

## INNOVATIONS IN THE PAYMENT SYSTEMS OF INDIA

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### Abstract

*The existence of the currency is always due to its paying ability. During the history of the currency, the paper currency as well as paper payment system has been quite popular all over the world. But since the last decade of 20<sup>th</sup> century a number of changes have been developed for payment which promoted paperless payment system. Today there are a number of ways and means where method of transactions has been changed between banks and customers. Days gone when physical presence of the customer was must for financial transactions. This paper aimed to discuss the innovations took place during last one decade in the country.*

**Key Words:** Debit Card, Credit Card, Internet Banking, Paperless currency, ATM, POS.

### INTRODUCTION

The central bank of any country is usually the driving force in the development of national payment systems. The Reserve Bank of India as the central bank of India has been playing this developmental role and has taken several initiatives for Safe, Secure, Sound, Efficient, Accessible and Authorised payment systems in the country.

The Board for Regulation and Supervision of Payment and Settlement Systems (BPSS), a sub-committee of the Central Board of the Reserve Bank of India is the highest policy making body on payment systems in the country. The BPSS is empowered for authorising, prescribing policies and setting standards for regulating and supervising all the payment and settlement systems in the country. The Department of Payment and Settlement Systems of the Reserve Bank of India serves as the Secretariat to the Board and executes its directions.

In India, the payment and settlement systems are regulated by the Payment and Settlement Systems Act, 2007 (PSS Act) which was legislated in December 2007. The PSS Act as well as the Payment and Settlement System Regulations, 2008 framed there under came into effect from August 12, 2008. In terms of Section 4 of the PSS Act, no person other than the Reserve Bank of India (RBI) can commence or operate a payment system in India unless authorised by RBI. Reserve Bank has since authorised payment system operators of pre-paid payment instruments, card schemes, cross-border in-bound money transfers, Automated Teller Machine (ATM) networks and centralised clearing arrangements.

The Reserve Bank encouraged the setting up of National Payments Corporation of India (NPCI) to act as an umbrella organisation for operating various Retail Payment Systems (RPS) in India. NPCI became functional in early 2009. NPCI has taken over National Financial Switch (NFS) from Institute for Development and Research in Banking Technology (IDRBT). NPCI is expected to bring greater efficiency by way of uniformity and standardization in retail payments and expanding and extending the reach of both existing and innovative payment products for greater customer convenience.

## LITERATURE REVIEW

**Hogarth and Hilgert (2004)** highlighted that electronic banking technology represents a variety of different services, ranging from common ATM services and direct deposit to Automatic Bill Payment (ABP), Electronic Transfer of Funds (EFT) and computer banking (PC banking). The use of e-banking technologies had grown rapidly in the USA, while others have been adopting it slowly. The authors explored such factors that affect the adoption to adopt three e-banking technologies and changes in these factors over time. They suggested that e-banking technologies could not be aggregated into a single category, and thus, “one size fits all” would not work. The use of e-banking depends upon how it helps in saving time, decrease the errors, improving inaccurate accounting and preventing in manipulation of data.

**Ashiya (2006)** evaluated developments made by electronic payments. The author evaluated different modes of e-payment used across the globe. The main objective of the study was to find the current offerings and development provided by electronic payments. The author evaluated different modes of e-payment such as plastic cards, debit cards, credit cards, smart cards, electronic cheques etc. These electronic ways provided an excellent instrument for payment system. The author analyzed that security was the main concern among electronic payments. However, e-payment this sophisticated technology could be used as a tool for the enhancement of customer loyalty and business of banks as it had reduced the risk & cost and could increase the customer loyalty.

**Jain and Hundal (2006)** described the importance of mobile banking and barriers in the adoption of mobile banking. The paper examined the forces that can act as barriers in mobile banking service adoption. The objective of the study was to find the reasons why the people had not fully accepted the technology though it provided much advantage to the banking customers as compared to previous technologies. The paper attempted to identify the various barriers, viz. access problems, dissatisfaction and inability of service providers in the adoption of mobile banking services. The results of the study indicated that consumers got disheartened by the complicated function while accessing the mobile banking services which lead to rise in their dissatisfaction level, as no proper guidance was provided to them. The researchers suggested that service providers should be aware of the problems of their customers.

**Krishnamurthy (2006)** highlighted the advantages, risks, innovations and convenience involved in e-banking. ATM, telephone, internet and cluster banking helped banks to deliver the products more effectively. The author, in his paper, also described operational efficiency of e-banking. It

included basic e-banking, simple transactional and advanced transactional e-banking. Each site offered a differential kind of services to customers. The author also commented upon some risks such as loss of secrecy of the customers, financial stability, fraud prone possibilities, eruption of legal claims, etc. So, the author suggested that banks should adopt such a strategy in which risks and innovation in banking products move parallel and simultaneously.

**Raghvan (2006)** highlighted the transformation in the banking sector due to effect of information technology, tele-communication and electronic data processing. He also attempted to visualize the perception of banks in India in the year 2020 taking into account the impact of internet banking, ATMs, EFT on the performance of banks and initiative taken in liberalization, privatization and globalization. He also evaluated the future of online and internet banking. Due to tangible and proven benefits, automation of manual processes; online and internet banking was slated to increase manifold. He also evaluated that currently an estimated 46 lakh net users were online and this was estimated to touch 160 lakh by March 2008. Furthermore, he analyzed the projected indicators of banks in India in 2020 with special emphasis on internet banking, online banking and electronic banking.

**Raja et al. (2008)** evaluated the impact of e-payment system on the business opportunities. They identified that due to the growth of internet users, various electronic payment mechanisms had been developed to cater the diversity of applicants. The researchers classified the e-payments into three main groups, namely, cash like systems, check like systems, and hybrid systems which were further classified into credit cards, debit cards and electronic cheques. They identified three main issues related to e-payment that were security issues, low interest among businessmen, and heavy reliance on traditional payment methods. They also analyzed that there were technical and cultural problems which hinder the path of e-payments. However, to make e-payments more effective, security threats should be reduced; and people should be realized that traditional payment methods were more time consuming than electronic payment methods. They should also be realized that plastic card payments were more convenient, easier and more secure than cash or cheques.

## **OBJECTIVE OF THE STUDY**

The objective of the paper is to find out the innovation in the field of payment system in India during the last one decade

## **RESEARCH METHODOLOGY**

The main source of data is of secondary type. The required data has been collected through RBI website, various journals and literature review.

## **INNOVATIVE PAYMENT SYSTEM**

The Reserve Bank has taken many initiatives towards introducing and upgrading safe and efficient modes of payment systems in the country to meet the requirements of the public at large. RBI has taken a number of steps to develop and implement innovative payment system in the country

**1. Paper-based Payments:** Use of paper-based instruments (like cheques, drafts, and the like) accounts for nearly 60% of the volume of total non-cash transactions in the country. In value terms, the share is presently around 11%. This share has been steadily decreasing over a period of time and electronic mode gained popularity due to the concerted efforts of Reserve Bank of India to popularize the electronic payment products in preference to cash and cheques. Since paper based payments occupy an important place in the country, Reserve Bank had introduced Magnetic Ink Character Recognition (MICR) technology for speeding up and bringing in efficiency in processing of cheques. Recent developments in paper-based instruments include launch of Speed Clearing (for local clearance of outstation cheques drawn on core-banking enabled branches of banks), introduction of cheque truncation system (to restrict physical movement of cheques and enable use of images for payment processing), framing CTS-2010 Standards (for enhancing the security features on cheque forms) and the like. Table-1 reveals that over the years the use of MICR clearing has been reduced because of paperless transactions.

**2. Table-1: Position of MICR Clearing**

3. Year	4. MICR Clearing			
	5. Volume (Million)	6. Index	7. Value (Rupees Billion)	8. Index
9. 2015-16	10. NA	11.	12. NA	13.
14. 2014-15	15. 22.43	16. 2	17. 1,850.40	18. 1.95
19. 2013-14	20. 440.07	21. 43	22. 30942.81	23. 32.66
24. 2012-13	25. 823.31	26. 80	27. 57503.97	28. 60.69
29. 2011-12	30. 934.89	31. 91	32. 65093.26	33. 68.70
34. 2010-11	35. 115.52	36. 11	37. 830.11	38. 0.88
39. 2009-10	40. 1149.72	41. 111	42. 85315.18	43. 90.05
44. 2008-09	45. 1163.85	46. 113	47. 104082.44	48. 109.86
49. 2007-08	50. 1222.97	51. 119	52. 115286.92	53. 121.68
54. 2006-07	55. 1,144.09	56. 111	57. 1,04,354.37	58. 110.14
2005-06	1031.84	100	94743.72	100
Total	8048.69		660003.17	
Average	804.87		66000.32	

**59. Online Banking:** Also known as internet banking, e-banking or virtual banking, is an electronic payment system that enables customers of a bank or other financial institution to conduct a range of financial transactions through the financial institution's website. The online banking system will typically connect to or be part of the core banking system operated by a bank and is in contrast to branch banking which was the traditional way customers accessed banking services.

The customer visits the financial institution's secure website, and enters the online banking facility using the customer number and credentials previously set up. The types of financial transactions which a customer may transact through online banking are determined by the financial institution, but usually includes obtaining account balances, a list of the recent transactions, electronic bill payments and funds transfers between a customer's or another's accounts. Most banks also enable a customer to download copies of bank statements, which can be printed at the customer's premises (some banks charge a fee for mailing hard copies of bank statements). Some banks also enable customers to download transactions directly into the customer's accounting software. The facility may also enable the customer to order a cheque book, statements, report loss of credit cards, stop payment on a cheque, advice change of address and other routine actions.

**60. Electronic Clearing Service (ECS) Credit:** The Bank introduced the ECS (Credit) scheme during the 1990s to handle bulk and repetitive payment requirements (like salary, interest, dividend payments) of corporate and other institutions. ECS (Credit) facilitates customer accounts to be credited on the specified value date and is presently available at all major cities in the country.

**61.** During September 2008, the Bank launched a new service known as National Electronic Clearing Service (NECS), at National Clearing Cell (NCC), Mumbai. NECS (Credit) facilitates multiple credits to beneficiary accounts with destination branches across the country against a single debit of the account of the sponsor bank. The system has a pan-India characteristic and leverages on Core Banking Solutions (CBS) of member banks, facilitating all CBS bank branches to participate in the system, irrespective of their location across the country. It can be observed through Table-2 that how ECS Credit transactions have increased over the years both in volume and value. Value has increased much faster than volume.

**Table-2: Position of ECS CR (includes NECS))**

Year	ECS CR (includes NECS)			
	Volume (Million)	Index	Value (Rupees Billion)	Index
2015-16	39.00	97	1059.44	525
2014-15	115.35	288	2,019.14	1001
2013-14	152.54	381	2492.19	1235
2012-13	122.18	305	1771.28	878

2011-12	121.5	303	1837.85	911
2010-11	117.31	293	1816.86	900
2009-10	98.14	245	1176.13	583
2008-09	88.4	221	974.86	483
2007-08	85.88	214	8066.03	3997
2006-07	107.40	268	1,592.72	789
2005-06	44.23	110	323.25	160
2004-05	40.07	100	201.79	100
Total	1132.00		23331.54	
Average	94.33		1944.29	

**62. Electronic Clearing Service (ECS) Debit:** The ECS (Debit) Scheme was introduced by RBI to provide a faster method of effecting periodic and repetitive collections of utility companies. ECS (Debit) facilitates consumers / subscribers of utility companies to make routine and repetitive payments by ‘mandating’ bank branches to debit their accounts and pass on the money to the companies. This tremendously minimises use of paper instruments apart from improving process efficiency and customer satisfaction. There is no limit as to the minimum or maximum amount of payment. Table-3 shows that how fast both volume and value has been increased in ECS-Debit. It shows the increasing habits of customers for their routine payment collection.

**Table-3: Position of ECS DR**

Year	ECS DR			
	Volume (Million)	Index	Value (Rupees Billion)	Index
2015-16	224.75	1469	1651.50	5653.9
2014-15	226.01	1477	1,739.78	5956.1
2013-14	192.91	1261	1267.96	4340.9
2012-13	176.53	1154	1083.10	3708.0
2011-12	164.74	1077	833.84	2854.6
2010-11	156.74	1024	736.48	2521.3
2009-10	149.29	976	695.24	2380.1
2008-09	160.06	1046	669.76	2292.9
2007-08	145.17	949	604.55	2069.7
2006-07	123.99	810	564.21	1931.6
2005-06	35.95	235	129.86	444.6
2004-05	15.3	100	29.21	100.0

Total	1771.45		10005.50	
Average	147.62		833.79	

### 63.National Electronic Funds Transfer (NEFT) System

In November 2005, a more secure system was introduced for facilitating one-to-one funds transfer requirements of individuals / corporate. Available across a longer time window, the NEFT system provides for batch settlements at hourly intervals, thus enabling near real-time transfer of funds. Certain other unique features viz. accepting cash for originating transactions, initiating transfer requests without any minimum or maximum amount limitations, facilitating one-way transfers to Nepal, receiving confirmation of the date / time of credit to the account of the beneficiaries, etc., are available in the system. Table-4 shows the tremendous growth in both volume and value of EFT/NEFT use. People have started to make all types of payments through this method.

**Table-4: Position of EFT/NEFT**

Year	EFT/NEFT			
	Volume (Million)	Index	Value (Rupees Billion)	Index
2015-16	1252.88	48561	83273.11	15251
2014-15	927.55	35951	59,803.83	10953
2013-14	661.01	25620	43785.52	8019
2012-13	394.13	15276	29022.42	5315
2011-12	226.1	8764	17903.49	3279
2010-11	132.33	5129	9391.49	1720
2009-10	66.34	2571	4095.09	750
2008-09	32.17	1247	2519.56	461
2007-08	73.26	2840	6263.14	1147
2006-07	93.65	3630	6,460.17	1183
2005-06	3.07	119	612.86	112
2004-05	2.58	100	546.01	100
Total	3865.06		263676.69	
Average	322.09		21973.06	

**64. Real Time Gross Settlement (RTGS) System:** RTGS is a funds transfer systems where transfer of money takes place from one bank to another on a "real time" and on "gross" basis. Settlement in "real time" means payment transaction is not subjected to any waiting period. "Gross settlement" means the transaction is settled on one to one basis without bunching or netting with any other transaction. Once processed, payments are final and irrevocable. This was introduced in 2004 and settles all inter-bank payments and

customer transactions above `2 lakh. Table-5 shows that how RTGS has been successful for payment of large amount. Volume has been increased multifold as compared to value.

**Table-5: Position of RTGS**

Year	RTGS			
	Volume (Million)	Index	Value (Rupees Billion)	Index
2015-16	98.34	21379	1035551.64	2547
2014-15	92.78	20170	9,29,332.89	2286
2013-14	81.11	17632	904968.04	2226
2012-13	68.52	14895	1026350.05	2524
2011-12	55.05	11967	1079790.58	2656
2010-11	49.28	10713	941039.33	2314
2009-10	33.27	7233	1011699.31	2488
2008-09	13.38	2909	611399.12	1504
2007-08	5.86	1274	482945.59	1188
2006-07	3.88	843	2,46,191.83	605
2005-06	1.77	385	115408.36	284
2004-05	0.46	100	40661.83	100
Total	503.70		8425338.57	
Average	41.98		702111.55	

**65. Clearing Corporation of India Limited (CCIL):** CCIL was set up in April 2001 by banks, financial institutions and primary dealers, to function as an industry service organisation for clearing and settlement of trades in money market, government securities and foreign exchange markets.

The Clearing Corporation plays the crucial role of a Central Counter Party (CCP) in the government securities, USD –INR forex exchange (both spot and forward segments) and Collateralised Borrowing and Lending Obligation (CBLO) markets. CCIL plays the role of a central counterparty whereby, the contract between buyer and seller gets replaced by two new contracts - between CCIL and each of the two parties. This process is known as 'Novation'. Through novation, the counterparty credit risk between the buyer and seller is eliminated with CCIL subsuming all counterparty and credit risks. In order to minimize the risks, that it exposes itself to, CCIL follows specific risk management practices which are as per international best practices. In addition to the guaranteed settlement, CCIL also provides non guaranteed settlement services for National Financial Switch (Inter bank ATM transactions) and for rupee derivatives such as Interest Rate Swaps.



CCIL is also providing a reporting platform and acts as a repository for Over the Counter (OTC) products.

**66. Pre-paid Payment Systems:** Pre-paid instruments are payment instruments that facilitate purchase of goods and services against the value stored on these instruments. The value stored on such instruments represents the value paid for by the holders by cash, by debit to a bank account, or by credit card. The pre-paid payment instruments can be issued in the form of smart cards, magnetic stripe cards, internet accounts, internet wallets, mobile accounts, mobile wallets, paper vouchers, etc. Subsequent to the notification of the PSS Act, policy guidelines for issuance and operation of prepaid instruments in India were issued in the public interest to regulate the issue of prepaid payment instruments in the country. The use of pre-paid payment instruments for cross border transactions has not been permitted, except for the payment instruments approved under Foreign Exchange Management Act, 1999 (FEMA).

**67. Debit Card:** A debit card (also known as a bank card or check card) is a plastic payment card that can be used instead of cash when making purchases. It is similar to a credit card, but unlike a credit card, the money comes directly from the user's bank account when using a debit card.

Some cards may bear a stored value with which a payment is made, while most relay a message to the cardholder's bank to withdraw funds from a payer's designated bank account. In some cases, the primary account number is assigned exclusively for use on the Internet and there is no physical card. Table-6 explains that how over the time the use of debit card has been increased particularly a huge jump can be seen in 2011-12. These figures show that now it has become a common practice to use debit card.

**Table-6: Position of Debit Cards**

Year	Debit Cards			
	Volume (Million)	Index	Value (Rupees Billion)	Index
2015-16	9247.00	22260	26960.63	50281
2014-15	7,804.57	18788	23,492.65	43813
2013-14	6707.10	16146	20602.86	38424
2012-13	5775.25	13903	17426.39	32500
2011-12	5409.45	13022	14532.04	27102
2010-11	237.063	571	386.9066	722
2009-10	170.169	410	264.1811	493
2008-09	127.654	307	185.4714	346
2007-08	155.486	374	240.8017	449

2006-07	182.74	440	295.74	552
2005-06	45.686	110	58.9714	110
2004-05	41.533	100	53.6105	100
<b>Total</b>	<b>35903.70</b>		<b>104500.25</b>	
<b>Average</b>	<b>2991.98</b>		<b>8708.35</b>	

**68. Credit Card:** A credit card is a [payment card](#) issued to users (cardholders) as a method of [payment](#). It allows the cardholder to pay for [goods and services](#) based on the holder's promise to pay for them. The [issuer](#) of the card (usually a bank) creates a [revolving account](#) and grants a [line of credit](#) to the cardholder, from which the cardholder can borrow money for payment to a [merchant](#) or as a [cash advance](#). Table-7 shows that there is an increasing trend towards use of credit card but still people prefer to use debit card instead of credit card.

**Table-7: Position of Credit Cards**

Year	Credit Cards			
	Volume (Million)	Index	Value (Rupees Billion)	Index
2015-16	791.67	611	2437.02	949
2014-15	619.41	478	1,922.63	748
2013-14	512.03	395	1556.72	606
2012-13	399.23	308	1244.27	484
2011-12	322.16	249	978.72	381
2010-11	265.16	205	755.16	294
2009-10	234.25	181	618.23	241
2008-09	259.63	201	653.54	254
2007-08	228.21	176	579.85	226
2006-07	169.55	131	413.62	161
2005-06	156.09	121	338.86	132
2004-05	129.48	100	256.88	100
<b>Total</b>	<b>4086.88</b>		<b>11755.49</b>	
<b>Average</b>	<b>340.57</b>		<b>979.62</b>	

**69. Mobile banking:** It is a service provided by a [bank](#) or other [financial institution](#) that allows its customers to conduct a range of [financial transactions](#) remotely using a [mobile device](#) such as a [mobile phone](#) or [tablet](#), and using software, usually called an [app](#), provided by the financial institution for the purpose. Mobile banking is usually available on a 24-hour basis. Some financial institutions have restrictions on which accounts may be accessed through mobile banking, as well as a limit on the amount that can be transacted. Table-8 explains that how mobile banking is becoming popular in the country. Particularly young generation use mobile banking extensively.

**Table-8: Position of Mobile Banking**

Year	Mobile Banking			
	Volume (Million)	Index	Value (Rupees Billion)	Index
2015-16	389.49	1524	4040.91	22203
2014-15	171.92	673	1,035.30	5688
2013-14	94.71	371	224.18	1232
2012-13	53.30	209	59.90	329
2011-12	25.56	100	18.2	100
<b>Total</b>	<b>734.99</b>		<b>5378.49</b>	
<b>Average</b>	<b>147.00</b>		<b>1075.70</b>	

**70. Mobile Wallet:** Mobile wallets are a novel concept. Despite certain commercial rollouts, especially in the Far East ([Osaifu Keitai](#) in Japan and [Smart Wallet](#) in South Korea), as well as in the US ([Softcard](#), [Google Wallet](#), [Passbook by Apple](#) and so forth) and Europe ([Vodafone Wallet](#), [V.me](#), [MasterPass](#)), mobile wallets are still in an early stage of market introduction. On the one hand, the current market situation offers various opportunities and growth potential for early movers. On the other, the market is still experiencing a lack of standardized processes and implemented solutions. Table-9 explains that how m-Wallet has become so popular in the country within short span of time.

**Table-9: Position of m-Wallet**

Year	m-Wallet			
	Volume (Million)	Index	Value (Rupees Billion)	Index
2015-16	603.98	1847	205.84	2056
2014-15	255.00	780	81.84	818
2013-14	107.51	329	29.05	290
2012-13	32.70	100.00	10.01	100.00
<b>Total</b>	<b>999.19</b>		<b>326.74</b>	
<b>Average</b>	<b>249.80</b>		<b>81.69</b>	

**71. Automated Teller Machine (ATM):** On most modern cash machines, the customer is identified by inserting a plastic [ATM card](#) with a [magnetic stripe](#) or a plastic [smart card](#) with a [chip](#) that contains a unique card number and some security information such as an expiration date or [CVVC](#) (CVV). Authentication is provided by the customer entering a [personal identification number](#) (PIN).

Using a cash machine, customers can access their bank deposit or credit accounts in order to make a variety of transactions such as [cash](#) withdrawals, check balances, or credit mobile phones. If the currency being withdrawn from the cash machine is different from that in which the bank account is denominated the money will be converted at an official [exchange rate](#). Thus, cash machines often provide the best possible exchange rates for foreign travellers, and are widely used for this purpose.

**Table-10: Position of ATMs**

Year	Number of ATMs (in actuals)	
	Volume (Million)	Index
2015-16	2415350.00	240
2014-15	21,24,484.00	211
2013-14	1606234.00	159
2012-13	1240159.00	123
2011-12	1008047	100
<b>Total</b>	<b>8394274.00</b>	
<b>Average</b>	<b>1678854.80</b>	

**72. Point of Sale (POS):** The **point of sale (POS)** or **point of purchase (POP)** is the time and place where a retail transaction is completed. At the point of sale, the merchant would calculate the amount owed by the customer and indicate the amount, and may prepare an [invoice](#) for the customer (which may be a cash register printout), and indicate the options for the customer to make payment. It is also the point at which a customer makes a payment to the merchant in exchange for goods or after provision of a service. After receiving payment, the merchant may issue a [receipt](#) for the transaction, which is usually printed, but is increasingly being dispensed with or sent electronically. Table-11 shows that how point of sale(POS) have been increased within five years of period. People are becoming habitual for payment on POS

**Table-11: Position of POS**

Year	Volume (Million)	Index
2015-16	14803585	201
2014-15	13143712	178
2013-14	11837259	161
2012-13	9012515	122

2011-12	7364225	100
<b>Total</b>	<b>56161296</b>	
<b>Average</b>	<b>11232259</b>	

## CONCLUSION

It can be concluded that the innovations in the field of payment have made the banking completely changed. Customers particularly the young generations are now habitual of using these innovative methods for their payment and receipt transactions. Almost all the innovative methods have increased both in volume as well as in value over the period of time and it can be expected to increase with much higher speed in the future. Today banking is altogether different than to 20<sup>th</sup> century banking. As 70% of Indian population reside in the rural area and hence they are not techno savvy as a result this portion of public use less type of innovative payment system but it can be expected that the use of these innovative methods will further increase in near future because people are becoming habitual of these user friendly methods.

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