

Use of Digital Payment Systems Before and After Demonetization: A Pre and Post Implementation Analysis of Consumers in Delhi / NCR Region

Aniruddha Ghosh^{1*} and Ashish Srivastava²

¹Assistant Professor, IMS Ghaziabad, Uttar Pradesh, India.
Email: prof.aniruddhaghosh@gmail.com

²Assistant Professor, IMS Ghaziabad, Uttar Pradesh, India.
Email: ashish4rv@gmail.com

*Corresponding Author

Abstract: This study investigates how different cash and non-cash variables effected the usage of digital payment systems in India pre and post digitalization. Focus group discussions were made to create statements. Then structured questionnaires were filled from consumers randomly who were using digital payment systems. The target sample was 300 sample units, however, on data cleaning, the authors found that 70% of the response was valid and should be taken for the study. Frequency analysis, principal component analysis (PCA) and structural equation modelling (SEM) using IBM SPSS 22.0 and AMOS was done to explore the relationship between the factors. Three key factors viz., promotional offers, convenience facilities and technical and non-technical barriers are affecting the digital payment systems in Indian environment. The study also allows us to think that how costs can be reduced through optimization of the input variables taken under study and possible latent variables that can affect the digital payments systems in near future.

Keywords: Digital payments, Demonetization, PCA, SEM.

I. INTRODUCTION

The term demonetization has become a household name since the government pulled the old Rs. 500 and Rs. 1,000 notes out of circulation. Demonetization means “ending something that is no longer the legal tender of a country”. Thus, demonetization is the act of stripping a currency unit of its status as legal tender.

On 8th Nov. at 8.00 p.m, Prime Minister has announced that, i.e., from 9th Nov. 2016, old notes of denomination of Rs. 500 and Rs. 1000 will not be in use. This decision of Prime Minister Narendra Modi’s to demonetize the high-value notes of Rs. 500 and Rs. 1,000 from the Indian economy. Which forms 86% of the total money circulation in the Indian market has created a shortage of cash in the system and lot discomfort to the citizens

because the tradition of India to save and spend in cash and presence of unorganized sectors, small farmers, daily wage labourers who are mostly dependent on cash caused a major disruption in the country.

Perhaps the main thought behind demonetization was first, to control the black money in the economy and second is to increase E-transactions and to move towards a cashless economy in the country.

The non-availability of cash for 50 days changed the saving and spending pattern of the Indian consumer [22], and people have switched to online payment platforms such as e-wallets, other app-based transactions and net banking, card swapping which include a debit card and credit card both has also increased. Following the demonetization on November 8, 2016, online monetary transactions have gone up by 250% compared to what the month were witnesses in recent years. This shows that there is scope for e-banking in our country. Thus cash crunch has boosted the concept of cashless economy which led people to turn to cashless options such as debit, credit cards, IMPS and mobile wallets.

Digital transactions have trebled and quadrupled in volume and value across various modes from wallets to cards and interbank transfers from a year earlier. Card transactions at a point of sale (POS) terminals at merchant locations have surged, reflecting a positive for the economy as more people start using their debit cards for payments rather than for withdrawing cash at ATMs.

In the present business transactions, the following options are available in the market:

- 1) Banking Channel - Both cash and cashless transactions can be done.
- 2) ATM
- 3) Internet Banking
- 4) Debit-Credit Cards
- 5) Mobile Banking
- 6) Various Wallets

- 7) Various transactions apps like PAYTM, Mobikwik etc.
- 8) POS machines

Besides plastic, the government has also been promoting smartphone-based transactions through the Unified Payments Interface (UPI) and the Bharat Interface for Money (BHIM). Both use the Immediate Payment Service (IMPS) network of the National Payments Corporation of India. IMPS has seen a 160% jump with 67 million transactions in March against 26 million a year earlier.

The study tries to eliminate the doubt, whether demonetization really takes a toll on the day to day transaction of the common consumers or in other words, this study wants to explore whether this demonetization has been effective post utilization. If implemented then to what degree and what possible factors influencing the same.

II. REVIEW OF LITERATURE

The emergence of Information and Communication Technology (ICT) had completely changed the lives and operations of individuals and organizations respectively. ICT and Digital technologies had made great evolutionary development in finance, economics, operational costs [26] and enhanced organizational performance (Ali, 2010). The era of ICT and digital innovations has come along with a dynamic change in the world business environment, whereby business transactions are constantly shifting from cash-based transactions to electronic-based ones [17]. The global proliferation of the internet and its rapid use over the years had contributed much in facilitating electronic commerce in global business environment (Fernandes, 2013). Also, changing customer behaviour & their needs & preferences has led to the adoption of electronic payment.

E-payment systems are important mechanisms used by individual and organizations as a secured and convenient way of making payments over the internet and at the same time a gateway to technological advancement in the field of the world economy [26].

Furthermore, e-payment system tends to bring many electronic modes of payments through which financial institutions offer different e-payment opportunities and services to their customers such as the credit cards, debit cards, online banking and mobile banking [23].

As a result, the adoption of e-payment technology is ever increasing in today's business environment [6] and public sector establishments [10-12]. However, despite all these benefits associated with e-payment, adequate ICT know-how among users and fear of security breach remain the most concern of individuals, organizations and experts in the field of information system [17].

In the last two decades, electronic payment systems (EPS) have attracted much attention from researchers and information

system designers due to their vital role in modern electronic commerce.

Abrazhevich defines e-payment system as a form of financial commitment that involves the buyer and the seller facilitated via the use of electronic communications [1]. Also, Briggs and Brooks see e-payment as a form of interconnections between organizations and individuals aided by banks and inter-switch houses that enables monetary exchange electronically [8]. In another perspective, Peter and Babatunde viewed the e-payment system as any form of fund transfer via the internet [21]. Similarly, according to Adeoti and Osotimehin, electronic payment system refers to an electronic means of making payments for goods and services procured online or in supermarkets and shopping malls [2]. Another definition suggests that e-payment systems are payments made in electronic commerce environment in the form of money exchange through electronic means [13].

Shon and Swatman define e-payment as any exchange of funds initiated via an electronic communication channel [25].

III. TYPES OF E-PAYMENT

Generally, there are quite a number of e-payments services that have been developed within the payment system around the globe. These include electronic cheques, e-cash, credit cards and electronic fund transfers [15].

According to Hsiao-Cheng, Kuo-Hua and Pei-Jen (2002), there are four major categories of electronic payment systems: online credit card payment, electronic cash, electronic cheques and small payments.

A. Credit Cards

A Credit card is a piece of plastic, 3 inches - 1/8 inches by 2 inches - 1/8 inches in size that carries information that allow you to make the purchase now pay for them later. (Kaur M, 2012).

B. Debit Cards

Debit card is a prepaid card and also known as ATM card. An individual has to open an account with the issuing bank which gives a debit card with a personal id number when he makes a purchase he enter his pin number on shop pin pad. When the card has slurped through the electronic terminal it dials the acquire a banking system either master card or visa card that validate the pin and finds out from the issuing bank whether to accept or decline. The transaction the customer can never overspend because the system rejects any transaction which exceeds the balance in his account the bank never face a default because the amount spent is debited immediately from the customer account with almost every bank account you are

issued a debit card. (Kaur M, 2012; Joseph P. T., and S. J., 2008; Kumaga D., 2010).

IV. ADOPTION OF E-PAYMENT

Most of these researches from the African countries focused on user acceptability of e-payment system except for Antwi *et al.* that investigate on its effectiveness and Nzaro, and Kavu on the role of e-payment system in financial institutions and Small and Medium Enterprises respectively [4], [14], [19]. This clearly shows that the e-payment system is an emerging issue in developing countries and need to be studied extensively. As such, there is need for further research on how government, financial institutions and other stakeholders in electronic payment services can influence people to use and adopt e-payment platforms in transaction payments and other payment services. Similarly, further studies could look into payment cultures, demographic and lifestyle characteristics, readiness of consumers to use electronic banking and the use Point of Sale (POS) in transactions payments (Dahlberg, Mallat, Ondrus & Zmijewska, 2007).

Also, other studies reviewed include those that were carried out in Asian countries. These consist of Ming-Yen Teoh, Choy Chong, and Wei Chua, (2013), Harris, Guru, and Avvari (2011), Muhayiddin, Ahmed, and Ismail, (2011), Bin Muhayiddin, Elsadiq and Ismail, (2011); Bin Muhayiddin, Elsadiq, and Yeow, (2011), Bapat, (2012), Roy and Sinha, (2014), Dehbini, Birjandi, and Birjandi, (2015), Dhevika, and Latasri, (2011), Cheraghi, Nazari and Mahmoodi (2015), Tani, (2015), Huang, and Chen, (2011), Kim, Tao, Shin, and Kim 2010; Lin and Nguyen, (2011), Chavosh, Halimi, and Espahbodi, (2011), Hsieh, Yang, Yang, and Yang (2013), Jeon and Ha, (2010), Zahari, Ariffin, Noriza, and Zamin (2014) and Chin, and Ahmad, (2015). All the studies in these countries, contrary to developing countries in Africa, focused more on users' perception of e-payment systems platforms as well as users' satisfaction with e-payment systems services. Only few studies were found on users' acceptability. These include Roy and Sinha, and Muhayiddin *et al.*, on customers' acceptance of electronic payment system among bank customers in India and the acceptance of electronic dinar payment system in Malaysia respectively [18, 24]. This indicates that e-payment systems are widely adopted and is used in Asian countries much more than in Middle East and African countries. This assertion was further supported by the 2014 World Payment Report as it revealed that combined Asian countries record 33.9% as compared to that of Central Europe, Middle East and African with 23.8% (World Payment Report, 2014). The adoption of new technologies and the factors affecting them, several conceptual models have been proposed in recent decades, several models have been proposed in the field of technology acceptance. The basic concept underly all models of technology acceptance [27].

Adoption of new technologies influence user behaviour, Fishbein and Ajzen (1975), proposed the theory of reasoned

action. The theory of reasoned action discuss about behaviour is only under the control of behavioural intention; therefore, this theory is limited to voluntary behaviour.

Davis (1989), proposed the first and most common technology acceptance theory in 1983. The theory named "technology acceptance model". This model is widely used to describe technology adoption over the past 2 decades. In this model, perceived usefulness and ease of use are the most important factors of behavioural intention to use technology.

Mohammad Ali Bagheri *et al.*, published article entitled "Acceptance of Internet Banking in Iran: Extend Technology Acceptance Model". This paper, taking the characteristics of the internet banking environment, has developed the technology acceptance model [5]. This article uses the features of internet banking environment, has developed the technology acceptance model. For better and more using of internet banking service; offered solutions including website design, development, hardware equipment, providing internet kiosks in places of public affairs.

In research entitled "Factors affecting the adoption of electronic banking using Pikkariainen model" Asadi *et al.*, factors affecting the adoption of e-banking customers based on Pikkariainen model are: usefulness, ease of use, enjoyable, information on e-banking, security, confidentiality and quality of the internet connection [7]. Results showed that all six factors affecting the adoption of e-banking customers have a positive effect. The most important features of e-banking adoption, are: first factor is security and confidentiality of (4.21), second factor in the adoption of e-banking customers in the point of view of Parsian bank is information on e-banking (3.86), third factor is beneficial and useful (3.37), the fourth factor ease of use (3.30), fifth factor is the internet connection (2.3) and sixth factor is enjoyable (3.05).

In this paper the study examines the factors affecting the demonetization in the pre and post-implementation phase in the Indian context. Earlier literature provides an insight into the traditional and modern avenues of digital payments, but no studies were conducted for studying the impact of demonetization in India and the factors affecting such change. It also gives scope for further exploring the other latent variables and independent variables which affects digital payment processes, and different relationships can also be established on the same.

V. PROBLEM STATEMENT

To identify the gaps in the digitalization process in the pre and post-implementation phases of demonetization.

VI. OBJECTIVES OF THE STUDY

- To understand the demand pattern for digital payments in India before demonetization.
- To know the current pattern of demand for digital payments in India after demonetization.

- To know about the consumers' attitude towards digital payment.
- To understand and explore the various reasons for using digital payment gateways.
- To build a model and show the interrelationship between the variables and the covariances between them.

VII. HYPOTHESIS

H_{01} : There is no significant change in demand for digital payments in India before and after demonetization.

H_{a1} : There is a significant change in demand for digital payments in India after demonetization.

H_{02} : There is no relationship between the items taken under the study.

H_{a2} : There is a significant relationship among the items taken under the study.

VIII. RESEARCH METHODOLOGY

A. Research Design

The study is mostly exploratory, descriptive and content study as well. The reason being no such study have been conducted to explore whether the demography is satisfied with the implementation of the digital payment systems incorporated in the economy. Descriptive statistics and frequency of the data will tell us about the nature of the usage of the cash and cash equivalent products in the Delhi/ NCR region. Other measures like variance and standard deviation will describe the variations in the data in the pre and post-demonetization period. The content study is conducted in the study to analyze the results of the studies conducted in other countries or other environmental conditions.

B. Sample Design

The simple random sampling procedure was adopted for the study. The rationale behind the selection of simple random sampling was to eliminate the biases from the study. The sample study will comprise of 210 samples; 10 respondents are interviewed for each sub-items included in the study. Approximately 250 questionnaires are circulated among various group of respondents which includes (50) students, (50) faculty members, (50) individuals, (50) businessmen and (50) professionals. Even in order to avoid biases effort was also made to have a fair sample between males and females, i.e., a proportion of 1:1 was made for the study.

C. Data and Data Collection

The data used in the study contains both primary and secondary data. Primary data is used in the study. Whereas secondary data is used for the selection of variables, and extensive literature survey was done for the same. Some focused group interviews

are also taken to explore more variables which can be included in the study.

D. Reliability of the Data

The reliability of the sample of 210 respondents was confirmed through Cronbach's alpha. Generally Cronbach's alpha value of more than 0.70 is considered to be statistically acceptable. However, previous literature has proved that any value greater than 0.90 is considered to be excellent. In our study the Cronbach's alpha turns out to be 0.927 is shown in Table I. Hence, the data set is considered to be reliable.

TABLE I: RELIABILITY STATISTICS

Cronbach's Alpha	No. of Items
0.927	15

Source: Author's own work

E. Statistical Tools Used in the Study

To check the reliability of the data, we have used Cronbach's alpha as described above.

To study the relationship between the various demographic variables we have used descriptive statistics for the same. Whereas, to test the normality of the data, we also analyzed descriptive statistics results especially the skewness and kurtosis of the distribution, i.e., whether if responses between two periods are same or different.

To study the pre and post-implementation implications of the various digital payment systems dependent samples t-test is conducted. Dependent sample t-test would give us the output of whether there are any significant changes after the implementation of digital payment systems or not.

To explore the various factors influencing the attitude of consumers in using digital payment systems exploratory factor analysis using maximum likelihood criterion have been performed. A ratio of 10:1 respondent has been taken for each item for the study as per past studies were done by us. It is normally recommended that a ratio of respondents to variables should be at least 10:1 and that factors to be stable and to cross-validate with a ratio of 30:1 [28]. As per Comfrey and Lee suggestion on the adequacy of sample size may be evaluated on the following prescribed scale: 50 - very poor; 100 - poor; 200 - fair; 300 - good; 500 - very good; 1000 or more-excellent. In our case due to lack of time we had a sample of 162 respondents [9].

IX. FINDINGS AND DISCUSSION

A. Objective Address

- Objective (a): To understand the demand pattern for digital payments in India before demonetization.
- Objective (b): To know the current pattern of demand for digital payments in India after demonetization.

TABLE II: INDEPENDENT SAMPLES TEST

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Trad_Before_Demo	Equal Variances Assumed	0.637	0.426	-0.631	159	0.529	-0.6095	0.9666	-2.5185	1.2994
	Equal Variances Not Assumed			-0.558	24.512	0.582	-0.6095	1.0917	-2.8603	1.6412
Trad_After_Demo	Equal Variances Assumed	0.063	0.802	-0.0414	159	0.679	-0.4833	1.1661	-2.7863	1.8197
	Equal Variances Not Assumed			-0.447	27.916	0.658	-0.4833	1.0802	-2.6964	1.7297

Source: Author's own work

TABLE III: INDEPENDENT SAMPLES TEST

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Mod_Before_Demo	Equal Variances Assumed	0.284	0.595	-2.390	159	0.018	-1.7644	0.7381	-3.2221	-0.3066
	Equal Variances Not Assumed			-2.435	80.305	0.017	-1.7644	0.7244	-3.2060	-0.3228
Mod_After_Demo	Equal Variances Assumed	0.498	0.482	-1.889	159	0.061	-1.9246	1.0191	-3.9373	0.0881
	Equal Variances Not Assumed			-2.050	92.057	.043	-1.9246	0.9389	-3.7894	-0.0598

Source: Author's own work

Hypothesis Under this Study

H_{01} : There is no significant change in demand for digital payments in India before and after demonetization.

H_{a1} : There is a significant change in demand for digital payments in India after demonetization.

H_{01a} : There is no significant change in demand for traditional avenues for digital payments in India before and after demonetization.

H_{a1a} : There is a significant change in demand for traditional avenues for digital payments in India before and after demonetization.

H_{01b} : There is no significant change in demand for modern avenues for digital payments in India before and after demonetization.

H_{a1b} : There is a significant change in demand for modern avenues for digital payments in India before and after demonetization.

The above results suggest that there is no significant difference in the demand for the traditional techniques before and after demonetization. Whereas, there is a significant difference in the demand of the modern technique before and after demonetization which signifies that the demonetization policy has some serious implications on demand for modern

techniques of digital transaction process is shown in Table II and Table III. Considerable surge has been observed in the usage of internet banking and e-wallets.

- Objective (c): To know about the consumer's attitude towards digital payment.

TABLE IV: TRADITIONAL AVENUES BEFORE DEMONETIZATION

Various Avenues	1	2	3	4	5	Total
	< 3	3 to 5	5 to 8	8 to 10	> 10	
Cash	32	23	22	42	26	145
Debit Card	40	34	24	18	4	120
Credit Card	33	18	5	3	3	62
Cheque	55	6	4	5	0	70
Gift Card	48	1	3	1	0	53
Shopping Card	43	6	5	2	3	59
Total						509

Source: Author's own work

TABLE V: TRADITIONAL AVENUES AFTER DEMONETIZATION

Various Avenues	< 3	3 to 5	5 to 8	8 to 10	> 10	Total	Change
Cash	55	19	23	15	8	120	-25
Debit Card	26	31	47	25	11	140	20
Credit Card	31	14	10	7	7	69	7
Cheque	38	14	12	4	4	72	2
Gift Card	37	5	5	1	2	50	-3
Shopping Card	34	2	9	3	3	51	-8
Total						502	-7

Source: Author's own work

TABLE VI: TRADITIONAL AVENUES CHANGE IN TRANSACTION VOLUME

Various Avenues	< 3	3 to 5	5 to 8	8 to 10	> 10	Total
Cash	23	-4	1	-27	-18	-25
Debit Card	-14	-3	23	7	7	20
Credit Card	-2	-4	5	4	4	7
Cheque	-17	8	8	-1	4	2
Gift Card	-11	4	2	0	2	-3
Shopping Card	-9	-4	4	1	0	-8
Total						-7

Source: Author's own work

TABLE VII: MODERN AVENUES BEFORE DEMONETIZATION

Various Avenues	< 3	3 to 5	5 to 8	8 to 10	> 10	Total
E-Wallets	51	26	18	14	5	114
Swipe Systems	36	28	23	7	4	98
Internet Banking	35	32	17	11	5	100
Imps / Rtgs / Neft	43	21	10	4	2	80
Digital Currency	47	0	5	1	0	53
Total						445

Source: Author's own work

TABLE VIII: AFTER DEMONETIZATION

Various Avenues	< 3	3 to 5	5 to 8	8 to 10	> 10	Total	Change
E Wallets	24	29	39	18	10	120	6
Swipe Systems	22	19	29	17	6	93	-5
Internet Banking	26	30	22	8	11	97	-3
Imps / Rtgs / Neft	33	22	16	8	2	81	1
Digital Currency	33	4	6	1	2	46	-7
Total						437	-8

Source: Author's own work

TABLE IX: CHANGE IN TRANSACTION VOLUME

Various Avenues	< 3	3 to 5	5 to 8	8 to 10	> 10	Total
E Wallets	-27	3	21	4	5	6
Swipe Systems	-14	-9	6	10	2	-5
Internet Banking	-9	-2	5	-3	6	-3
IMPS / RTGS / NEFT	-10	1	6	4	0	1
Digital Currency	-14	4	1	0	2	-7
Total						-8

Source: Author's own work

From the above Tables IV-IX, we can observe that in the transaction pattern in traditional avenues before demonetization and the transaction pattern in the modern avenues after demonetization.

In traditional avenues cash and debit card were the most frequently preferred by consumers and customers; hence the volume of transactions reflect the same during the pre-demonetization phase. Whereas, in post demonetization the overall volume in cash transactions is higher than any other avenues used by consumers. Even there is an increase in the

number of transactions previously the numbers were quite high on usage of cash, but after demonetization the number of transactions has come down as well.

In the modern avenues e-wallets and transfers were on a high note. However, if we compare the scores, then the traditional avenues were having a greater score than the modern avenues. Which also proves our hypothesis there is no significant difference between the usage of traditional and modern techniques of transaction.

B. Exploratory Factor Analysis

TABLE X: KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.915
Bartlett's Test of Sphericity	Approx. Chi-Square	1189.160
	Df.	91
	Sig.	0.000

Source: Author's own work

The above Table X shows two tests that indicate the suitability of the data under study for structure detection. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (MSA) is a statistic that indicates the proportion of variance in your variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that factor analysis may be useful with your data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful. Kaiser, Meyer, Olkin (1974) recommend 0.50 as minimum (barely accepted), values

between 0.80-0.90 is meritorious, and values above 0.90 are superb. The standard at least measure of is shown in Table X, KMO should be more than 0.60 here we have a value of 0.915 is shown in Table X, which is very efficient and accurate results for the sample adequacy. However, this is not the ultimate measure of sampling adequacy.

Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix, which would indicate

that the variables under study are unrelated and therefore unsuitable for structure detection. Small values (less than 0.05) of the significance level indicate that factor analysis may be useful with your data. Here, hypothesis for the Bartlett's test

H_0 : The Correlation Matrix is an Identity matrix.

H_1 : Correlation Matrix is not an Identity matrix.

Here results show that at 91 degrees of freedom at 5% significance level the value is 1189.160, and the sig. value is 0.000 which rejects the null hypothesis. Hence, we can infer that the correlation matrix is not an identity matrix and the sample is adequate to go ahead with factor analysis. Also to add on, the strength of the relationship among variables are strong and appropriate for factor analysis.

TABLE XI: COMMUNALITIES

	Initial	Extraction
Reward Points	1.00	0.731
Promo Code	1.00	0.710
Gift Coupons	1.00	0.603
Cash Back	1.00	0.763
Nonavailability of Cash	1.00	0.731
No Need for Cash	1.00	0.433
Technology Usage, Awareness and Availability	1.00	0.525
Safety and Security	1.00	0.683
Mobile App Availability	1.00	0.659
Going Paperless	1.00	0.713
Security Frauds	1.00	0.527
Speed of Internet	1.00	0.575
Extra Charges/Hidden Charges	1.00	0.611
Low Reach	1.00	0.668
Extraction Method: Maximum Likelihood.		

Source: Author's own work

The amount of variance in each variable that accounted explained by the commonalities is in Table XI. Here, the Initial communalities are estimates of the variance in each variable accounted for by all components or factors. For principal components extraction, this is always equal to 1.00 for correlation analyses. Extraction communalities are estimates of

the variance in each variable accounted for by the components. The communalities in this Table XI, all are moderately high i.e., > 0.50 , which indicates that the extracted components represent the variables well. If any of the communalities are very low, i.e., < 0.50 in principal components extraction, we would have to extract another component.

TABLE XII: TOTAL VARIANCE EXPLAINED

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.510	46.497	46.497	6.110	43.644	43.644	4.380
2	1.779	12.705	59.202	1.383	9.876	53.520	4.531
3	1.046	7.471	66.673	0.639	4.562	58.082	5.316
4	0.814	5.812	72.485				
5	0.572	4.086	76.571				
6	0.530	3.787	80.358				
7	0.491	3.508	83.866				
8	0.416	2.973	86.839				
9	0.390	2.788	89.627				
10	0.358	2.560	92.187				
11	0.332	2.372	94.559				
12	0.280	2.001	96.561				
13	0.270	1.926	98.487				
14	0.212	1.513	100.000				
Extraction Method: Maximum Likelihood.							

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Source: Author's own work

C. Initial Eigenvalues

From the leftmost section of the above Table XII it is evident that only three factors in the initial solution have eigenvalues greater than 1. Together, they account for almost 66.673% of the variability in the original variables. This suggests that three latent influences are associated with service usage, but there remains room for a lot of unexplained variation.

D. Extraction Sums of Squared Loadings

The second section of Table XII shows the variance explained by the extracted factors before rotation. The cumulative vari-

ability explained by these three factors in the extracted solution is about 58.082%, a difference of approximately 8% from the initial solution. Thus, about 8% of the variation explained by the initial solution is lost due to latent factors unique to the original variables and variability that simply cannot be explained by the factor model.

E. Rotation Sum of Squared Loadings

The rightmost section of this Table XIII shows the variance explained by the extracted factors after rotation. The rotated factor model makes some small adjustments to factors 1, 2, and 3.

TABLE XIII: STRUCTURE MATRIX

	Factor		
	1	2	3
Reward Points		0.652	
Promo Code		0.842	0.546
Gift Coupons		0.773	
Cashback		0.861	0.688
No Need for Cash			0.657
Technology Usage, Awareness and Availability		0.611	0.699
Safety and Security	0.505	0.566	0.826
Mobile App Availability		0.531	0.811
Going Paperless	0.657	0.551	0.828
Security Frauds	0.715		0.546
Speed of Internet	0.749		0.511
Extra Charges/Hidden Charges	0.780		
Low Reach	0.809		
Extraction Method: Maximum Likelihood.			
Rotation Method: Promax with Kaiser Normalization.			

Source: Author's own work

Now we need to look for changes between the unrotated and rotated factor matrices to see how the rotation affects the interpretation of the first and second factors in Table XIII. The variability in all three factors is now easier to interpret. The first rotated factor (technical and non-technical barriers) is most highly correlated with security frauds, speed of internet, extra charges or hidden charges and low reach. These variables are not particularly correlated with the second factor and partially with the third factor.

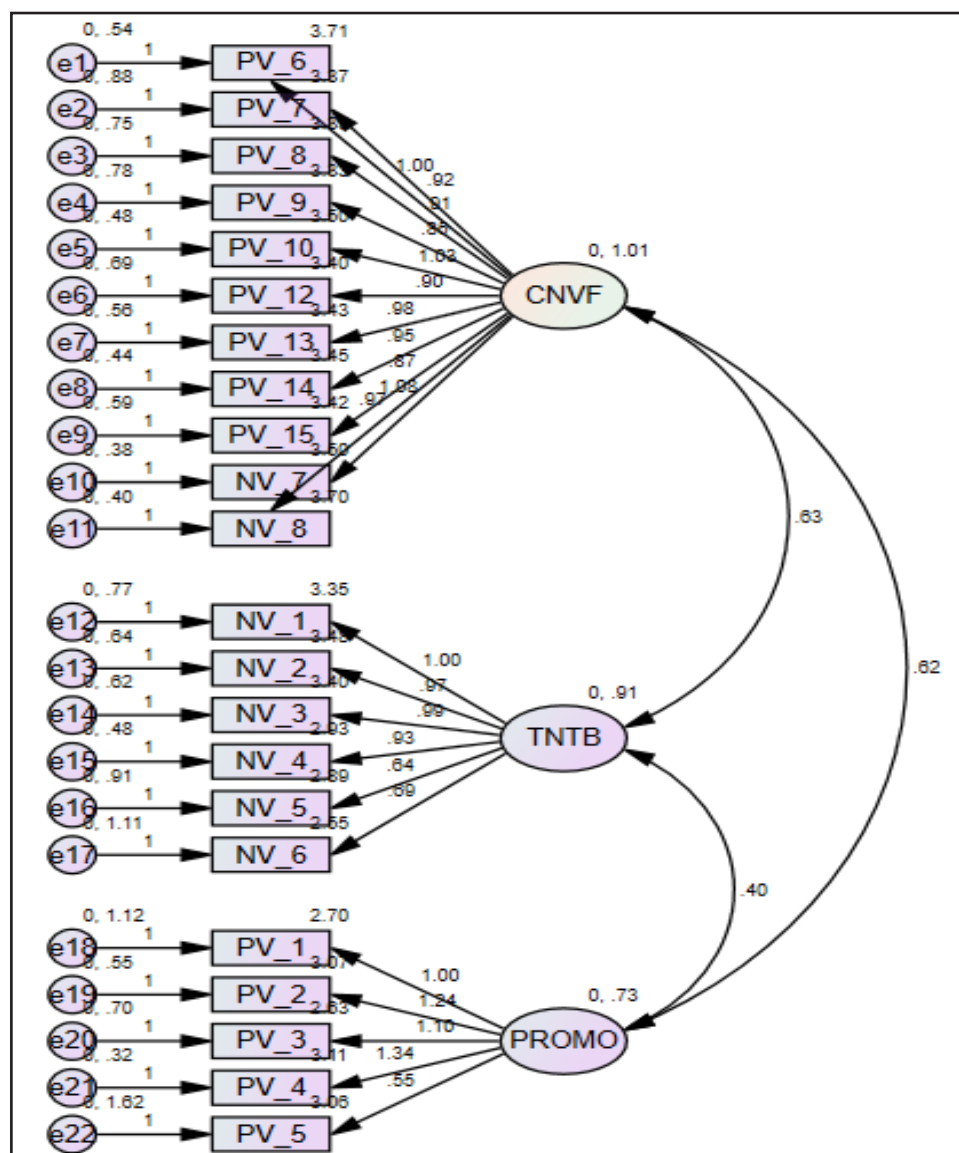
However, the first factor (technical and non-technical barriers) also had a moderate degree of correlation with the variables safety and security and going paperless variable. The second factor is most highly correlated with cashback, promo code,

gift coupons and reward points. The third factor is most highly correlated with going paperless, safety and security, mobile app availability and technology awareness and availability. Again it is also observed that there is a moderately high correlation between factor 2 and 3 on technology awareness and availability which also means that the gap between convenience facilities and technological and non-technological barriers can be bridged on behalf of technology awareness and availability. Thus there are three major groupings of digital services, as defined by the highly correlated with three is shown in Table XIII and Table XIV. This suggests that banks and other digital service providers can cross-sell their products and services. For example, those customers who are willing to get cash backs can go for bitcoin to minimize the risk of fraudulent transactions.

TABLE XIV: PATTERN MATRIX

Key Factors	Sub Items	Factor		
		1	2	3
Promotional Offers (PROMO)	Reward Points		0.654	
	Promo Code		0.866	
	Gift Coupons		0.818	
	Cashback		0.728	
Convenience Facilities (CONVF)	No Need for Cash			0.642
	Technology Usage, Awareness and Availability			0.532
	Safety and Security			0.836
	Mobile App Availability			0.847
	Going Paperless			0.698
Technical and Nontechnical Barriers (TNTB)	Security Frauds	0.618		
	Speed of Internet	0.710		
	Extra Charges/Hidden Charges	0.818		
	Low Reach	0.857		
Extraction Method: Maximum Likelihood.				
Rotation Method: Promax with Kaiser Normalization.				
a. Rotation converged in 5 iterations. ^a				

Source: Author's own work



Source: Author's own work

Fig. 1: Association Between the Various Latent Constructs

The above Table XIV and Fig. 1 show the convergence of the following factors, the factors which turned up had the following loadings:

- The first factor can be interpreted as promotional offers which comprise the following sub-items, i.e., reward points with the loading of 0.654; promo code 0.866; gift coupons 0.818 and cashback offers 0.728. The highest loading has been in promo code item and the lowest in the reward points.
- The second factor can be enumerated as convenience facilities which comprise the following variables, i.e., no need for cash having a loading of 0.642; technology usage, awareness and availability 0.532; safety and security 0.847 and going paperless 0.698. The highest loading being in safety and security and lowest being in technology usage, awareness and availability.
- The third factor which emerged was technical and nontechnical barriers which were constructed based on the following independent variables under the cluster, i.e., security frauds with the loading of 0.618; speed of internet with a loading of 0.710; extra/hidden charges 0.818 and low reach 0.857. The highest loading being in low reach and the lowest being in security frauds.

F. Reliability Scores of the Factor Items

The combined reliability score of the factor-1 is

TABLE XV: RELIABILITY STATISTICS

Cronbach's Alpha	No. of Items
0.859	4

Source: Author's own work

The reliability score of the sample of items under factor 1 was confirmed through Cronbach's alpha. Generally Cronbach's alpha value of more than 0.70 is considered to be statistically acceptable. However, previous literature has proved that any value greater than 0.90 is considered to be excellent. In our study the Cronbach's alpha turns out to be 0.859 is shown in Table XV. Hence, the data set is considered to be reliable.

The combined reliability score of the factor-2 is

TABLE XVI: RELIABILITY STATISTICS

Cronbach's Alpha	No. of Items
0.872	5

Source: Author's own work

The reliability score of the sample of items under factor 2 was confirmed through Cronbach's alpha. Generally Cronbach's alpha value of more than 0.70 is considered to be statistically acceptable. However, previous literature has proved that any

value greater than 0.90 is considered to be excellent. In our study the Cronbach's alpha turns out to be 0.872 is shown in Table XVI. Hence, the data set is considered to be reliable.

The combined reliability score of the factor-3 is

TABLE XVII: RELIABILITY STATISTICS

Cronbach's Alpha	No. of Items
0.845	4

Source: Author's own work

The reliability score of the sample of items under factor 3 was confirmed through Cronbach's alpha. Generally Cronbach's alpha value of more than 0.70 is considered to be statistically acceptable. However, previous literature has proved that any value greater than 0.90 is considered to be excellent. In our study the Cronbach's alpha turns out to be 0.845 is shown in Table XVII. Hence, the data set is considered to be reliable.

X. LIMITATIONS, CONCLUSION AND FUTURE

SCOPE OF STUDY

The above study also suffers from the following limitations. The study is solely based on the secondary sources, i.e., previous literature available and through focus-grouped interviews and conducting pilot surveys. Though the authenticity of the data was tried to be proved through the Cronbach's Alpha which is a measure of reliability but still the authenticity remains a challenge. Secondly, the data used for conducting for factor analysis was only 210 samples were collected which nullifies the thumb rule of 1:10 samples for each item. Thirdly, the duration of the study was also very small (i.e., only 3 months). So there can be differential results if we can study on a longer time horizon. However, this study can be a stepping stone for other researchers to explore other independent variables and latent variables which can affect the demand of digital payment systems. Thus it gives a scope for path analysis and structural equation modelling to understand the relationship between the variables taken under the study.

REFERENCES

- [1] D. Abrazhevich, "Electronic payment system: A user-centered perspective and interaction design," Doctoral thesis, Data Library of Univ. of Technische, Eindhoven, Netherland, pp. 23-33, 2004. [Online]. Available: <http://www.idemployee.id.tue.nl/p.markopoulos/downloadablePapers/ThesisAbrazhevich.pdf>
- [2] O. Adeoti, and K. Osotimehin, "Adoption of point of sale terminals in Nigeria: Assessment of consumers' level of satisfaction," *Research Journal of Finance and Accounting*, vol. 3, no. 1, pp. 1-5, 2012.
- [3] S. K. Antwi, K. Hamza, and S. W. Bavoh, "Examining the effectiveness of electronic payment system in Ghana: The case of e-ZWICH in the tamale metropolis,"

- Research Journal of Finance and Accounting*, vol. 6, no. 2, pp. 163-177, 2015.
- [4] M. A. Bagheri, M. T. HamidiBeheshti, and S. Alidousti, "Acceptance of internet banking in Iran: Extension of technology acceptance model (TAM)," *Journal of Information Processing and Management*, vol. 24, no. 3, pp. 5-33, 2009.
- [5] A. Balogun, "Electronic retail payment systems in Nigeria: User acceptance through infrastructural approach," Masters dissertation, Liverpool John Moores Univ., 2012. Accessed: Apr. 19, 2017. [Online]. Available: <http://www.scribd.com/doc/127190513/Dissertation>
- [6] M. B. Asadi, S. Sharifi, and H. Pournabi, "Factors influencing adoption of electronic banking," in *3rd Int. Conf. on E-Banking*, 2009.
- [7] A. Briggs, and L. Brooks, "Electronic payment systems development in a developing country: The role of institutional arrangements," *Electronic Journal on Information Systems in Developing Countries*, vol. 49, no. 3, pp. 1-16, 2011.
- [8] L. A. Comfrey, and H. B. Lee, "A first course in factor analysis," 2nd ed., Hillside, NJ: Lawrence Erlbaum Associates, p. 217, 1992.
- [9] J. Gil-Garcia, and L. Luna-Reyes, "Towards a definition of electronic government: A comparative review," *Techno-legal Aspects of Badajoz*, Formatex, Spain, 2003.
- [10] R. Hussein, N. Mohamed, A. Ahlan, and M. Mahmud, "E-government application: An integrated model on G2C adoption of online tax," *Transforming Government: People, Process and Policy*, vol. 5, no. 3, pp. 225-248, 2010.
- [11] M. Kaliannan, and H. Awang, "Adoption and use of e-government services: A case study of e-procurement in Malaysia," *WSEAS Transactions on Business and Economics*, vol. 7, no. 1, 2010.
- [12] K. Kaur, and A. Pathak, "E-payment system on e-commerce in India," *International Journal of Engineering Research and Applications*, vol. 5, no. 2, pp. 79-87, 2015.
- [13] T. D. Kavuu, T. Kavuu, B. M. Nyambo, and G. T. Hapanyengwi, "An electronic payment model for small and medium enterprises in Zimbabwe," *International Journal of Scientific and Engineering Research*, vol. 4, no. 1, pp. 1-8, 2013.
- [14] P. Ken, and M. Will, "An agenda for research about the value of payment systems for transactions in electronic commerce," *Journal of Information Technology Theory and Application*, vol. 4, no. 4, pp. 1-15, 2003.
- [15] N. K. Khairun, and M. H. Yasmin, "E-commerce adoption in Malaysia: Trends, issues and opportunities," *ICT Strategic Review*, PIKOM publishers, Malaysia, pp. 89-134, 2010.
- [16] A. Mohamad, A. Haroon, and A. Najiran, "Development of electronic money and its impact on the central bank role," *Issues in Informing Science and Information Technology*, vol. 6, pp. 339-348, 2009.
- [17] M. N. Muhayiddin, E. M. Ahmed, and H. Ismail, "Consumer acceptance of an electronic dinar payment system in Malaysia," *Journal of Electronic Banking Systems*, vol. 1, pp. 1-13, 2011.
- [18] N. M. Nzaro, "Assessing the role of electronic payment systems in financial institutions: A case of a savings bank in Zimbabwe," *Global Journal of Management and Business Research*, vol. 14, no. 2, 2014.
- [19] J. W. Osborne, and A. B. Costello, "Sample size and subject to item ratio in principal component analysis," *Practical Assessment, Research and Evaluation*, vol. 9, no. 11, 2004.
- [20] M. O. Peter, and P. J. Babatunde, "E-payment: Prospects and challenges in Nigerian public sector," *International Journal of Modern Engineering Research*, vol. 5, no. 2, pp. 3104-3106, 2012.
- [21] R. P. Kumar, "What is demonetization and why was it done," *The Economic Times*, 2016. [Online]. Available: <http://economictimes.indiatimes.com/news/economy/policy> (Accessed Apr. 22, 2017).
- [22] A. Premchand, and A. Choudhry, "Future of payments: E-payments," *International Journal of Emerging Technology and Advanced Engineering*, vol. 5, pp. 110-115, 2015.
- [23] S. Roy, and I. Sinha, "Determinants of customers' acceptance of electronic payment system in Indian banking sector: A study," *International Journal of Scientific and Engineering Research*, vol. 5, no. 1, pp. 177-187, 2014.
- [24] T. H. Shon, and P. M. Swatman, "Identifying effectiveness criteria for internet payment systems," *Internet Research: Electronic Networking Applications and Policy*, vol. 8, no. 3, pp. 202-218, 1998.
- [25] O. Slozko, and A. Pelo, "Problems and risks of digital technologies introduction into e-payments," *Transformations in Business and Economics*, vol. 14, no. 1, pp. 42-59, 2015.
- [26] V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, "User acceptance of information technology: Toward a unified view," *MIS Quarterly*, pp. 425-478, 2003.
- [27] A. G. Yong, and S. Pearce, "A beginner's guide to factor analysis: Focusing on exploratory factor analysis," *Tutorials in Quantitative Methods in Psychology*, vol. 9, no. 2, pp. 79-94, 2013.