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DYNAMICS OF DIGITAL PAYMENTS IN INDIA – A STATISTICAL ANALYSIS

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ABSTRACT

The pace of shift towards digital payments has enormously increased in India due to government's initiatives towards cashless economy. The Information technology revolution, Demonetisation alongside the digital policy opted by government made people to opt different digital payment systems. In spite of increasing cyber crimes day by day there found increasing inclination of people towards digital payments due to its ease, convenience and flexibility. The framework undertaken by the government to encourage digital payments proved fruitful. There are number of electronic payment systems available in India today like Real Time Gross Payment System (RTGS), National Electronic Funds Transfer System (NEFT), Cheque Truncation System (CTS), Immediate Payment System (IMPS), NACH's Aadhaar Payment Bridge (APB) System, Unified Payments Interface (UPI) and others. The present study focused on analyzing the digital payment systems in India. It also aimed to investigate and interpret the Volume and Value transactions in electronic payment system with respect to RTGS, NEFT and IMPS for a period of 16 months i.e from November 2016 to February 2018.One way ANOVA is conducted in MS-Excel to study the significance of the data concerned. Finally outcomes of the analysis suggest that Volume and Value of transactions in the Electronic payment systems differ significantly during the period of study.

KEYWORDS:

Demonetisation, Digital payment systems, IMPS, RTGS, NEFT.

INTRODUCTION

According to The Payment and Settlement Act, 2007 Digital Payments are any "electronic funds transfer", i.e., any transfer of funds which is initiated by a person by way of instruction, authorization or order to a bank to debit or credit an account maintained with that bank through electronic means. India is a cash dominated and cash dependent economy. Demonetization forced Indians towards opting and trusting digital payments. In the post demonetization period people came to know that digital payment methods are often easy to make, flexibility and convenient to make payments anytime and anywhere. Indian economy is in the pace of replacing traditional methods of payment with digital payments to accelerate and speed up the transactions in its financial system. Digital payments are vivid range of instruments used in different ways for making payments. Users adopt them according to their need and convenience.

Even rural India started moving towards cashless and digital payments due to the demonetization drive implemented in November 2016.The petty shop keeper and vendors opted towards digital payments from this period. Digital payments won the trust and confidence in every sector and section of the society. The experts in financial industry opine that the mobile based payment methods are increasing day by day.

OBJECTIVES OF THE STUDY

The following are the objectives of the study:

1. To assess different modes of digital payment systems in India.
2. To analyze benefits and drawbacks of using digital payment system in India.
3. To investigate and interpret the Volume and Value transactions in electronic payment system with respect to RTGS, NEFT and IMPS.

PAPER BASED PAYMENTS TO DIGITAL PAYMENTS

There is a paradigm shift in Indian economy from paper-based regime to digital payments culture. In the past, the RBI's national payment system was dominated by paper-based payment instruments like Cheques, demand drafts etc. But now the situation has changed, electronic payment methods have emerged as leader in terms of value of transactions (only 11% payments are paper based according to the RBI statistics). This share has been gradually decreasing over a period of time. The concentrated efforts of RBI with establishment of NPCI is a direction in this move. National Payments Corporation of India (NPCI) established in 2008 is an umbrella organization for all retail payments in India. It was set up with the guidance and support of the Reserve Bank of India (RBI) and Indian Banks Association (IBA). The overall trust by Government is to encourage cashless payments and digitalize the transactions. Government has been supporting the digital payments by reducing certain taxes on digital payments, Lucky Grahak Yojana for customers and Digi Dhan Vyapay Yojana for shopkeepers. Due to these incentives and schemes more users showed interest in digital payments.

DIGITAL PAYMENT SYSTEMS IN INDIA

The following are the Digital Payment Systems in India.

(i) **Real Time Gross Settlement System (RTGS):** This was introduced in 2004.RTGS is a real time payment system and is not subject to any waiting time for the transfer of funds. This is the fastest possible money transfer system through the banking channel. Transactions are settled on one to one basis without bunching or netting with any other transaction. These payments are irrecoverable. All the interbank payments and customer transactions above 2 lakhs are settled through RTGS.

(ii) **National Electronic Funds Transfer System (NEFT):** Introduced in the year 2005.Transactions in NEFT are settled in batches. NEFT settles fund transfers in half-hourly batches with 23 settlements occurring between 8:00 AM and 7:30 PM on week days and the 1st, 3rd and 5th Saturday of the calendar month. Transfers initiated outside this time period are settled at the next available window. No settlements are made on the second and fourth Saturday of the month, or on Sundays, or on public holidays. Certain other unique features viz. accepting cash for originating transactions, initiating transfer requests without any minimum or maximum amount limitations, receiving confirmation of the date / time of credit to the account of the beneficiaries, etc., are available in the system.

(iii) **Cheque Truncation System (CTS):** Introduced in 2010.This is a cheque clearing system undertaken by the Reserve Bank of India (RBI) for faster clearing of cheques. Cheque Truncation System (CTS) was implemented, whereby the flow of the physical movement of the cheque eliminated. In the cheque clearing process using Magnetic Ink Character Recognition (MICR). This reduces the costs associated with movement of cheques and the processing time for clearing cheques.

(iv) **Immediate Payment System (IMPS):** Introduced in the year 2010.It offers interbank electronic transfer of funds through mobile applications instantly. This is known for 24/7 service unlike NEFT and RTGS.IMPS can be done through ATMs and SMS. Instant process and ease of use has made this most preferred electronic system.

(v) **National automated clearing house (NACH):** This is the clearing house developed by NPCI. High volume interbank electronic transactions of banks, Financial Institutions, Corporates and Government are facilitated NACH. It electronic clearing service available especially for banks to clear bulk repetitive transactions between banks. The government announced subsidies other benefits to intended beneficiaries using their Aadhaar number are successfully channelized through NACH's Aadhaar Payment Bridge (APB) System. It links the sponsor bank and the government department on one side Beneficiary and their respective bank in the other side. However, it can be said that NACH's Aadhaar Payment Bridge (APB) System has instrumentalised the government programs in meeting the beneficiaries.

(vi) **Unified Payments Interface (UPI):** This call for instant transfer of money with mobile applications. It is built over IMPS for transferring funds 24/7. It uses Virtual Payment Address, registered mobile number, Aadhaar Number for transferring funds-commerce websites have made UPI as a payment where customers an instantly make payment by pasting their virtual id in the link provided. However, customers need to enter UPI pin to confirm their payment.

(vii) **Unstructured Supplementary Service Data (USSD):** It is similar to Short Messaging Service (SMS). USSD is a Global System for Mobile (GSM) communication technology that is used to send text between a mobile phone and an application program in the network. When a user sends a message to the phone company network, it is received by a computer dedicated to USSD. The computer's response is sent back to the phone, generally in a basic format that can easily be seen on the phone display. Callback service, interactive data service, check balance, missed call services, delivering OTP is the services provided by USSD.

(viii) **Debit and Credit Cards:** Savings account customers can avail debit and credit card options by the banks. People need not carry the cash all the time when they have these cards with them. The amount in the savings accounts can be withdrawn or made as payment through Debit cards. Credit card is card payment system issued by the bank with the promise that the card holder will pay the assured money with other charges on a specified date. However, the amount of money to be advanced to the customers depends on his credit worthiness. Transactions are processed on a network, like Visa, MasterCard or American Express. This plastic money has demanded a separate space in the wallets of users.

(ix) **Prepaid Payment Instruments (PPI):** This is an instrument with certain amount of pre-loaded cash. The prepaid instruments can be issued as smart cards, magnetic stripe cards, internet accounts, online wallets, mobile accounts, mobile wallets, paper vouchers to access the pre loaded amount. These instruments has gained more popularity as more of gifts and also used as a sales promotion tool by the companies like cash back offers.

(x) **Mobile Banking:** It is a service provided by banks to access the customer savings account from their smart phones or tablets. This facility can be availed 24 hours by the customers where by the frequency of customers visiting the bank premises is reduced drastically. Through mobile banking customers can obtain their account balances and list of their latest transactions, make bill payments, insurance premium payments and more importantly transfer of funds within the bank and other banks. They also enable customers to download their account statements. Mobile banking is more convenient and has reduced the cost of handling the transaction.

BENEFITS OF DIGITAL PAYMENTS

After analyzing the above payment systems, the following are the benefits identified.

(i) **Quick and convenient mode of payments:** The speed in the payment process with the no waiting time and convenience in handling the transactions is the ultimate advantage of digital payments.

(ii) **Low transaction handling cost:** The payment apps and UPI interface are free of cost and do not demand any charges from the users.

(iii) **Waivers, discounts and cash backs:** There are many rewards and discounts offered to customers using digital payment apps and mobile wallets. There are attractive cash back offers given by many digital payment banks, which motivate the customers to go cashless.

(iv) **Tracking of transactions:** Customers can have evidence of the transactions made by them and track the record of all the transactions made by them irrespective of its value.

(v) **Platform for paying bills:** The digital payment systems have made a convenient platform for paying utility bills in a single click. Consumers are busy with their routine life, so they find it more convenient to make digital payments.

(vi) **No movement of physical currency:** Digital transactions will help the government keep a record of all the transactions. There by it eliminates circulation of black money and counterfeit notes in economy in its long run survival. The cost of maintain and minting to currency notes reduces on the part of government.

DRAWBACKS OF DIGITAL PAYMENTS

The following are some of the challenges faced by India in the era of digital payments

(i) **Literacy Rate in India:** The literacy rate in India was at 74.04% in 2011, but the financial and computer literacy is much lower than this rate

(ii) **Risk of Security & Cyber Fraud**: The problem of hacking, data theft, security breaches continues to reflect in the digital payment which is the main hindrance objecting users to trust the digital payments. A recent example is an attack on 3.2 million RuPaycard details stolen in October 2016.

(iii) **Privacy problems:** Some users think that the data can be accessed by other parties and thereby they do not come forward to utilize the services of digital tools.

Hypotheses of the Study

1. $H0_1$: The volume of transactions among the electronic payment systems, i.e., RTGS,NEFT and IMPS do not differ significantly
2. $H0_2$: The value of transactions among the electronic payment systems, i.e., RTGS, NEFT and IMPS do not differ significantly.

DATA ANALYSIS AND INTERPRETATION

The present study was conducted with the selected three payment systems, i.e., RTGS, NEFT and IMPS. Data for 16 months is considered for the study, i.e., from November 2016 to February 2018 which is collected from the RBI statistics. The analysis was carried to know the differences in volume (in million) and value (in billion) per transaction among the selected modes of digital payments. The study used statistical tools like averages and One-way ANOVA.MS Excel was used in the analysis to derive the results.

Table-1: Volume of transactions in Electronic Payment Systems (in Millions)				
Data for the period	**RTGS**	**NEFT**	**IMPS**	**Mean**
Nov-16	7.9	123.0	36.2	55.700
Dec-16	8.8	166.3	52.8	75.966
Jan-17	9.3	164.2	62.4	78.633
Feb-17	9.1	148.2	59.7	72.333
Mar-17	12.5	186.7	67.4	88.866
Apr-17	9.5	143.2	65.1	72.600
May-17	10.4	155.8	66.7	77.633
Jun-17	9.8	152.3	65.8	75.966
Jul-17	9.4	148.1	69.1	75.533
Aug-17	9.5	151.6	75.7	78.933
Sep-17	9.6	157.7	82.9	83.400
Oct-17	10.0	158.8	88.1	85.633
Nov-17	10.8	162.0	89.5	87.433
Dec-17	10.9	169.0	98.0	92.633
Jan-18	11.2	170.2	99.6	93.666
Feb-18	10.6	165.6	99.2	91.800
Mean	**9.956**	**157.667**	**73.637**	**80.420**
Source: RBI Statistics				

Table-1 explains the volume of transactions in Electronic Payment Systems. The volume of transactions in electronic payment systems in RTGS, NEFT and IMPS in the period of study varied between the highest of 93.666 Million in January 2018 and least of 55.700 Million in November 2016. The Mean of all the payments systems in the period of study recorded at 80.420 Million. The mean of NEFT transactions is recoded at 157.667 Million IMPS with 73.637 Million and RTGS with least mean of 9.956 Million. The above said Electronic payment systems were compiled using One-way ANOVA and were tested by the following hypothesis ($H0_1$). The results were shown in the Table-2.

Table-2: ANOVA Results for the Volume of Transactions in Electronic Payment Systems						
Source of Variation	**SS**	**df**	**MS**	**F**	**P-value**	**F crit**
Between Groups	175656.2	2	87828.09	501.6894	1.72E-31	3.204317
Within Groups	7877.911	45	175.0647			
Total	183534.1	47				

Source: RBI Statistics

- $H0_1$: The volume of transaction among the electronic payment systems, i.e., RTGS, NEFT and IMPS do not differ significantly.
- Inference: $F_{cal} > F_{crit.}$ therefore, reject $H0_1$ and conclude that the volume of transaction among the electronic payment systems of RTGS, NEFT ANF IMPS differ significantly

Table- 3: Value of transactions in Electronic Payment Systems (in Billions)				
Data for the period	**RTGS**	**NEFT**	**IMPS**	**Mean Value**
Nov-16	78479.2	8807.8	324.8	87611.8
Dec-16	84096.5	11537.6	431.9	96066
Jan-17	77486.1	11355.1	491.2	89332.4
Feb-17	74218.8	10877.9	482.2	85578.9
Mar-17	123375.8	16294.5	564.7	140235
Apr-17	88512.2	12156.2	562.1	101230.5
May-17	90170.5	12410.8	585.6	103166.9
Jun-17	92812.6	12694.2	596.5	106103.3
Jul-17	87149.3	12011.6	604.8	99765.7
Aug-17	89163.4	12500.4	651.5	102315.3
Sep-17	102348.1	14182.1	717.6	117247.8
Oct-17	92056.1	13851.3	750.4	106657.8
Nov-17	98410.5	13884.0	782.6	113077.1
Dec-17	100907.8	15779.2	871.1	117558.1
Jan-18	107488.4	15374.1	882.1	123744.6
Feb-18	91765.6	14843.9	882.7	107492.2
MEAN	92402.56	13035.04	636.3625	106074

Source: RBI statistics

Table-3 explains the volume of transactions in Electronic Payment Systems. The volume of transactions in electronic payment systems in RTGS, NEFT and IMPS in the period of study varied between the highest of 93.666 Million in January 2018 and least of 55.700 Million in November 2016. The Mean of all the payments systems in the period of study recorded at 80.420 Million. The mean of NEFT transactions is recoded at 157.667 Million IMPS with 73.637 Million and RTGS with least mean of 9.956 Million. The above said Electronic payment systems were compiled using One-way ANOVA and were tested by the following hypothesis ($H0_2$). The results were shown in the Table-2.

Table-4: ANOVA Results for the Value of Transactions in Electronic Payment Systems						
Source of Variation	**SS**	**df**	**MS**	**F**	**P-value**	**F crit**
Between Groups	79327806147	2	39663903073	766.242	1.75E-35	3.204317
Within Groups	2329388809	45	51764195.76			
Total	81657194956	47				

Source: RBI Statistics

- $H0_2$: The value of transactions among the electronic payment systems i.e RTGS, NEFT ANF IMPS do not differ significantly
- Inference: $F_{cal} > F_{crit.}$ therefore, reject $H0_2$ and conclude that the value of transactions among the electronic payment systems, i.e., RTGS, NEFT and IMPS differ significantly

CONCLUSION

The electronic payment systems in India was analysed through the construction of tables and calculating averages in the period of study, i.e., from November 2016 to February 2018. It is found from the analysis that there is an increasing trend in the mean value of the identified variables. However, to test the statistical significance of the data One-way ANOVA was conducted for Volume of the transactions and Value of the transactions separately. The results of the study indicate that the volume of transactions and value of transactions of electronic payment systems, i.e., RTGS,NEFT and IMPS differ significantly in the period of study.

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