

Factors affecting Customers' adoption of Electronic Payment : an Empirical Analysis

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Abstract: In view of the promising growth of Electronic Payment and Clearing System in India, the purpose of this study is to discover the factors which influence adoption of Electronic Payment and Clearing System from Indian customers' perspective. Literature indicates that factors such as Perceived Usefulness, Perceived Ease of Use, Perceived Risk and Perceived Security influence customers' perception towards Electronic Payment and Clearing System. Factor analysis and multiple regression analysis result reveal that Perceived Usefulness, Perceived Ease of Use and Perceived Security have significant influences on customers' perception towards Electronic Payment and Clearing System. However, insignificant result obtained for Perceived Risk which demands further improvement. RBI along with Government of India have given special emphasis on converting traditional payment system to Electronic Payment System and have a positive intension to meet customers' demand and expectations which will subsequently lead to its increased adoption and use. The significant factors identified from this study are beneficial to the policy maker, banking institutions, online transaction facility providers as well as software developers as they develop strategies directed at increasing E-Payment acceptance and use.

Keywords: Electronic Payment and Clearing System, Modern Payment System, Perceived Ease of Use, Perceived Risk, Perceived Security, Perceived Usefulness, Traditional Payment System.

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I. Introduction

In the post liberalization and deregulation period there is a focus on payment system issues which reflect both political changes and economic development around the world. For a developing country like India rebuilding the payment system is one of the foremost importance for supporting the establishment of the market economies. Due to the advent of Information technology and its convergence with communication technology there was a drastic change in payment mechanism throughout the globe. Electronic payment which is a subset of Electronic Commerce technology is cordially related to online banking or Electronic Banking. E-payment system can simply be defined as a collection of components and processes that enables two or more parties to transact and exchange monetary value via electronic means.

Traditional payment mechanism has its own problems and limitations. Few of them are -

- i. Huge cost is involved in printing cash in the form of bank notes
- ii. Problems with soiled and mutilated notes due to mishandling
- iii. Establishment of several branches for cash payment and transaction
- iv. Risks of theft and robbery while carrying cash to the revenue collection centers
- v. Cost involved in giving large number of employment

Obviously Electronic Payment System provides solutions to the aforementioned problems and limitations of the use of cash.

Some of the advantages are -

1. Time savings
2. Expenses control
3. Reduced risk of loss and theft
4. User-friendly

1.1 Changing scenario of Electronic Payment infrastructure in India

Personal Computer and Network connectivity is one of the pre requisites for Electronic Payment transaction. Research studies indicated that usage of Electronic Payment transaction has become popular among youths. Reason is that youths are more computer literate and tech savvy than the older. The fact is that there exist a large market segment that are still comfortable with traditional transaction. Government has already

implemented JAM (JanDhan , Adhar, Mobile) strategy to reach out to the unbanked population. More infrastructure is necessary specially in semi urban and rural areas.

1.2 Demonetization – Metamorphosis for Cashless India

The thought process of making Cashless India has been started on 15th Aug. 2014 when Prime Minister announced opening of Jan-dhan accounts on affordable cost for poor and unbanked areas under Financial inclusion. Under the same process, lastly on 9th November, 2016 Prime Minister Mr. Narendra Modi implemented demonitization in India.

Due to the affect of demonetization online monetary transactions have gone up by 250% compared to what the month was witnessed in recent years. Effect of demonetization indirectly forces people to turn to cashless options such as debit, credit cards, IMPS, Paytm, and mobile wallets.

1.3 Digital Payment Methods in Cashless India

“Digital India” is a flagship programme of India Government with a vision to transform India into a digitally empowered society and knowledge economy. Various modes of digital payments are available with a mission to promote cashless transactions and convert India into less-cash society.

a) Banking Cards (Debit/Credit/Cash/Travel/Others)

Banking cards are more secure, convenient and flexible than any other payment method. Wide variety of cards are available including credit, debit and prepaid card.

b) Automated Teller Machine (ATM)

Apart from cash dispensing ATMs offer a number of Value Added Services (VAS), such as cash withdrawal, deposit money, pay bills, balance enquiry, obtaining bank statement etc.

c) Unstructured Supplementary Service Data (USSD)

Bank customers can avail this service by dialling *99# and can perform transaction through an interactive menu displayed on the mobile screen. To avail this service basic feature mobile phone is necessary. Key services offered under USSD channel includes interbank fund transfer, balance enquiry, mini bank statement.

d) Aadhaar Enabled Payment System (AEPS)

To avail this service aadhaar number should be linked with bank account. Bio-metric impression of the account holder along with MicroATM is essential. Using AEPS facility a customer can do balance enquiry, cash withdrawal, cash deposit and even aadhaar to aadhaar unlimited fund transfer.

e) Unified Payment Interface (UPI)

Unified Payment Service (UPI) is a system that can integrate multiple bank accounts into a single mobile application of any participating bank. Each bank has its own UPI App which is available for Android, Windows and iOS mobile platform smart phones with internet facility.

• BHIM UPI

BHIM (Bharat Interface for Money) is a Mobile App developed by National Payments Corporation of India (NPCI), based on the Unified Payment Interface. It is built over the Immediate Payment Service infrastructure and allows the user to instantly transfer money between bank accounts of any two parties.

• VPA (Virtual Payment Address)

VPA helps users to avoid exposing bank account number and IFSC code for online transaction. Virtual Payment Address is highly flexible used in place of bank account address.

f) Mobile Wallets

One can link his / her debit card or credit card information to mobile wallet application through mobile device like smart phone or tablet and then transfer money online to mobile wallet. Many banks and few private companies have their own mobile wallet. Example – PayTm, Freecharge, Mobikwik, Oxigen, mRuppee, Airtel Money, SBI Buddy, Jio Money, Vodafone M-Pesa, itz Cash, ICICI pockets, Axis Bank Lime etc.

g) Point of Sale (PoS)

A Point of Sale is a place where actual transaction / sale takes place. In macro sense, a PoS may be a mall or a market. In micro sense, retailers consider a PoS to be the area where a customer completes a transaction, such as a checkout counter.

h) Internet Banking

Internet Banking, also known as Online banking, E-Banking or Virtual Banking is an Electronic Payment System that enables customers of a bank or other financial institutions to conduct financial transactions through financial Institutions website. Different types of online financial transactions are –

- i. Electronic Fund Transfer (EFT) –Electronic Fund Transfer (EFT) is a mode of direct transfer of money from one bank account to another without any paper money changing hands. EFT is used for both credit transfers such as payroll payments and for debit transfer such as mortgage payments.

- ii. Electronic Clearing System (ECS) - ECS is an electronic mode of payment / receipt for transactions that are repetitive and periodic in nature. ECS is used by institutions for making bulk payment of amounts towards distribution of dividend, interest, salary, pension, etc., or for bulk collection of amounts towards telephone / electricity / water dues, cess / tax collections, loan instalment repayments, periodic investments in mutual funds, insurance premium etc. Primarily, there are two variants of ECS - ECS Credit and ECS Debit.
- iii. National Electronic Fund Transfer (NEFT) - NEFT uses a secure mode of transferring fund from one bank branch to another bank branch electronically. To ensure end-to-end security in transaction NEFT uses Public Key Infrastructure (PKI) technology
- iv. Real Time Gross Settlement System (RTGS) - RTGS introduced in 2004, is a funds transfer systems where transfer of money takes place from one bank to another on a "real time" and on "gross" basis.
- v. Immediate Payment Service (IMPS) - National Payments Corporation of India (NPCI) introduced a pilot mobile payment project known as the Immediate Payment Service (IMPS) which offers an instant, 24X7, interbank electronic fund transfer service through mobile phones.

(i) Tele Banking

Telephone Banking is a technology enabled banking services provided by a bank or other financial institutions to facilitate 24 hour banking services to customers.

(j) Mobile banking

This type of service is provided by a bank or other financial institution that allows its customers to conduct different types of financial transactions remotely using a mobile device such as mobile phone or tablet.

(k) QR Code

Quick Response Code is a machine readable code which is used for storing URLs or other information for reading by the camera on a smart phone. Digital Payments and electronic start up PayTm has introduced QR code-based payments on the Paytm Wallet app.

(l) Payments Bank

Payments bank can accept a restricted deposit, whose current limit is Rs. 1 lakh per customer. These type of bank cannot issue loans and credit cards. Users can operate both current account and savings accounts in such type of banks.

(m) Virtual Card

Virtual Card or Electronic Card or e-Card, is a limit Debit Card provides an easy and secure way of transacting online without providing the Primary Card or account information to the merchant.

(n) Aadhaar Enabled Payment

Aadhaar-enabled transactions are card-less and pin-less transaction. This would enable Android phones users to digitally transact using their Aadhaar number and fingerprint/iris authentication.

1.4 User Acceptance of Electronic Payment System

A well-known approach to explain user acceptance is the Technology Acceptance Model (TAM), (Davis, 1989). TAM suggests that users formulate attitudes toward the technology that depends only on perceived usefulness and perceived ease of use of Information Technology. However, TAM2 takes into account other factors such as security, trust, privacy and involved risks that may be critical to user acceptance or rejection of specific technology.

Though Electronic Payment as a medium of alternate payment option is gaining acceptance from customers and has become fastest growing up sector in India particularly in West Bengal; still acceptance and use of Electronic Payment is confined mainly with urban people. Rural and semi rural people are still far away from the flavour of this new technology. Though several studies have been conducted worldwide, region specific studies in the field of Electronic Payment specially in West Bengal are hardly found.

II. Literature Review

Any research should start with a review of earlier studies in bringing out the uniqueness of the proposed study. The literature review is focussed on providing the reader with the information about the literature connected to the research problem. The relevant literatures are classified under the five main headings:

- 1) Theories on Innovation adoption
- 2) Studies on Electronic Payment and Clearing System
- 3) Studies on Electronic Banking
- 4) Studies on Mobile Banking and
- 5) Other literatures related to the study

2.1 Theories on Innovation Adoption

Studies related to **Theories on Innovation adoption** showed that there are several theories that explain the factors influencing the adoption of new technologies. Important among them are –

- i. Theory of Reasoned Action (TRA)
- ii. Innovation Diffusion Theory (IDT)
- iii. Technology Acceptance Model (TAM) and Technology Acceptance Model 2 (TAM2)
- iv. Theory of Planned Behaviour (TPB)
- v. Decomposed Theory of Planned Behaviour (DTPB)

According to Everett Roger (1962) **Innovation Diffusion Theory (IDT)**, innovation adoption is a process of uncertainty reduction. This theory seeks to explain how, why and at what rate new ideas and technology spread through cultures.

Davis (1989) [1] developed **Technology Acceptance Model (TAM)**, which provides a valid and reliable measure that predicts the acceptance or adoption of new technologies by end users.

Davis's (1989) original TAM predicts acceptance based on the end-user's **Perceived Usefulness (PU)** and **Perceived Ease of Use (PEOU)** of the technology for a specific purpose.

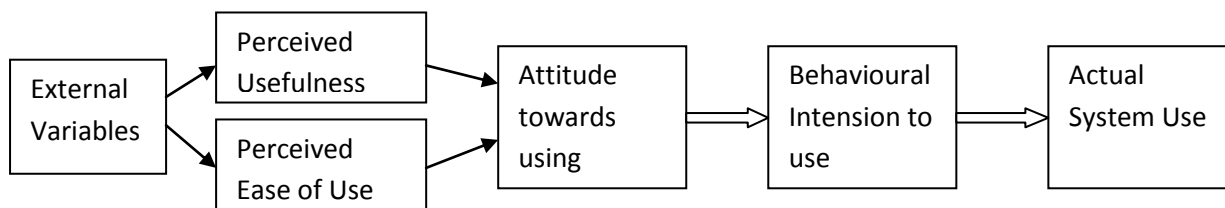


Fig. 2.1 Technology Acceptance Model

2.2 Literature Review on E-Payment System

Khiaonarong(2000) [2] examined the creation of modern Electronic Payment System in Thailand and concluded that this creation has helped to facilitate the turnover of fund in the economy.

Pohjola (2002) [3] in a study conducted on Finnish market sector revealed that the use of E-payments and E-filing led to significant rise in the output of the market sector in Finland.

Murphy(2004) [4] reviewed the progress of payment systems in United States concluded that Network providers are increasingly consolidating among themselves leading to concentration risk and opening up issues in the areas of pricing, quality of service and product innovation. Monoharan (2007) [5]highlighted the Electronic Payment System in India and its impact on Indian banking sector.

Venkatesh V and Morris M (2000) [6] in their paper used Technology Acceptance Model to investigate gender differences in the overlooked context of individual adoption and sustained usage of technology in the workplace. From the analysis it was found that, women were more strongly influenced by perceptions of ease of use and subjective norm.

Hamidinava and Madhaushi (2010) [7] tried to evaluate the specifications of Electronic Payment System in the view of Iranian bank users. All the specifications are classified into four sub-structures such as technical, legal, security and socio-economic. Finally, at the end of the study it was revealed that socio-economic index has major influence on adoption of E-payment services in Iran.

Al – Ghaithet. al (2010) [8] in their study based on the Diffusion of Innovations (DOI) theory, investigates factors that influence adoption and usage of e-services including Electronic Payment, in Saudi Arabia. Factors like Demographic profile of users, complexity, trust, security, privacy issues, service quality and loyalty were empirically tested against primary data collected through survey. Perceived complexity was found to be the most significantly related factors affecting e-service adoption in Saudi Arabia, followed by privacy and compatibility.

Singh S. (2009) [9] broadly classified Electronic Payment System into four categories : Online Credit Card Payment System, Online Electronic Cash System, Electronic Cheque System and Smart Card based Electronic Payment System. These payment systems have numbers of requirements; example security, acceptability, convenience, cost, control and traceability. Therefore instead of focusing on the technological specifications of various Electronic Payment System, the researcher analyze the difference of each Electronic Payment System by evaluating their requirements, characteristics and access the applicability of each system.

Badruddin A. (2015) [10] in the paper intends to understand the various facilities provided by Reserve Bank of India (RBI) to expedite payment and settlement issues. Greater adoption of Electronic Payment not only

increase speed, efficiency and security of monetary transaction but also creating trust and safety of operations in the minds of the users.

Gardner and Amoroso (2004) [11] tried to find out the relationship among the external factors that influence the acceptance of Information Technology. They used modified TAM to test Internet-based technologies by customers. Four influential factors were used for their study, which are gender, experience, complexity and voluntariness. The outcomes indicated that gender would influence the Perceived Ease of Use, Perceived Usefulness and actual usage of the Internet. Experience of using Internet had direct relationship to Perceived Usefulness and the behaviour intention to use the Internet.

Lai and Li (2004) [12] found out that TAM was invariant for their sample across different gender, age and IT competence subgroups. Result showed that male and female, old and young, IT expert or novice have conceptualized TAM in very similar way. Their results also explain that the adopters of internet banking were convinced of the usefulness of the Electronic Banking which influenced their intention to the use of Electronic Banking technology. However, for non adopters, the results were opposite.

He and Sappideen(2008) [13] studied the progress of the payment system in the Chinese banking sector and acknowledged the requirement for a transparent, comprehensive and a sound legal framework.

Oladejo M. and Akanbi T (2012) [14] observed increasing popularity of Electronic Banking. Conclusion was drawn based on primary data collected from bank employees'. The result suggests that bankers in Nigeria perceive Electronic Banking as a tool for minimizing inconvenience, reducing transaction cost, altering customers queuing pattern and saving customers banking time. Apart from potential benefits risks associated with Electronic Banking was also judged. Bankers believe that Electronic Banking increases the chances of government access to public data, increases the chances of fraud and there was a lack of information security.

III. Research formulation

3.1 Objectives of the Study

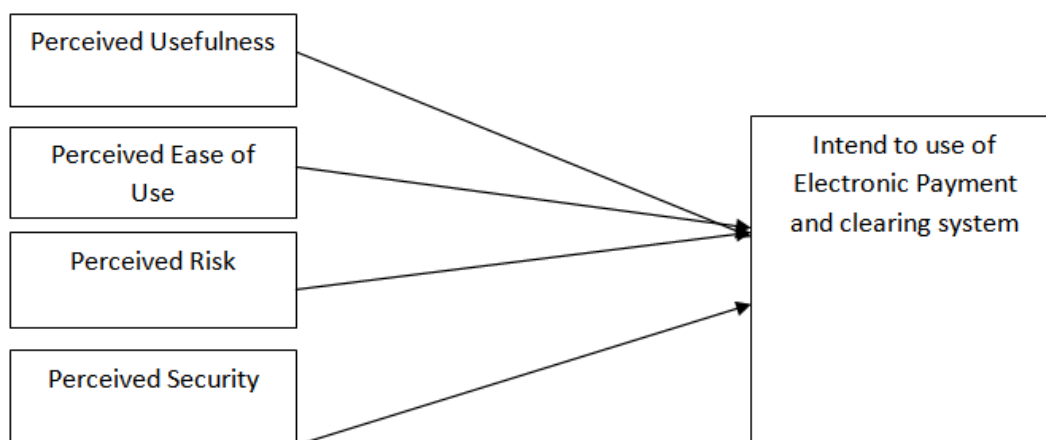
Primary objective of this research work is to study the acceptance of Electronic Payment and Clearing System in India, mainly in West Bengal. The specific research objective seeks to –

- 1) Examine the predictors / variables that would determine acceptance of Electronic Payment and Clearing system in Indian Banking sector.
- 2) To examine the demographic factors of customers and analyze their influence in adoption of Electronic Payment and clearing system in Indian banking sector.

3.2 Research Gap

Based on the above review on the subject, it was felt that many research has been conducted in the area of E-Commerce, E-Banking, Electronic Payment, Electronic shopping, E-Governance and M-Commerce mainly in the academic environment, Manufacturing or E-Commerce environment. But no research is conducted on acceptance of Electronic payment and clearance system specially in Indian state namely West Bengal. Therefore it is considered as a research gap and taken as a study topic to cover the above gaps and to bring out a detailed study in the above mentioned topic.

3.3 Proposed Research Model



3.4 Formulation of Hypothesis and Research Design

Perceived Usefulness (PU) -It is defined as ‘the degree to which a person believes that using a particular technology will enhance his or her job performance’ (Davis, 1989).

H₀₁ : Perceived Usefulness has effect on adoption of Electronic Payment and clearance system in Indian banking sector.

Perceived Ease of Use (PEOU) – It is defined as the “the degree to which an individual; believes that using a particular system would be free from physical and mental effort” Davis, (1989).

H₀₂ : Perceived Ease of Use has effect on adoption of Electronic Payment and clearance system in Indian banking sector.

Perceived Risk (PR) – It is defined as the subjectively determined expectation of loss by an online bank user in contemplating a particular online transaction”.

H₀₃ : Perceived Risk has effect on adoption of Electronic Payment and clearance system in Indian banking sector.

Perceived Security (PS) – It is defined as “the extent to which a consumer believes that making payments online is secure”.

H₀₄ : Perceived Security has effect on adoption of Electronic Payment and clearance system in Indian banking sector.

3.5 Research Design

Though this study’s main framework is quantitative research approach, qualitative method is also used specially during problem formulation and research instrument development. This study is a combination of exploratory, descriptive and explanatory research design.

3.6 Sample Design

In this research non probability sample technique is used for collecting responses. Convenience sampling is a type of non probability sampling where population elements are selected for inclusion in the sample based on the ease of access. In some cases judgement sampling is used where the researcher’s judgement is used for selecting items which is considered as representative of the population.

3.7 Determining Sample Size

While determining sample size first specify level of precision; Here D = ±5. Here 95% confidence interval is selected. Next determine Z value associated with the confidence interval. For 95% confidence level, associated z value is 1.96.

Now determine the standard deviation of the population. The range of a normally distributed variable is approximately equal to plus or minus three Standard deviations, so S.D. can be estimated by dividing the range by 6.

Therefore, sample size using the formula for the standard error of the mean becomes –

$$n = \frac{\sigma^2 \times z^2}{D^2} \quad [15]$$

$$= \frac{55^2 \times (1.96)^2}{5^2}$$

$$= 464.83 \sim 465$$

Generally shopping malls, metro stations, banks, colleges, different MNCs’ and apart from that friends, relatives, colleagues, student groups are selected for data collection purposes. The final usable sample size obtained in the study was 465 of which 212 were from Kolkata, 105 from rural and 148 from sub urban areas of West Bengal.

3.8 Pilot Study

The pilot study was done on 5 students, 8 academicians, 3 doctors, 7 IT professionals, 4 house wives and another sample of 9 respondents. Necessary corrections were made to the questionnaire from the feedback so obtained.

3.9 Reliability Testing

Cronbach alpha which is a measure of reliability based on internal consistency of the constructs used have been calculated as recommended by Nunnally (1978) [16]. The threshold value suggested by Nunnally is 0.7.

Sl. No.	Topic	Cronbach's Alpha	N of Items
1	Demographic Variables	0.865	11
2	Perceived Usefulness	0.798	5
	Perceived Ease of Use	0.821	4

	Perceived Risk	0.799	3
	Perceived Security	0.766	3
3	Dependent variable	0.952	4

TABLE 3.1

3.10 Collection of Data

Primary data was collected through a sample survey using structured pre-tested questionnaire. Survey methods could be classified into telephone interviews, personal interviews or mail survey.

3.11 Tools of Analysis

For demographic analysis purpose various statistical tools like percentage, mean, median, mode, standard deviation were used. Next for testing hypothesis chi-square test, one way Analysis of Variance (ANOVA), Correlation analysis, Regression analysis, Factor analysis, Multiple regression and Structured Equation Modelling were used to test the differences in adoption levels of various group of people.

Primary data collected from the respondents were tabulated and analyzed using the Statistical Package for Social Sciences (SPSS 19). Exploratory factor analysis was conducted using Principal Component Analysis with Varimax Rotation. After that Confirmatory factor Analysis (CFA) was done using AMOS 16 statistical package. Structural Equation Modeling (SEM) using AMOS 16 package was employed to find the relationship among dependent and independent variable.

IV. Analysis

4.1 Demographic Characteristics

Gender - Out of 465 respondents that took part in the study, 56% are males while 44% of them are females.

Age – The study revealed that customers fall in age bracket 31-45 formed majority of respondents that use Electronic Payment and Clearing System. This was followed by teen agers and young groups who are below 30 years, least group being those aged 60 years and above.

Education- 35% of the respondents had post graduation or higher degree of education like M.Phil, PhD, MBBS, 29% respondents are either graduate or diploma degree holder. People with other qualification either educational or professional degree holder constitutes a group of 22% while 14% had attained school level of education upto class 12, under this group fall mostly urban teenagers.

Occupation- Out of the total population 125 (27%) respondents are self employed professionals and 163 (35%) are employees.

Income- Majority of the respondents (26%) have monthly income ranging from Rs. 30,000 – Rs. 45,000. As most of the respondents are salaried employees their monthly income normally falls within this range. Under ‘no income’ category falls students and housewives. They primarily do ATM transactions. Apart from that for online shopping purpose debit card and credit cards are used.

4.2 Summary of Descriptive Statistics of Demographic Variables

Descriptive statistics for usage of Electronic Payment and Clearing System based on demographic variables are given in Table 4.1

Group	Class	N	Mean	Std. Deviation
Gender	Male	259	1	0
	Female	205	2	0
Age	Upto 30	148	1.99	12.001
	31 - 45	158	2.98	12.331
	46 – 60	115	3	0
	Above 60	43	4	0
Education	Upto class 12	64	1	0
	Graduate/Diploma	138	2	0
	Post Graduate/Higher Education	157	3	0
	Other Degree	101	4	0
Occupation	Student	51	1	0
	Retired/Home Maker	63	2	0
	In Service	145	3	0
	Self Employed	125	4	0
	Entrepreneur	63	5	0
Monthly Income	No Income	61	1	0
	Up to 15,000	66	2	0
	15,001 - 30,000	89	3	0
	30,001 - 45,000	100	4	0

	45,001 - 60,000	72	5	0
	Above 60,000	55	6	0
	Valid N (listwise)	43		

The mean values of usage of Electronic Payment and Clearing System are shown in Table 4.1. Based on demographic variables of the respondents, such as (a) gender, (b) age, (c) qualification, (d) occupation, (e) monthly income, appear to be different for different sub-groups within a sample group.

4.3 Awareness on various Electronic Payment services

Almost all the respondents are aware of the services viz. Balance check and online shopping. The percentage of respondents, who are aware of services other than the above two, ranges from 72% to 97%. On the other hand 13% to 31% of the respondents are unaware of the following five services – (i) payment of utility bills, ii) payment of direct and indirect taxes, iii) online request application for using ATM cum debit card, iv) Mobile recharging and v) online request for cheque book, pass book.

4.4 Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis is conducted on 15 items to validate constructs that will help to evaluate factors which influence adoption of Electronic Payment and clearing system. In order to check the suitability of the data for Factor Analysis, the following steps are taken.

1. Kaiser-Meyer-Okin (KMO) measures Sampling Adequacy which is 0.796. Here the resultant value 0.714 is very close to 0.8 and it can be treated as meritorious. It means that the sample is big enough to do factor analysis.
 2. Bartlett's Test of sphericity is used to measure multivariate normality of the set of distribution. From the Table 4.2, the significant value is 0.000 which is less than 0.05 and therefore the distributions are approximately multivariate normal and acceptable for Factor analysis.
- Principle Component Analysis is employed for extracting the factors, their Eigen values, percentage and cumulative percentage of variance. It is shown in the Table 4.2

TABLE 4.2

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.462	20.519	23.12	2.462	20.519	20.519	2.371	19.761	19.761
2	2.034	16.952	40.072	2.034	16.952	37.471	2.007	16.724	36.485
3	1.372	11.435	51.507	1.372	11.435	48.906	1.377	11.478	47.963
4	1.215	10.122	61.629	1.215	10.122	59.028	1.328	11.065	59.028
5	0.896	5.463	67.092						
6	0.81	3.75	70.842						
7	0.714	3.948	74.79						
8	0.683	3.693	78.483						
9	0.656	3.467	81.95						
10	0.592	2.935	84.885						
11	0.566	2.714	87.599						
12	0.589	2.645	90.244						
13	0.642	3.012	93.256						
14	0.663	3.521	96.268						
15	0.679	3.732	100						

Extraction Method: Principal Component Analysis.

It is seen from Table 4.2 that 4 factors with Eigen values more than 1 are extracted whose cumulative percentage of total variance is 61.629. The communalities of the 15 original measures ranges from 0.361 to 0.566 which indicates that the variance of the original values is captured fairly well by these 4 factors. Extracted factors are rotated using 'VarimaxRotation Method' and the Rotated Component Matrix is shown in the Table 4.3

TABLE 4.3

Rotated Component Matrix ^a				
	Component			
	1	2	3	4
PU1	0.692			
PU2	0.654			
PU3	0.632			
PU4	0.631			
PU5	0.674			
PEOU1		0.652		
PEOU2		0.997		
PEOU3		0.729		
PEOU4		0.628		
PR1			0.814	
PR2			0.829	
PR3			0.692	
PS1				0.821
PS2				0.726
PS3				0.629
Extraction Method: Principal Component Analysis.				
Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 4 iterations.				

The factors identified are Perceived Usefulness, Perceived Ease of Use, Perceived Risk and Perceived Security. The factor loading ranges from 0.692 to 0.631 for Perceived Usefulness, 0.628 to 0.997 for Perceived Ease of Use, 0.692 to 0.829 for Perceived Risk and 0.629 to 0.821 for Perceived Security.

4.5 Correlation Analysis

To find the relationship between dependent and independent variables, correlation analysis is adopted. The correlation coefficients between independent variables and dependent variables are shown in Table 4.4

		Adoption of Electronic Payment & Clearing System	PU	PEOU	PR	PS
Pearson Correlation	Adoption of Electronic Payment & Clearing System	1	0.619	0.707	-0.139	0.307
	PU	0.619	1	0.512	-0.219	0.576
	PEOU	-0.139	-0.219	-0.091	1	0.032
	PR	0.707	0.512	1	-0.091	0.325
	PS	0.307	0.576	0.325	0.032	1
Sig. (1-tailed)	Adoption of Electronic Payment & Clearing System	.	0	0	0.006	0
	PU	0	.	0	0	0
	PEOU	0.006	0	0.049	.	0.281
	PR	0	0	.	0.049	0
	PS	0	0	0	0.281	.
N	Adoption of Electronic Payment & Clearing System	465	465	465	465	465
	PU	465	465	465	465	465
	PEOU	465	465	465	465	465
	PR	465	465	465	465	465
	PS	465	465	465	465	465

There is positive correlation among Perceived Usefulness, Perceived Ease of Use, Perceived Security and adoption of E-payment and clearing system. But there exists negative correlation between Perceived Risk and adoption of E-payment and clearing system. The correlations are significant at 5% level of significance in all cases.

4.6 Regression Analysis

Multiple Regression equation for adoption of Electronic Payment and Clearing System on dependent variable becomes –

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3$$

Dependent variable = Y = Adoption of Electronic Payment and Clearing System

Independent variable = X1 = Perceived Usefulness

X2= Perceived Ease of Use

X3= Perceived Security

TABLE 4.5

Model Summary^d

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.707 ^a	0.499	0.498	0.50868	0.499	326.96	1	328	0	
2	.768 ^b	0.589	0.587	0.46146	0.09	71.562	1	327	0	
3	.772 ^c	0.696	0.692	0.45855	0.006	5.16	1	326	0.024	2.324

a. Predictors: (Constant), PU

b. Predictors: (Constant), PU, PEOU

c. Predictors: (Constant), PU, PEOU, PS

d. Dependent Variable: Adoption of Electronic Payment & Clearing System

Multiple correlation coefficient R=0.772 measures the degree of relationship between the actual values and predicted values. Predicted values are obtained as a linear combination of X1 (Perceived Usefulness), X2(Perceived Ease of Use) and X3(Perceived Security). R² represents percentage of the variance in the dependent variables.

Table 4.5 shows that 49.8% of the variation (model 1) in adoption of Electronic payment and clearing system is explained by Perceived Usefulness alone, 58.7% of the variation (model 2) is explained by Perceived Usefulness and Perceived Ease of Use and 69.2% of the variation (model 3) is explained by Perceived Usefulness, Perceived Ease of Use and Perceived Security. So this is the best fit model. Perceived Risk has been found to be insignificant, so it has been excluded.

The Tolerance values ranges from 0.551 to 0.738 and VIF values range from 1.355 to 1.816 (Table 4.7) and therefore no multi collinearity has been observed. The Durbin – Watson (2.324) (Table 4.5) statistics tests for auto correlation value ranges from 0 to 4. As a rule of thumb, the value should be between 1.5 and 2.5 to indicate independent of observations (Garson, G. David, 2010). As shown in Table 4.5, the value of the test is 2.324 which is independent of observations.

ANOVA table showing the regression model fit presented in Table 4.6. It shows that the model is statistically significant at 5% significance level.

Table 4.6

ANOVA^d

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	84.604	1	84.604	326.964	.000 ^a
	Residual	84.872	328	.259		
	Total	169.476	329			
2	Regression	99.843	2	49.921	234.433	.000 ^b
	Residual	69.633	327	.213		
	Total	169.476	329			
3	Regression	100.928	3	33.643	159.997	.000 ^c
	Residual	68.548	326	.210		

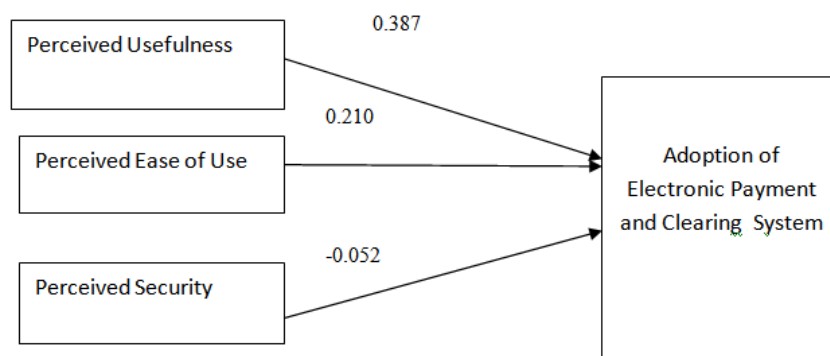
Total	169.476	329			
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- a. Predictors: (Constant), PU
- b. Predictors: (Constant), PU, PEOU
- c. Predictors: (Constant), PU, PEOU, PS
- d. Dependent Variable: Adoption of Electronic Payment & Clearing System

Table 4.7 presents β values, t values and significance values of independent variables.

All the independent variables viz. Perceived Usefulness ($t=12.962, p=0.0000$), Perceived Ease of Use ($t=8.498, p=0.0000$) and Perceived Security ($t=-2.271, p=0.024$) are statistically significant at 5% significance level and hence the alternate hypothesis is accepted. It means that independent variables have significant effect on adoption of Electronic Payment and Clearing System. Perceived Usefulness and Perceived Ease of Use have positive effect on adoption of Electronic Payment and Clearing System and Perceived Security has negative effect on adoption of Electronic Payment System. The β coefficients give a measure of the contribution of each variable to the model. Higher the β value, greater is the effect of independent variable on dependent variable. Perceived Usefulness has the highest coefficient ($\beta= 0.532$) and therefore it has greater effect on adoption of Electronic Payment and Clearing System followed by Perceived Ease of Use (0.403) and Perceived Security (-0.098). The statistically validated model is given in Figure 4.1

Figure 4.1



Multiple Regression Equation is –

$$Y = 1.837 + 0.387X_1 + 0.210X_2 - 0.052X_3$$

The constant $b_0 = 1.837$ has no interpretable meaning because the average level of dependent variable could not be negatively employed. $b_1 = 0.387$ represents Perceived Usefulness, other variables are constant. Also $b_2 = 0.210$ represents Perceived Ease of Use, other variables are constant. The estimated positive sign implies that such effect is positive and implies rate of adoption of Electronic Payment and Clearing system would increased by 0.387 and 0.210. $b_3= -0.052$ represents Perceived Security, other variables are constant. The estimated negative sign implies that such effect is negative and implies that acceptance of Electronic Payment system would decreased by -0.052.

4.7 Confirmatory Factor Analysis (CFA)

The three dimension model of ‘Adoption of Electronic Payment and Clearing System’ resulted in Exploratory Factor Analysis (EFA) is further validated through Confirmatory Factor Analysis(CFA) using Analysis of Moment Structure (AMOS version 16; SPSS version 19).Model fit and unidimensionality of scale items are tested here. For assessing model fit few additional indices like CFI, GFI, AGFI, NFI and RMSEA are also considered.

SEM is a model analysis technique consist of covariance structure analysis, latent variable analysis, confirmatory factor analysis, path analysis and linear structural analysis. SEM is also useful because it can estimate “a series of separate, but interdependent, multiple regression equations simultaneously” in a specified structural model(Hair et. al.,2006). [17] SEM is the most suitable analysis to estimate the strength of causal relationship of these constructs.

Standardized regression weights and Critical ratio (CR) estimates are also considered to evaluate the 3- dimension model. Reliability and convergent validity of the factors are estimated by Composite reliability Coefficient (CRC) and Average Variance Extracted (AVE) which are calculated using the following formula –

Composite Reliability Coefficient (CRC) = $(\text{Sum of Standardized Loadings})^2 \div \{(\text{Sum of Standardized loadings})^2 + (\text{Sum of indicator measurement error})\}$ (Hair et. Al, 1998) [18] Avearge Variance Extracted (AVE) = $(\text{Sum of Squared Standard Loadings}) \div (\text{Sum of Squared Stand loadings} + \text{Sum of indicator measurement error})$ (Hair et. Al, 1998)

Table 4.8

Constructs	Indicators	SRW	CR	P(Sig. Level)	AVE	CRC
PU	PU1	0.669	11.773	**	0.51	0.81
	PU2	0.661	11.657	**		
	PU3	0.789	13.231	**		
	PU4	0.728	12.768	**		
	PU5	0.701	12.865	**		
	PU6	0.687	*			
PEOU	PEOU1	0.478	6.913	**	0.369	0.58
	PEOU2	0.663	8.057	**		
	PEOU3	0.769	7.634	**		
	PEOU4	0.549	*			
PS	PS1	0.726	7.400	**	0.435	0.72
	PS2	0.893	8.141	**		
	PS3	0.637	9.124	**		
	PS4	0.463	*			

As shown in Table 4.8 almost all standardized regression weights of indicators in the model are close to or above 0.70 except PEOU1 and PS4 which are less than 0.5. The standardized regression weights are significant from the Critical Ratio (CR) test ($CR > \pm 1.96, p < .05$). The AVE of PEOU and PS are found below the cut off criteria 0.5 and the CRC of PEOU is below the cut of criteria 0.7. For further refinement of the model PEOU1 and PS4 are dropped and the model is re-run . values of the measurements are shown in Table 4.9

Table 4.9

Measures	Standard	Actual
χ^2 / df	<3	1.627
GFI	>0.95	0.966
AGFI	>0.8	0.942
CFI	>0.95	0.983
NFI	>0.9	0.957
RMSEA	<0.05	0.041

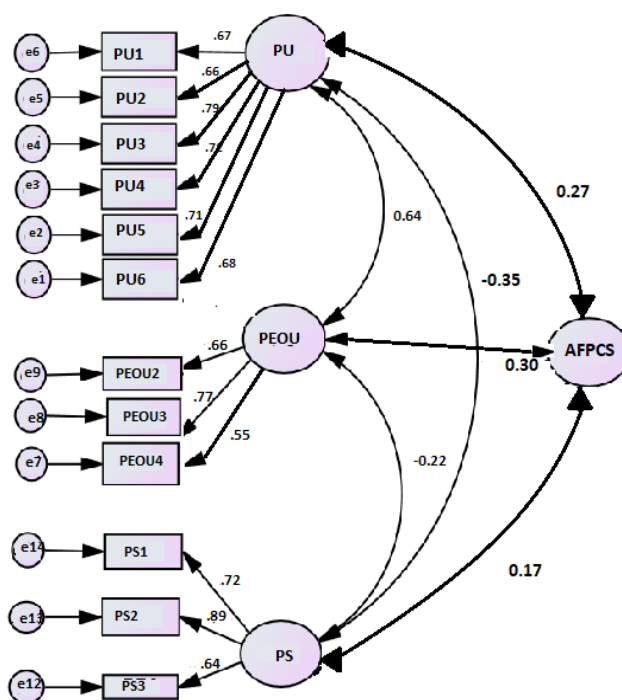


Figure 4.2 CFA of 3-Dimension Model (TAM)

It is clear from Figure 4.2 that all the regression weights are above the cut off criteria 0.5 and the critical ratios are found higher than 1.96. The CRC and AVE are recomputed for the modified model and these are 0.61 and 0.45 respectively for PEOU construct and 0.76 and 0.52 respectively for PS construct and for PU construct CRC and AVE are 0.81 and 0.51 respectively. Thus with the final CFA model AVE for PEOU and PS constructs improved. Moreover, though the AVE of PEOU construct is below the cut off 0.5, it is kept in the model due to its AVE close to the threshold value of 0.5 and its content validity.

4.8 Results

- Perceived Usefulness

Hypothesis 1 (H_{01}) is supported.

Indian bank customer's intent to use Electronic payment and clearing system will increase if they find it useful to use. Customers will adopt Electronic payment and clearing system if they believe in the existence of a positive use-performance and has relative advantage in adopting the same. This is similar to the TAM model which has been applied in other technology adoption studies. Customers are willing to adopt Electronic Payment and Clearing System when they know the advantages of it when compared to traditional ways of payment. Therefore RBI and Government of India should further investigate various types of features which current users find useful or they accept and promote such features to encourage more customers to adopt Electronic Payment and Clearing System.

- Perceived Ease of Use

Hypothesis 2 (H_{02}) is supported.

Customers' intention to adopt Electronic payment and clearing system will increase if customers perceive the service to be easy to use. ATM interface software, mobile banking operation software should be ease of use and be user friendly so as to capture the attention of the customer. If a user becomes frustrated because of the inability to seamlessly locate information and complete transactions, this will decrease his or her intension to adopt E-Payment services. However, it is consistent with the result of the original TAM models.

- Perceived Risk

Hypothesis 3 (H_{03}) is supported.

However, perceived risk has negative correlation with the adoption of Electronic Payment and Clearing system. Indian customers will adopt E-payment and Clearing system when he/she finds it is less riskier than traditional mode of payment.

- Perceived Security

Hypothesis 4 (H_{04}) is supported.

Indian customers adopt Electronic payment and Clearing services when they find the channel of Electronic payment to be safe and secure. Therefore RBI, banks and other financial institutions must ensure that security measures are implemented so that threat of loss over E-Payment transaction is minimal.

4.9 Conclusion

This study is a holistic study from the point of view of Electronic Payment customers'. With the help of research questions, the researcher tried to understand the perceptions of Electronic Payment users on varied aspects of Electronic Payment adoption. This study integrates constructs from Technology Acceptance Model and Diffusion of Innovation models into an insightful model of Electronic Payment and clearing system adoption.

The results indicate that perceived usefulness, perceived ease of use, perceived risk and perceived security are significant indicators of customers' intension to adopt Electronic Payment and Clearing System. Knowledge of these factors that influence adoption will enable customers to develop E-Payment services that meet their satisfaction.

It can be concluded that majority of the customers are unaware of various features of Electronic payment and clearing system and they are availing few of the features to far extent. However, the study enlightened the necessity for educating customers regarding various security features. Proper education will help to remove unnecessary fear of risk which hinders Electronic Payment adoption. Though users face problems during transaction, but the gravity of problems was found to be less. This study has both theoretical and practical aspect in the domain of Electronic Payment and Clearing System.

V. Recommendation and Suggestion

This section throws light into the major findings of the study, theoretical and practical implications of the findings and their limitations.

5.1 Contribution of the Research

This research has two fold contribution – (a) Theoretical Contribution and (b) Practical Contribution

- (a) Theoretical Contribution of the Research

With the development of Technology Acceptance Model (TAM) researchers all over the world have been empirically testing TAM in various areas which are concerned with acceptance of technology. The present research empirically validated Technology Acceptance Model with one additional construct – 'Perceived Security' for predicting adoption of Electronic Payment and Clearing System in India, specially in West Bengal. This makes an important theoretical contribution to the research as TAM constructs were found to be applicable in West Bengal too. Further, the Technology Acceptance Model used in the study can be employed for adoption of other online services like E-shopping, E-Banking and Electronic Commerce.

(b) Practical Contribution of the Research

Based on the findings following suggestions are made –

- (i) Due to convenience, availability, understanding and easy accessibility Electronic Payment services is suitable for all categories of customers even the physically challenged.
- (ii) Features of Electronic Payment and Clearing System should be enhanced to make online enquiry and online payment much easier to the customers. For the purpose of customers' satisfaction and fulfillment of their expectations banks should arrange demonstration programs for the customers to enjoy all E-Payment services properly.
- (iii) It is necessary to give customers more public education and awareness concerning the use of Electronic Payment services such as use of ATM cards, process of doing various online transactions without giving room for Internet fraudsters and ensuring more security for their online transactions.
- (iv) To encourage cashless trading it would be better for the banks to eliminate service tax for purchasing goods and services through ATM cum debit card.
- (v) Management of bank should provide customers with a toll free number and E-mail Id. These can be used to handle customers' complain and also to collect customers' feedback about Electronic Payment services. This process will provide RBI with valuable information which can be used for future development on electronic service.
- (vi) RBI should take initiative to develop electronic transaction software in regional language and should use most commonly used phrases, names and shortcuts in the software.
- (vii) Banks should enhance and also make easier their refund facilities concerns to wrong transactions made by customers by mistake or if any.
- (viii) It has become necessary to incorporate various security features to protect Electronic Payment users from various risks associated with Electronic payment transaction. Few of them are–
 - a) VeriSign
 - b) Padlock Symbol
 - c) Https
 - d) Virtual Keyboard
 - e) Secure Socket Layer Technology
 - f) SMS alert
 - g) Sign on Password Expiry
 - h) Use of dynamic password rather than static password.
 - i) Automatic Lockout on Multiple Incorrect Password Entry
 - j) Automatic Timeout if Account not Operated for Specified Time
 - k) Mandatory Use of Special Characters in Password

5.2 Limitations of the Study

Though the study brought out encouraging and useful findings, it has certain limitations. Following are the few major limitations –

- (i) The focus of the study is given on the respondents of West Bengal. Respondents of other part of India have not been considered.
- (ii) The study considered the perceptions of only retail customers but the perceptions of corporate customers are not taken into consideration.
- (iii) Another limitation of the research was the unwillingness of some respondents to pick up the questionnaire and the late return of completed ones.

5.3 Scope of Further Research

- (i) This study concentrates mainly on the customers of Eastern India. Further research will try to highlight the customers of other part of India
- (ii) Moreover future research may replicate the study with corporate customers apart from retail customers to evaluate the validity of the findings of the study.
- (iii) The research does not try to know customers' satisfaction level, quality of services provided to them, customers' trust on Electronic Payment and Clearing System. Future research must include aforesaid topic for better study.

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