Growth of Digital Payments in India

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Abstract

India is world's second largest nation with a population of 1.3 billion, which is approximately 18% of the global population. To meet the financial service needs of a growing population requires a sustainable approach in the form of digital payment system. Digital payment services offer convenience, ease of transactions and security while transacting. This analytical study focuses on growth of digital payments with respect to its volume and value of transactions during the period 2012-2013 to 2018-2019. This study reports positive growth in terms of actual volume (24.11%) and value (15.84%) of overall digital payments in the country over the last 7 years. Further, the country is expected to generate 28,000 lakh transactions exceeding INR 15,20,000 billion in digital transactions in 2020-2021.

Keywords: *Payment & Settlement system, Digital Payment, Retail payment, Cashless economy*

Introduction and execution of the study

India's financial system is continuously evolving with the help of emerging technologies to make online transactions easier, safer, accessible and more personalized for customers. It is also becoming more agile and efficient. The development and modernization of the payment system has resulted in transparency and accountability, reduced transaction costs, and has decreased the size of the informal economy. Further, it has reduced overall corruption and boosted economic growth, especially in India's rural areas. The financial sector in India has undergone significant reforms during the last three decades. The transformation of financial services started during the 1990s with increased emphasis on deregulation, competition, and adoption of international best practices. The Reserve Bank of India (RBI) set out its objectives in 1998 with monograph on Payment Systems in India and provided a roadmap for the consolidation, development and integration of the country's payment systems (Payment System Vision Document for 2001–04). Further, Payment and Settlement Systems Act was implemented in 2007 with the objective of ensuring the safe, secure, sound, efficient, accessible and authorized payment and settlement system in the country. Gaining positive experience in the payments system during different vision periods, the RBI provided a roadmap to ensure benefits of a structured modern payment and settlement system, including innovative products, to reach beyond the currently served target groups thereby facilitating greater financial inclusion (Vision Document 2012-15). In 2015, Government of India launched a flagship programme titled 'Digital India' with the aim to transform India into a digitally empowered society and knowledge economy. “Faceless, Paperless, Cashless” is one part of the role of Digital India. The positive outcomes of the developments during the period 2015-2018 include introduction of new and innovative systems, distinctive shift from paper to electronic payment modes, sizeable increase in transaction turnover, customer centric initiatives, international recognition, etc. Other government measures that have promoted digital usage are demonetisation of high denomination currency notes in 2016 and the enactment of Goods and Services Tax legislation in 2017. Presently, various modes of digital payments are available in the country, namely Real Time Gross Settlement (RTGS), CCIL operated systems, Electronic Clearing Services (ECS), Unified Payment Interface (UPI), National Automated Clearing House (NACH), National Electronic Fund Transfer (NEFT), Aadhaar-enabled Payment System (AePS), Internet banking, Card payments, Mobile Wallet, Cheque Truncation System (CTS), Immediate Payment Service (IMPS), Prepaid payment Cards, and Mobile banking. Under the Payment Systems Vision 2019-21, there was emphasis on innovation, cyber security, financial inclusion, customer protection and competition. Presently, the global Covid'19 pandemic has influenced the shift towards digital payments and also increased the adoption rate of digital channels. In the current situation and as a result of the lockdown, the usage of digital payment systems in India is higher (75%) than China (63%) and Italy (49%) whereas the global average stood at 45 per cent (Capgemini Institute; 2020). So, there is an importance to measure the growth of digital payment services in the country.

Objectives of the Study

- To find out the overall growth of digital payments in India
- To assess and analyse the difference in growth across the categories of digital payments

Hypotheses of the Study

- Ho: There exists lesser growth in digital payments
- Ho: There is no significant difference in the growth rate across the categories of digital payments.

Review of Literature

Rajat Deb (2020) studied the impact of using pre and post mobile-apps with household saving-spending behaviour. This study reported nearly 50 percent increase in saving and spending decisions in post-mobile-app use than the pre mobile-app use.
Ravikumar et al. (2019) in their study, analysed the impact of digital payments on economic growth in terms of real Gross Domestic Product (GDP). The authors reported that among the various digital payment modes, only retail electronic payment positively impacts the real GDP significantly in the short-run, but in the long run, retail electronic payments don't impact the real GDP. Further, digital payments at large and retail electronic payments don't contribute to economic growth in India directly in the long run.

According to Richard Reisman (2019), pricing is the most important challenge of digital media based business for the consumer market. The author noted that FairPay (Fair price) is a repeated game between buyer and seller. Moreover, Fairpay is a new logic to solve the issues because it makes better changes in modern Business to Consumer (B2C) market.

David et al. (2018) examined the importance of Distributed Ledger Technology (DLT) in the area of payments and settlement system along with opportunities, challenges associated with its long-term implementation and adoption. This study concluded that it is possible to use DLT in payments, clearing and settlement including cross border payments, transfer and record the ownership of digital assets, immutably and securely store information, provide for identity management and other evolving operations through peer-to-peer networking.

Jubair and Yakoob (2017) in their descriptive and analytical study, analyse the awareness and adoption of digital wallets in urban and rural areas. This study reveals that around 2/5th of the people are aware about digital wallets both in urban and rural areas, but adoption and usage of digital wallet services is higher in urban areas than in rural areas.

Shendge, Shelar and Kapase (2017) reported that when India becomes a cashless economy, there will be both positive and negative impact, but negative impact can be overlooked if the gain from positive impact is considered.

Padashetty and Krishna Kishore (2013) concluded that perceived ease of use, trust, expressiveness and perceived use has been influenced to adoption of digital payment system, in particular, mobile payment.

Hasan et al. (2012) in their study, examine the relationship between retail payments and overall economic growth during the study period 1995-2009 in the European region. This study reported that migration to electronic retail payments stimulates overall economic growth, consumption as well as trade. Among various retail payment instruments, this relationship is strongest for card payments, followed by credit transfers and direct debits.

Papadopoulos (2007) agreed that new technologies in electronic money (e-money) provide novel solutions, increase convenience and reduce costs, whereas in retail payments, suggests the possibility of a society with minimal use of cash. Even though cash remains important because it has an established position, it is anonymous, non-exclusive and still the cheapest medium for small value transactions.

Methods and Materials

This study analyses the overall growth of digital payments in India and also growth of selected categories during the seven financial years from 2012-2013 to 2018- 2019. To analyse the growth performance during the period under study, both volume and value of transactions of seven different parameters have been taken into account, namely, RTGS customer transactions, CTS, IMPS, Debit and Credit Card, M-Wallet and PPI Cards. Secondary data for the period under study has been collected from reports published by Reserve Bank of India, Ministry of Electronic and Information Technology and other Government agencies. Mean, Compound Growth Rate (CGR), Co-efficient of Variation (CV), Annual Growth Rate (AGR), straight line trend, Kruskal Wallis $\chi 2$ test and post-hoc comparison test were applied to draw the inference of the study.

Limitations of the Study

This study has taken only seven categories of digital payment mediums to measure the growth performance during the study period.

Analysis And Discussions

Overall Growth of Digital Payments in India

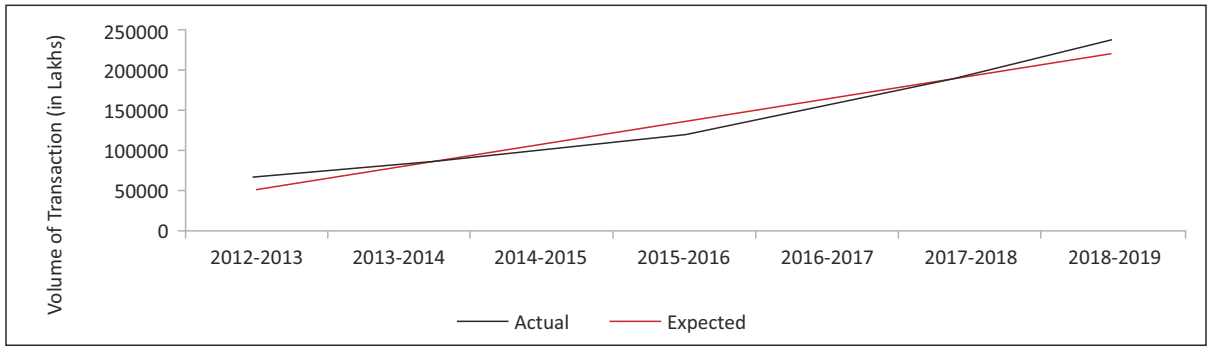
Table 1 shows the overall growth of digital payments according to volume and value of transactions.

Table 1: Overall Growth of Digital Payments in India

	Digital Payments in India	
Reference Period	**Volume of Transactions(in lakhs)**	**Value of Transactions (Rs. In crores)**
2012-2013	65,812	553,51,198
2013-2014	80,353	640,61,822
2014-2015	98,695	724,00,501
2015-2016	120,593	802,26,850
2016-2017	157,412	959,12,592
2017-2018	190,858	1164,68,676
2018-2019	236,484	1329,05,595
2019-2020*	248,850	1397,59,460
2020-2021*	277,126	1526,51,924
Mean	135,744	881,89,605
CV (%)	45.82	32.18
CGR (%)	24.11	15.84
*Forecast		

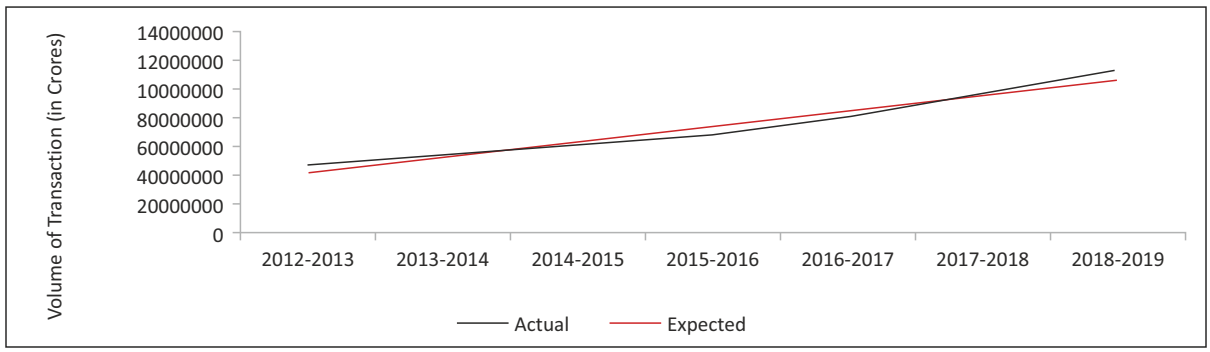
For year-on-year basis, Table 1 indicates that there is a gradually increasing trend of digital payments in India both in terms of volume and value of transactions. On an average, 135,744 lakhs volume of transactions (CV 45.82%) brings the digital payment value to INR 881,896.05 billion (CV 32.18%) per year across the study period. The Compound Growth Rate for the study period 2012-2013 to 2018-2019 indicates volume growth rate of transactions at 24.11% and value growth rate of transactions at 15.84% of the country's digital payment system. Moreover, the growth of digital payments is likely to be nearly 28,000 lakhs in terms of volume of transactions and INR 1526,519 billion in terms of value of transactions in 2020-2021 with growth rate of 17.19 percent and 14.86 percent respectively over the year 2018-2019. The actual overall growth rate of digital payment transactions in terms of volume is lower than expected during the study period 2014-2015 to 2017-2018. It started an upward trend since 2018-19 (refer to Figure 1). The actual overall growth rate of digital payment transactions in terms of value of transactions was higher than expected during the periods 2012-13 and 2013-14, whereas it has seen an increasing trend since 2017-2018 (refer to Figure 2).

Figure 1: Growth Movement in Volume of Transactions in Digital Payments



Source: Reports from Reserve Bank of India

Figure 2: Growth Movement in Value of Transactions in Digital Payments



Source: Reports from Reserve Bank of India

Growth movement of Digital Payments across categories

Table 2 shows the average growth in volume and value of digital payment transactions across the categories for the reference period 2012-2013 to 2018-2019.

Table 2: Growth of Digital Payments across categories

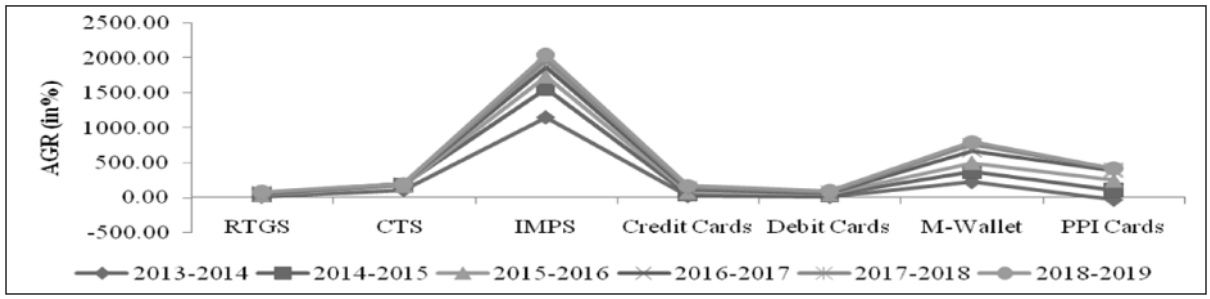
	Volume of Transactions (in lakh)		Value of Transactions (Rs. In crore)	
Mode	**Mean**	**CGR (%)**	**Mean**	**CGR (%)**
RTGS Customer Transactions	971.93	12.41	78422569	15.37
Cheque Truncation System (CTS)	8787.50	22.26	6259320	20.44
Immediate Payment Service (IMPS)	5121.72	213.93	446401	257.16
Credit Cards	9430.24	28.79	302543	30.6
Debit Cards	95308.32	16.18	2685933	13.43
M-Wallet	13992.05	127.73	54035	142.05
PPI Cards	2132.11	72.46	18805	48.44

Source: Reports from Reserve Bank of India

Table 2 explains that the maximum contribution on average growth performance of digital payments in terms of volume of transactions takes place by the way of debit cards, M-Wallet and credit card payments, whereas maximum contribution on the average growth performance of digital payments takes place by the way of RTGS, CTS and Debit cards. Over the past seven years, both volume and value of digital payment transactions have grown multi-fold. Therefore, the CGR across the categories of digital payments for the period 2012-2013 to 2018-2019 indicates positive growth in the country, both in terms of volume and value of digital payment transactions. Among various categories of digital payments, both IMPS and M-Wallet services have the highest growth rate as compared to other categories of digital payments in terms of both the aspects during the study period.

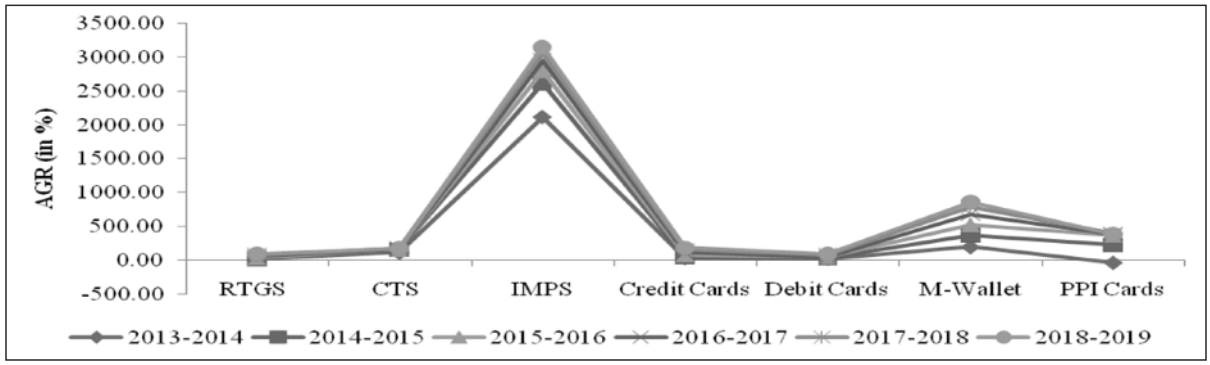
For visual representation, the annual growth rate in volume and value of digital payments among various categories is given in Figures 3 and 4.

Figure 3: Growth Rate in Volume of Transactions across Categories of Digital Payments



Source: Reports from Reserve Bank of India

Figure 4: Growth in Value of Transactions across Categories of Digital Payments



Source: Reports from Reserve Bank of India

Growth rate in Volume of Transactions across categories of Digital Payments

Ho: There is no significant difference in the growth rate of volume of transactions across the categories of digital payments.

Table 3: Mean Ranks in Volume of Digital Payment Transactions

Digital Payments	Mean Rank	
RTGS	10.50	χ^2 23.993**
CTS	13.00	df = 6
IMPS	35.33	p<0.01
Credit Card	21.83	
Debit Card	13.50	
M-Wallet	33.83	
PPI Cards	22.50	

** Sig. at 1% level; *Sig. at 5% level; NS = Not Significant

Source: Reports from RBI

From Table 3, it is inferred that the calculated value of Kruskal Wallis test (χ2 23.993**;p<0.01; df 6) is statistically significant at 1% level. Hence, the null hypothesis is rejected. It indicates that there is a significant difference in the growth rate of volume of transactions across the categories of digital payments.

Difference in Growth Rate in Volume of Transactions across the categories of Digital Payments

Post-hoc analysis has been conducted in order to compare the category-wise difference in growth performance for the study period. The detailed picture is given in Table 4.

Table 4: Category-wise comparison in Growth Rate in Volume of Digital Payments

Sample1 - Sample 2	Mean Rank Difference	Std. Error	Std. Test Statistic	Result
RTGS - CTS	-2.500	7.083	0.353^{NS}	Here, the calculated values are statistically not significant at 5% level. Therefore, null hypothesis is accepted. It is reported that the growth rate in volume of transactions is the same across these categories of digital payments.
RTGS - Debit card	-3.000	7.083	0.424^{NS}	
RTGS - Credit Card	-11.330	7.083	1.600^{NS}	
RTGS - PPI Cards	-12.000	7.083	1.694^{NS}	
RTGS - M-Wallet	-23.330	7.083	3.294**	Here, the calculated values are statistically significant. Therefore, null hypothesis is rejected. It indicates that the growth rate in volume of transactions is different across these categories of digital payments.
RTGS - IMPS	-24.830	7.083	3.506**	
CTS - Debit Card	-0.500	7.083	0.071^{NS}	Here, the calculated values are statistically not significant at 5% level. Therefore, null hypothesis is accepted. It is concluded that the growth rate in volume of transactions is the same across these categories of digital payments.
CTS - Credit Card	-8.833	7.083	1.247^{NS}	
CTS - PPI Cards	-9.500	7.083	1.341^{NS}	
CTS - M-Wallet	-20.833	7.083	2.941**	Here, the calculated value is statistically significant at 1% level. Therefore, null hypothesis is rejected. It indicates that the growth rate in volume of transactions is different within these categories of digital payments.
CTS - IMPS	-22.333	7.083	3.153**	

Sample1 - Sample 2	Mean Rank Difference	Std. Error	Std. Test Statistic	Result
Debit Card - Credit Card	8.333	7.083	1.177^{NS}	Here, the calculated values are statistically not significant at 5% level. Therefore, null hypothesis is accepted. It is concluded that the growth rate in volume of transactions is the same across these categories of digital payments.
Debit Card - PPI Cards	-9.000	7.083	1.271^{NS}	
Debit Card - M-Wallet	-20.333	7.083	2.871**	Here, the calculated value is statistically significant at 1% level. Therefore, null hypothesis is rejected. It indicates that the growth rate in volume of transactions is different across these categories of digital payments
Debit Card - IMPS	21.833	7.083	3.083**	
Credit Card - PPI Cards	-0.667	7.083	0.094^{NS}	Here, the calculated values are statistically not significant at 5% level. Therefore, null hypothesis is accepted. It is reported that the growth rate in volume of transactions is the same across these categories of digital payments.
Credit Card - M-Wallet	-12.000	7.083	1.694^{NS}	
Credit Card - IMPS	13.500	7.083	1.906^{NS}	
PPI Cards - M-wallet	11.333	7.083	1.600^{NS}	
PPI Cards - IMPS	12.833	7.083	1.812^{NS}	
M-Wallet - IMPS	1.500	7.083	0.212^{NS}	

** Sig. at 1% level; *Sig. at 5% level; NS = Not Significant

Source: Reports from RBI

Growth Rate in Value of Transactions across the categories of Digital Payments

Post-hoc analysis has been conducted in order to compare the category-wise difference in growth performance for the study period. The detailed picture is given in Table 5.

Ho: There is no significant difference in the growth rate of value of transactions across the categories of digital payments.

Table 5: Mean Ranks in Value of Digital Payment Transactions

Digital Payments	Mean Rank	
RTGS	13.50	χ^2 23.473** df = 6 p<0.01
CTS	13.33	
IMPS	36.00	
Credit Card	23.33	
Debit Card	14.17	
M-Wallet	34.17	
PPI Cards	16.00	

** Sig. at 1% level; *Sig. at 5% level; NS = Not Significant

Source: Reports from RBI

From Table 5, it is inferred that the calculated value of Kruskal Wallis test (χ2 23.473**;p<0.01; df 6) is statistically significant at 1% level. Hence, the null hypothesis is rejected. It indicates that there is a significant difference in the growth rate of value of transactions across the categories of digital payments.

Difference in Growth Rate in Value of Transactions across the categories of Digital Payments

Post-hoc analysis has been conducted in order to compare the category-wise difference in growth performance in value of transactions for the study period. The detailed picture is given in Table 6.

Table 6: Category-wise comparison in Growth Rate in Value of Digital Payments

Sample1 - Sample 2	Mean Rank Difference	Std. Error	Std. Test Statistic	Result
CTS - RTGS	0.167	7.083	0.024NS	Here, the calculated values are statistically not significant at 5% level. Therefore, null hypothesis is accepted. It is concluded that the growth rate in value of transactions is the same across these categories of digital payments.
CTS - Debit Card	-0.833	7.083	0.118 NS	
CTS - PPI Cards	-2.667	7.083	0.376 NS	
CTS - Credit Card	-10.000	7.083	1.412 NS	
CTS - M-Wallet	-20.833	7.083	2.941**	Here, the calculated values are statistically significant at 1% level. Therefore, null hypothesis is rejected. It indicates that the growth rate in value of transactions is different within these categories of digital payments.
CTS - IMPS	-22.677	7.083	3.200**	
RTGS - Debit card	-0.677	7.083	0.094 NS	Here, the calculated values are statistically not significant at 5% level. Therefore, null hypothesis is accepted. It is concluded that the growth rate in value of transactions is the same across these categories of digital payments.
RTGS - PPI Cards	-2.500	7.083	0.353 NS	
RTGS - Credit Card	-9.833	7.083	1.388 NS	
RTGS - M-Wallet	-20.667	7.083	2.918**	Here, the calculated values are statistically significant at 1% level. Therefore, null hypothesis is rejected. It indicates that the growth rate in value of transactions is different within these categories of digital payments.
RTGS - IMPS	-22.500	7.083	3.177**	
Debit Card - PPI Cards	-1.833	7.083	0.259 NS	Here, the calculated values are statistically not significant at 5% level. Therefore, null hypothesis is accepted. It is concluded that the growth rate in value of transactions is the same across these categories of digital payments.
Debit Card - Credit Card	9.167	7.083	1.294 NS	
Debit Card - M-Wallet	-20.000	7.083	2.824**	Here, the calculated values are statistically significant at 1% level. Therefore, null hypothesis is rejected. It indicates that the growth rate in value of transactions is different within these categories of digital payments.
Debit Card - IMPS	21.833	7.083	3.083**	
PPI Cards - Credit Card	7.333	7.083	1.035 NS	Here, the calculated value is statistically not significant at 5% level. Therefore, null hypothesis is accepted. It is concluded that the growth rate in value of transactions is the same across these categories of digital payments.
PPI Cards - M-wallet	18.167	7.083	2.565**	Here, the calculated values are statistically significant at 1% level. Therefore, null hypothesis is rejected. It indicates that the growth rate in value of transactions is different within these categories of digital payments.
PPI Cards - IMPS	20.000	7.083	2.824**	
Credit Card - M-Wallet	-10.833	7.083	1.530 NS	Here, the calculated values are statistically not significant at 5% level. Therefore, null hypothesis is accepted. It is concluded that the growth rate in value of transactions is the same across these categories of digital payments.
Credit Card - IMPS	12.667	7.083	1.788 NS	
M-Wallet - IMPS	1.833	7.083	0.259 NS	

** Sig. at 1% level; *Sig. at 5% level; NS = Not Significant

Source: Reports from RBI

Major Findings towards Difference in Growth Rate in Volume of Transactions

- There is no significant difference in the growth rate of volume of transactions in RTGS with growth rate on CTS, Debit card, Credit Card and PPI Cards for the reference period.
- There exists significant difference in the growth rate of volume of transactions in RTGS with growth rate of M-Wallet and IMPS for the reference period.
- There exists significant difference in the growth rate of volume of transactions in CTS with growth rate of IMPS and M-Wallet for the reference period.
- There is no significant difference in the growth rate of volume of transactions in CTS with growth rate on Debit card, Credit card and PPI Cards for the reference period
- There is no significant difference in the growth rate of volume of transaction in Debit card with growth rate of Credit card and PPI Cards for the reference period.
- There exists significant difference in the growth rate of volume of transactions in Debit card with growth rate of M-Wallet and IMPS for the reference period.
- There is no significant difference in the growth rate of credit card with growth rate of PPI Cards, M-Wallet and IMPS for the reference period.
- There is no significant difference in the growth rate of PPI Cards with growth rate of M-Wallet and IMPS for the reference period.
- There is no significant difference in the growth rate of M-wallet with growth rate of IMPS for the reference period.

Major Findings towards Difference in Growth Rate of Value of Transactions

- There is no significant difference in the growth rate of value of transactions in CTS with growth rate of RTGS, Debit Card, PPI Cards and Credit Card for the reference period.
- There exists significant difference in the growth rate of value of transactions in CTS with growth rate of M-Wallet and IMPS for the reference period.
- There is no significant difference in the growth rate of value of transactions in RTGS with growth rate of Debit Card, PPI Cards and Credit Card for the reference period.
- There exists significant difference in the growth rate of value of transactions in RTGS with growth rate of M-Wallet and IMPS for the reference period.
- There is no significant difference in the growth rate of value of transactions in Debit Card with growth rate of PPI Cards and Credit Card for the reference period.
- There exists significant difference in the growth rate of value of transactions in Debit Card with growth rate of IMPS and Credit Card for the reference period.
- There is no significant difference in the growth rate of value of transactions in PPI Cards with growth rate of Credit Card for the reference period.
- There exists significant difference in the growth rate of value of transactions in PPI Cards with growth rate of M-Wallet and IMPS and Credit Card for the reference period.
- There is no significant difference in the growth rate of value of transactions in Credit Card with growth rate of M-Wallet and IMPS for the reference period.
- There is no significant difference in the growth rate of value of transactions in M-Wallet with growth rate of IMPS for the reference period.

Conclusion

Digital payment systems are the connective tissue of every economic system, including India. It facilitates purchase of goods and services (payment of utility bills, insurance premiums, etc.) and sending money to friends, family, and business partners as well. It enables Governments to collect taxes and disburse social payments, and suppliers to collect payments from buyers. The overall digital payment transactions recorded significant growth in both volume and value terms at a Compound Growth Rate of 24.11% and 15.84% respectively. In India, the government's focus on reducing cash in the economy has resulted in a robust payment system with ensures safety and efficiency. It has led to phenomenal growth, in particular, in IMPS, M-Wallet and PPI Cards during the study period in terms of both volume and value measures. These mediums have proved to be game changers in digital payments, online payment platforms and fund transfers. With digital payment transactions being inexpensive and convenient, economic activity is quickly shifting to cash-less society.

Generalizability of the result

This study estimates digital payment transactions to achieve volume of 27.72 billion with INR value of 1,526 trillion in 2019-2021. This could attract investments from other advanced economies to India. However, the world economy itself is in collapse. With the Covid-19 pandemic disrupting lives and industries, the world is going to become contactless and digital payments are going to play a major role in helping people adjust to the new normal. Government decisions and initiatives are helping enhance the global digital payments space and the emphasis on moving towards a cashless economy is driving favourable regulations.

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