

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. A self-administered questionnaire was developed and distributed to 600 respondents, out of which 465 valid responses were considered for further statistical analysis. 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. This research paper proposes four factors for measuring customers' perception towards Electronic Payment and Clearing System which is replicable across different economics. However, small sample size raises the issue of generalizability which demands future studies. Adoption of Electronic Payment by the respondents confirms that there is a great potential for future expansion of such payment devices. 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. This study has advanced knowledge for it has provided information on the current state of Electronic Payment acceptance and use, particularly among Indians. The significant factors identified 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, Traditional Payment System, Modern Payment System, Perceived Usefulness, Perceived Ease of Use, Perceived Risk, Perceived Security.

1. 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 -

1. Huge cost is involved in printing cash in the form of bank notes
2. Problems with soiled and mutilated notes due to mishandling
3. Establishment of several branches for cash payment and transaction
4. Risks of theft and robbery while carrying cash to the revenue collection centers
5. 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 – i) Time savings, ii) Expenses control, iii) Reduced risk of loss and theft, iv) User-friendly

1.1 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)
- b) Automated Teller Machine (ATM)
- c) Unstructured Supplementary Service Data (USSD)

- d) Aadhaar Enabled Payment System (AEPS)
- e) Unified Payment Interface (UPI)
- f) Mobile Wallets
- g) Internet Banking – i) Electronic Fund Transfer (EFT), ii) Electronic Clearing System (ECS) , iii) National Electronic Fund Transfer (NEFT) , iv) Real Time Gross Settlement System (RTGS) , v) Immediate Payment Service (IMPS)
- h) Tele Banking
- i) Mobile banking

2. LITERATURE REVIEW ON E-PAYMENT SYSTEM

Khiaonarong(2000) 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) 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) 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) highlighted the Electronic Payment System in India and its impact on Indian banking sector.

3. 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.

3.1 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.

3.2 DETERMINING SAMPLE SIZE

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.

4. ANALYSIS

4.1 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-Oklin (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 4.1

Table 4.1

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	20.52	23.12	2.462	20.52	20.52	2.371	19.76	19.76
2	2.034	16.95	40.07	2.034	16.95	37.47	2.007	16.72	36.49
3	1.372	11.44	51.51	1.372	11.44	48.91	1.377	11.48	47.96
4	1.215	10.12	61.63	1.215	10.12	59.03	1.328	11.07	59.03
5	0.896	5.463	67.09						
6	0.81	3.75	70.84						
7	0.714	3.948	74.79						
8	0.683	3.693	78.48						
9	0.656	3.467	81.95						
10	0.592	2.935	84.89						

11	0.56 6	2.714	87.6						
12	0.58 9	2.645	90.24						
13	0.64 2	3.012	93.26						
14	0.66 3	3.521	96.27						
15	0.67 9	3.732	100						

Extraction Method: Principal Component Analysis.

It is seen from Table 4.1 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 'Varimax Rotation Method' and the Rotated Component Matrix is shown in the Table 4.2

Table 4.2

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.

4.2 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 Co-efficient (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]

Average 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 4.3

Constructs	Indicators	SRW	CR	P(Sig. Level)	AVE	CRC
PU	PU1	0.669	11.77	**	0.51	0.81
	PU2	0.661	11.66	**		
	PU3	0.789	13.23	**		
	PU4	0.728	12.77	**		
	PU5	0.701	12.87	**		
	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	7.4	**	0.435	0.72
	PS2	0.893	8.141	**		
	PS3	0.637	9.124	**		
	PS4	0.463	*			

As shown in Table 4.3 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 4.4

Table 4.4

Measures	Standard	Actual
Λ^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

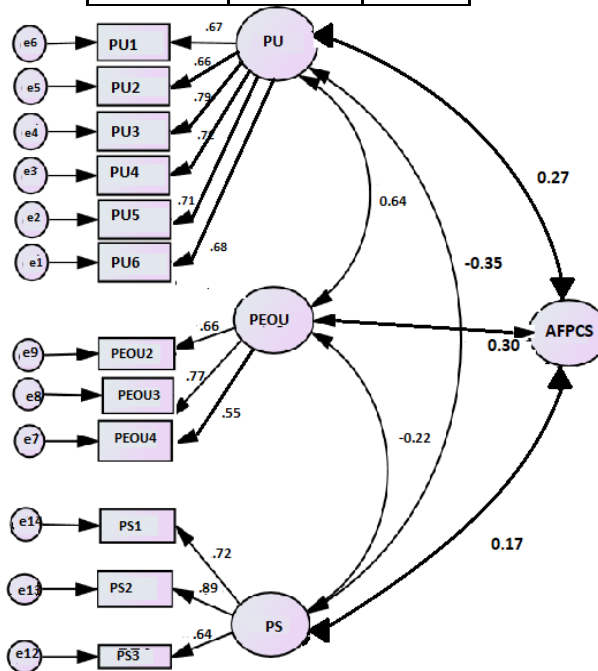


Figure 4.1CFA of 3-Dimension Model (TAM)

It is clear from Figure 4.1 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.

5. 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.

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.

LIMITATIONS OF THE STUDY

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

- 1) The focus of the study is given on the respondents of West Bengal. Respondents of other part of India have not been considered.
- 2) The study considered the perceptions of only retail customers but the perceptions of corporate customers are not taken into consideration.

- 3) Another limitation of the research was the unwillingness of some respondents to pick up the questionnaire and the late return of completed ones.

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