adoption of card-based payment method.

Environmental Influence. This measures the government initiative, social influence towards the adoption of card-based payment method.

Customer Satisfaction: This factor broadly measures the satisfaction related to features of card-based payment method. Facilities like tracking and managing expenses are covered under this factor.

Table 2
Model summary with R Square and Adjusted R Square value

Model Summary[g]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.520[a]	.270	.268	.67451
2	.633[b]	.401	.398	.61197
3	.715[c]	.512	.508	.55302
4	.729[d]	.531	.527	.54255
5	.737[e]	.544	.538	.53595
6	.741[f]	.549	.542	.53348

a. Predictors: (Constant), Perceived Security
b. Predictors: (Constant), Perceived Security, Ease of use
c. Predictors: (Constant), Perceived Security, Ease of use, Convenience
d. Predictors: (Constant), Perceived Security, Ease of use, Convenience, E-loyalty
e. Predictors: (Constant), Perceived Security, Ease of use, Convenience, E-loyalty, Customer Satisfaction
f. Predictors: (Constant), Perceived Security, Ease of use, Convenience, E-loyalty, Customer Satisfaction, Privacy and Trust
g. Dependent Variable: OFINAL

Above eight factors are taken, and Linear Regression operation is performed with these factors. Regression analysis is a quantitative research method which is used when the study involves modeling and analyzing several variables where the relationship includes a dependent variable i.e. overall acceptance and eight independent variables i.e. the factors which are the output of Factor analysis. The rationale behind doing linear regression is to find how much variance in a continuous dependent variable is explained by a set of independent variables. The method of the linear regression is Stepwise method. The stepwise method means that the choice of independent variables is carried out by an automatic procedure. In each step, a variable is considered for addition to or subtraction from the set of independent variables on some pre-specified criterion.

Table 3
Regression Residual Values

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	66.809	1	66.809	146.843	.000[b]
	Residual	180.622	397	.455		
	Total	247.431	398			
2	Regression	99.128	2	49.564	132.345	.000[c]
	Residual	148.304	396	.375		
	Total	247.431	398			
3	Regression	126.627	3	42.209	138.013	.000[d]
	Residual	120.804	395	.306		
	Total	247.431	398			
4	Regression	131.451	4	32.863	111.640	.000[e]
	Residual	115.980	394	.294		
	Total	247.431	398			
5	Regression	134.544	5	26.909	93.679	.000[f]
	Residual	112.887	393	.287		
	Total	247.431	398			
6	Regression	135.868	6	22.645	79.566	.000[g]
	Residual	111.563	392	.285		
	Total	247.431	398			

a. Dependent Variable: OFINAL

b. Predictors: (Constant), Perceived Security

c. Predictors: (Constant), Perceived Security, Ease of use

d. Predictors: (Constant), Perceived Security, Ease of use, Convenience

e. Predictors: (Constant), Perceived Security, Ease of use, Convenience, E-loyalty

f. Predictors: (Constant), Perceived Security, Ease of use, Convenience, E-loyalty, Customer Satisfaction

g. Predictors: (Constant), Perceived Security, Ease of use, Convenience, E-loyalty, Customer Satisfaction, Privacy and Trust

Table 4
Multiple Linear Regressions - Stepwise

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	5.810	.034		172.061	.000
	Perceived Security	.410	.034	.520	12.118	.000
2	(Constant)	5.810	.031		189.647	.000
	Perceived Security	.410	.031	.520	13.356	.000
	Ease of use	.285	.031	.361	9.290	.000
3	(Constant)	5.810	.028		209.861	.000
	Perceived Security	.410	.028	.520	14.780	.000
	Ease of use	.285	.028	.361	10.280	.000
	Convenience	.263	.028	.333	9.482	.000
4	(Constant)	5.810	.027		213.910	.000
	Perceived Security	.410	.027	.520	15.065	.000
	Ease of use	.285	.027	.361	10.478	.000
	Convenience	.263	.027	.333	9.665	.000
	E-loyalty	-.110	.027	-.140	-4.048	.000
5	(Constant)	5.810	.027		216.545	.000
	Perceived Security	.410	.027	.520	15.251	.000
	Ease of use	.285	.027	.361	10.607	.000
	Convenience	.263	.027	.333	9.784	.000
	E-loyalty	-.110	.027	-.140	-4.098	.000
	Customer Satisfaction	.088	.027	.112	3.281	.001
6	(Constant)	5.810	.027		217.548	.000
	Perceived Security	.410	.027	.520	15.321	.000
	Ease of use	.285	.027	.361	10.656	.000
	Convenience	.263	.027	.333	9.830	.000
	E-loyalty	-.110	.027	-.140	-4.117	.000
	Customer Satisfaction	.088	.027	.112	3.297	.001
	Privacy and Trust	.058	.027	.073	2.157	.032

a. Dependent Variable: OFINAL

Residual Analysis

Residual is studied by analyzing distribution of residual. Residual is found to be normally distributed.
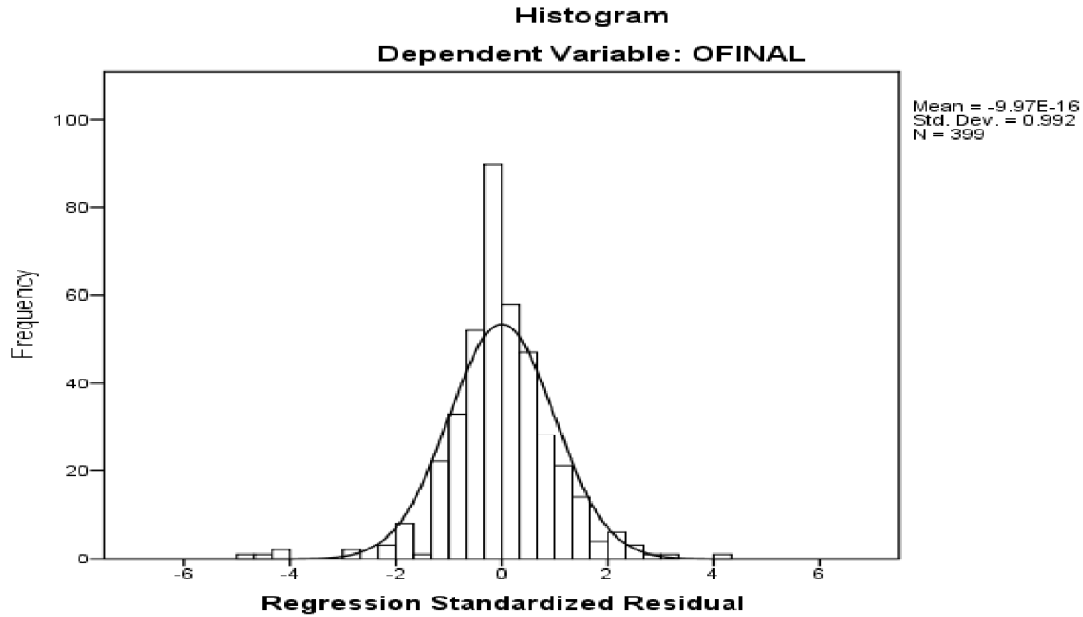
Figure 1: Output of Residual Analysis

The output of multiple linear regression shows, creates six different models with different R square value. Model 6 has the highest R square value of 54.9%. This means, model 6 is the best model to form an equation. By the stepwise method, retailer acceptance and environmental influence has been removed from the model.

Finally six factors have significance level as required. Thus, these six factors are selected to form the equation. Following six factors are prominent-

Ease of Use: This factor states the usefulness of credit card/debit card in the mind of the consumer. In simple terms if the ease of use is high for credit/debit card, people will continue using this mode.

Privacy and Trust: This factor deals with the privacy and trust in the mind of the customer. This is an important factor because consumers do not use any technology until and unless they feel their privacy is secured.

Perceived Security: This factor captures the perceived security features that are related to how a card based transaction is made secured. Fear of connection loss and data theft is associated with this mode of payment.

Convenience: **This factor relates to how the entire end to end transaction of a card based payment is convenient in using for the customers.**

Customer Satisfaction: With this factor, it is clear that customer satisfaction is most important. Satisfaction while using the card based method is important for acceptance of credit/debit card as the preferred mode of payment.

E-loyalty: This is an important factor both from the customer point of view as well as from the provider's point of view.

FINDINGS AND IMPLICATIONS

Based on the primary research done across several cities, factors is identified which contribute to the high acceptance of credit/debit cards amongst users.

Ease of use, privacy and trust, perceived security, convenience, customer satisfaction and e-loyalty are the key factors affecting the acceptance of Credit/Debit card based payment mode in India. The equation with the coefficient for the consumer behavior is as follows:

> Equation for Technology Adoption for Credit Card/Debit Card = 5.810 + 0.410 (Perceived Security) + 0.285 (Ease of use) + 0.263 (Convenience) + 0.088 (Customer Satisfaction) + 0.058 (Privacy & Trust) - 0.110 (E-loyalty)
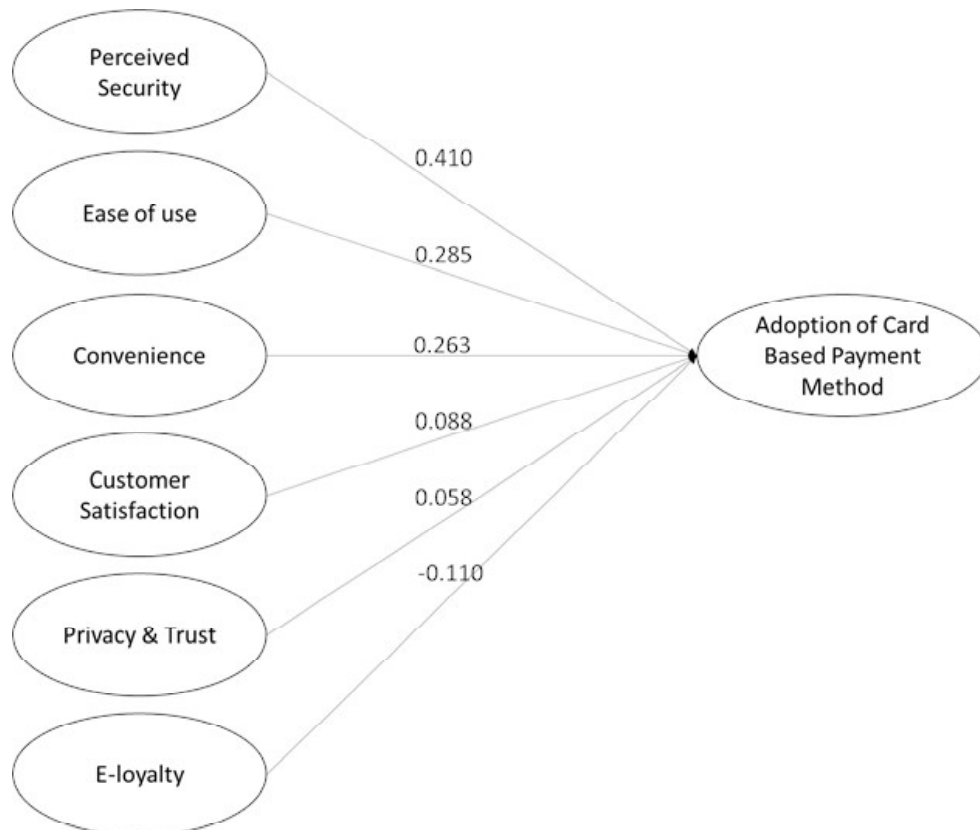

Figure 2: Final Factor Mapping

CONCLUSION

Based on the Factor Analysis performed using Principal component method, following factors are identified which influence the adoption of card-based payment method in India- Ease of Use, Privacy and Trust, Perceived Security, Convenience, Environmental Influence, Retailer Acceptance-loyalty and Customer Satisfaction.

However multiple linear regression of above factors suggests that environmental influence retailer acceptance and e-loyalty were not having significant value. Thus, the final factors after regression are ease-of-use, privacy and trust, perceived security, convenience, customer satisfaction and e-loyalty. The research concludes that these six factors in Indian context determine the consumer adoption of credit/debit mode of payment option.

This finding can be tested on other fintech tools to find out how they differ from widely used card-based payment methods. Based on those research, strategy can be formulated which will help India in the journey towards the cash-less economy. Additionally, in the highly competitive FinTech world, understanding and doing a confirmatory analysis with the outcome of this research to other payment option will help companies understand the consumer behavior. Based on which, company can do personalization and create the exceptional customer experience.

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