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Growth of Digital Payment System in India

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Development of smartphone technology, accessibility of internet data, internet penetration and increased investments in Fintech are blossoming throughout the world. The evolving intersection between monetary services and technology is described as Financial Technology Innovation in digital payment gateways from debit / credit cards to UPI based E Wallets have flourished E Commerce, online money transfer mechanism, insurance , brokerage, agriculture sector and so forth. In this research paper, the author elaborated on the driving force, growth and impact of Fintech in digital payment gateways. This paper also helps readers understand the sharing of prominent digital modes in the development of cashless, transparent logistics.

Keywords: Fintech, Digital Payments, E Wallets, Cashless

DIGITAL PAYMENT SYSTEM

Digital payments are cashless, with debit / credit / prepay card, QR scanning, E wallets and UPI payments, etc. Online payment transactions. Technological progress paved the way for digital payment methods to grow. Indians had 944 million debit cards, which could be used electronically for payment, in June 2018 according to the Indian Reserve Bank. In all areas, including digital payments, Fintech's smartphone technology sector, Internet penetration, low data accessibility, increased investments in fintech have been having a positive impact. E-commerce firms report using debit cards for payment purposes to 61 percent of customers. That shows clearly, that the use of debit cards in activities other than ATM retracts is convenient and many online retailers insist on payment of debit cards for high-value transactions which allow e-tailers to reach more. Digital payment will be the turning point in the domestic e-commerce market, according to experts in the industry, and the current trend of dominance of cash-on-payments will be reversed over the next five years. Increased spending by women and new Internet users from smaller cities were expected to reach $100 million by 2020, according to the Google report from India and the BCG. Reserve Bank of India is expected to change the game by introducing the Unified Payments Interface (UPI).[1] A near universal presence of mobile equipment and a rapidly growing use of P2P payments by mobile customers drive the global growth of international mobile payment services. The decision by Government to access the 24 X 7 non-tax NEFT facility has facilitated digital transactions. Given below are the growth engines which contributed development of digital payment gateways.

GROWTH DRIVERS OF DIGITAL PAYMENT GATEWAYS

With banks liberalization, Fintech began to evolve in India after 1990. Technologies like MICR, electronic transfers and other e-payments were increasingly being promoted. Yet implementation of technology was slow. The FinTech start-ups provided space for filling the gap. Between 2005 to 2013, firms like Oxigen, Mobikwik, Paytm and Freecharge joined in to help shift the economy towards electronic payments. FinTech developments have been held back by regulatory uncertainty and a conservative approach on the part of existing financial institutions and the government. Of late, however, regulations have been accommodative. Following are the crucial factors which contributed growth in Fintech in India and eventually resulted into digital gateways' mechanism.

GOVERNMENT'S INITIATIVES

The pro-start-up policies of the Government and the flexible regulatory conditions imposed by the Reserve Bank of India (RBI) are supporting Fintech sector growth during the FinTech 3.0 era. India has developed a strong FinTech incubation and growth network over the past five years. Indian Stack, comprising Trinity's JAM (Jan Dhan, Aadhaar & Mobile) and digital signage locker, has helped FinTechs build its companies a major boost. Banks and other financial institutions use technology either internally and as partners in a partnership to develop and update business processes and procedures (e.g. NPCI). This combined with the Aadhaar Enabled Payment Stack (AEPS), Unified Payment Interface (UPI), India Quick Response (QR),

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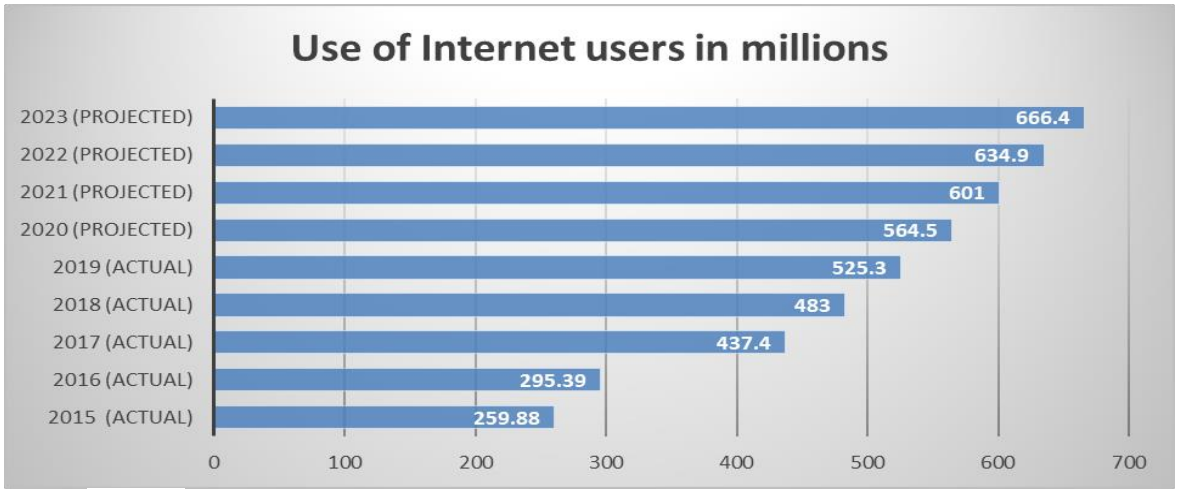
Immediate Payment Service (IMPS), National Automated Clearing House (NACH), Bharat Bill Pay (BBPS) & USSD–is one of the world's largest interoperable payment systems. After the GST roll-out, the digital adoption of companies, in particular SMEs, was increased. This makes it easier for FinTechs to provide SME loans quickly and easily. NITI Aayog is developing India's own Blockchain Network Indiachain. This speeds up the implementation of contracts, minimizes fraud and improves transparency while increasing operational efficiency and accuracy.

GROWTH IN INTERNET PENETRATION

I-Cube is the longest internet analysis in India and the Indian Internet marketing and marketing association (IAMAI). This Web includes details about market size, Internet penetration and acceptance and compliance with the Internet. This recognizes the main problems and factors for use and predicts potential drivers of development. This noted that the number of internet users in India has reported an annual growth of 18 percent, which ICUBE 2018 study monitors digital adoption and the use patterns in India. In the following table, the number of internet users has shown extra ordinary growth in some years.[2]

Year	Use of Internet users in millions	Actual / Projected Growth Rate
2015 (Actual)	259.88	---
2016 (Actual)	295.39	113.66
2017 (Actual)	437.4	168.31
2018 (Actual)	483	185.86
2019 (Actual)	525.3	202.13
2020 (Projected)	564.5	217.22
2021 (Projected)	601	231.26
2022 (Projected)	634.9	244.31
2023 (Projected)	666.4	256.43



Source: https://www.statista.com/statistics/255146/number-of-internet-users-in-india/

REVOLUTION OF SMART PHONE TECHNOLOGY

One of India's top trade bodies is The Associated Chambers of Industry and Commerce of India (ASSOCHAM). ASSOCHAM was set up in 1920 to establish an Indian business environment conducive to global competition. According to a joint report by ASSOCHAM-PwC, India is estimated to double the number of smartphone users in 2022, from 468 million users to 12.9 percent in 2017, to 859 million. In 2017 there were 468 million smartphones in the world, and by 2022 859 million users could be reached. Non-smartphone owners in India will decrease by CAGR by-7,4%, with more and more people choosing smartphones from 701 million in 2017 to 504 million by 2022. Due to the increase in smartphone users and

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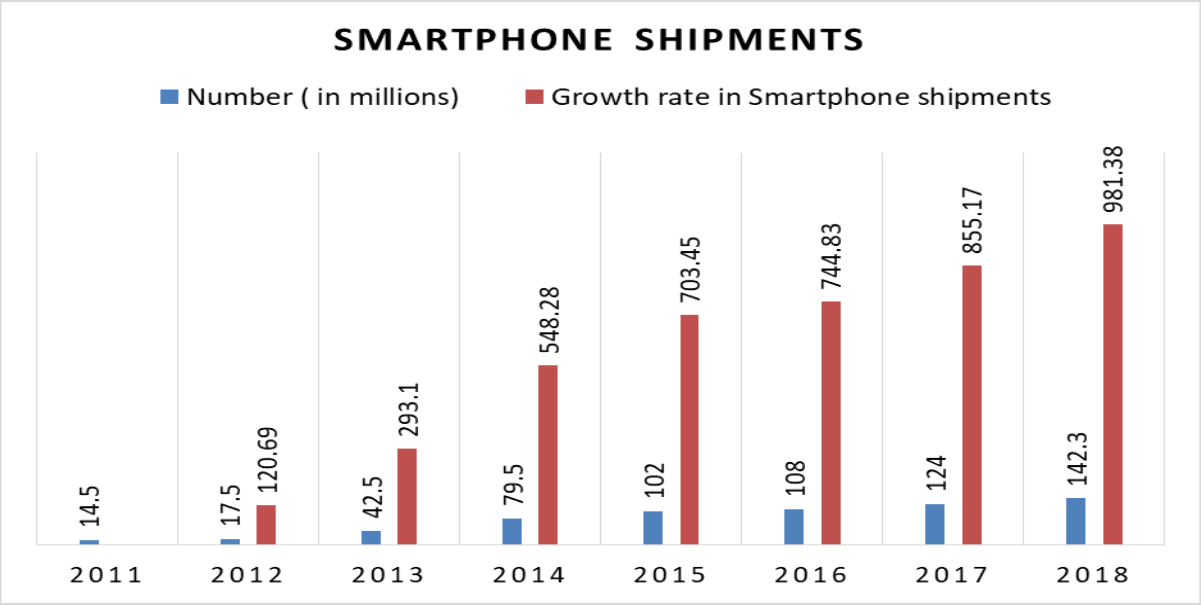
Internet access, the use of finance technologies in different sectors, in particular in the digital payment system, is booming.[3]

INDIA'S SMARTPHONE SHIPMENTS (IN MILLIONS)

Year	Numbers	Growth rate
2011	14.5	---
2012	17.5	120.69
2013	42.5	293.1
2014	79.5	548.28
2015	102	703.45
2016	108	744.83
2017	124	855.17
2018	142.3	981.38



Source: October 2019 Report, IBEF

INCREASING DATA USAGE

According to a study by Swedish mobile telecom manufacturer Ericsson, India uses 9.8 GB a month for the world's highest data per device, doubling to 18 GB by 2024. The second place in North East Asia is 7.1 GB per month, while the least in western Asia and Africa is 3 GB per month. The growth in data-intensive content such as videos, and enhanced app penetration, cost-effective data tariff plans, are the key boosters for increased use of data in India.[4]

INVESTMENT IN FINTECH SECTOR

Globally, traditional financial markets underwent a radical transformation triggered by technology and innovation. With over US$ 19 billion in massive investment, more than 12 000 start-ups were sprouted worldwide in Fintech in 2015. Fintech is characterized by technology-based companies that compete, activate or collaborate with current financial institutions. We also collaborate with universities, research institutions, government organizations and business bodies. With the global Fintech services market expected to reach USD 45 billion by end of 2020 and continue to follow its current growth rate at an annual Compound Growth Rate of 7.1 percent. India has created an ecosystem at this juncture which offers start-ups the opportunity to become large businesses exponentially. Through explorations to the foreign markets in a number of unexplored areas, Fintech start-ups have creativity that had previously been hard to reach. By

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2020 the Indian software market in Financial Year (FY) 2016 will hit USD 2.4 billion out of the present USD 1.2 billion. The table below illustrates how interest in Fintech in a couple of years has increased.

Private equity and venture capital investments in the fintech sector in India from 2013 to 2018

Year	Value in million U.S. dollars	Growth Rate
2013	6.1	---
2014	52.3	857.38
2015	439.2	7200
2016	83.6	1370.49
2017	251.9	4129.51
2018	347.7	5700

HYPOTHESIS OF THE STUDY

Null Hypothesis: H_0

There is no significant difference in the turnover of digital transactions executed through different modes of digital payments.

Alternative Hypothesis: H_1

There is a significant difference in the turnover of digital transactions executed through different modes of digital payments.

Sample Data

NEFT (National electronic funds transfer), IMPS (Immediate payment service), NACH (National automated clearing house), UPI (Unified Payments Interface) and Debit /Credit Cards are the different modes of digital payments. These payment gateways are considered for data analysis and hypothesis testing.

DATA ANALYSIS AND INTERPRETATION

For analysing the data of turnover executed by abovementioned digital gateways One Factor ANOVA Test is followed with Post – Hoc Analysis.

Digital Payment Systems (Value in Rs. Billion)

Month / Digital Payment Mode	NEFT *	IMPS**	NACH***	UPI #	Debit and Credit Cards
Nov-16	8807.8	324.8	606.6	0.9	352.4
Dec-16	11537.6	431.9	626.8	7.0	522.2
Jan-17	11355.1	491.2	541.4	16.6	481.2
Feb-17	10877.9	482.2	592.0	19.0	391.5
Mar-17	16294.5	564.7	829.4	23.9	416.2
Apr-17	12156.2	562.1	905.2	22.0	431.4
May-17	12410.8	585.6	692.4	27.7	450.8
Jun-17	12694.2	596.5	708.6	30.7	468.2
Jul-17	12011.6	604.8	771.7	33.8	439.3
Aug-17	12500.4	651.5	752.4	41.3	457.1
Sep-17	14182.1	717.6	628.4	52.9	478.2
Oct-17	13851.3	750.4	900.5	70.3	530.5
Nov-17	13884.0	782.6	724.1	96.4	483.3
Dec-17	15779.2	871.1	714.0	131.4	528.7
Jan-18	15374.1	882.1	727.7	155.4	521.9
Feb-18	14843.9	882.7	850.9	191.0	465.9

* NEFT – National electronic funds transfer

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** IMPS – Immediate payment service

***NACH – National automated clearing house

UPI - Unified Payments Interface

Source: https://www.npci.org.in/statistics

KOLMOGOROV-SMIRNOV TEST OF NORMALITY

The Kolmogorov-Smirnov Test of Normality is performed to know whether the distribution is normal or not. This test guides the tests to be performed as per the nature of variables used in the study. Following is a output sheet of Kolmogorov-Smirnov Test of Normality.

Variables Used	**NEFT (Sample A)**	**IMPS (Sample B)**	**NACH (Sample C)**	**UPI (Sample D)**	**Debit and Credit Cards (Sample E)**
Count	16	16	16	16	16
Mean	13035.044	636.363	723.256	57.519	463.675
Median	12597.300	600.650	719.050	32.250	467.050
Standard Deviation	1996.651	166.717	109.166	56.742	50.417
Skewness	-0.184	0.022	0.197	1.334	-0.549
Kurtosis:	-0.143	-0.706	-0.744	0.787	0.121
K-S test statistic (D)	0.132	0.14001.	0.128	0.24108.	0.134
The *p*-value is	0.907	0.871	0.927	0.26473.	0.903

The test statistics (D) measures the divergence in sample data and p value indicates probability of divergence of sample from normal distribution to an extend unlikely to arise merely by chance. In this table, in case of all variables test statistics (D) has lower value which indicates minimum divergence in sample data. P-value across the variables is greater, indicating higher possibility of divergence to an extend unlikely to arise merely by chance. Thus Kolmogorov-Smirnov Test of Normality shows normal distribution pattern in all variables.

One Factor ANOVA Test

The variables (digital payment gateways NEFT, IMPS, NACH, UPI and Debit /Credit Cards) are independent in nature hence One Factor ANOVA Test is used for further analysis.

One Factor ANOVA Result Sheet

Treatment →	**A**	**B**	**C**	**D**	**E**	**Pooled Total**
observations N	16	16	16	16	16	80
sum ∑xi∑xi	208,560.70	10,181.80	11,572.10	920.3	7,418.80	238,653.70
mean ¯xx¯	13,035.04	636.3625	723.2562	57.5187	463.675	2,983.17
sum of squares ∑x2i∑xi2	2,778,397,091.47	6,896,231.92	8,548,351.25	101,229.07	3,478,039.96	2,797,420,943.67
sample variance s2s2	3,986,616.16	27,794.41	11,917.17	3,219.64	2,541.86	26,398,431.48
sample std. dev. Ss	1,996.65	166.7166	109.1658	56.7419	50.4168	5,137.94
std. dev. of mean SE¯xSEx¯	499.1628	41.6791	27.2915	14.1855	12.6042	574.4392

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Source	sum of squares SS	degrees of freedom	mean square MS	F statistic	p-value
Treatment	2,024,994,748.43	4	506,248,687.11	627.7747	1.11E-16
Error	60,481,338.69	75	806,417.85		
Total	2,085,476,087.12	79			

The p-value corresponding to the F-statistic of one-way ANOVA is lower than 0.05, suggesting that the one or more treatments are significantly different. Thus Null hypothesis cannot be accepted. Henceforth it is inferred that "There is a significant difference in the turnover of digital transactions executed through different modes of digital payments."

However to find out which digital mode's turnover is significantly different from turnover of other modes, Post – hoc analysis is performed. The Tukey HSD test, Scheffe, Bonferroni and Holm multiple comparison tests are applied in Post-hoc analysis.

Tukey's HSD Test

The test p-value corresponding to the F-statistic of one-way ANOVA is lower than 0.01 which strongly suggests that one or more pairs of treatments are significantly different. So Turkey's Honest Significant Difference (HSD) test and Scheffe Test are used to assess the significance of differences between pairs of groups**.**

Tukey's HSD Test Output Sheet

Treatments Pair	Tukey HSD Q statistic	Tukey HSD p-value	Tukey HSD inferfence
A vs B	55.23	0.001	** p<0.01
A vs C	54.84	0.001	** p<0.01
A vs D	57.81	0.001	** p<0.01
A vs E	56	0.001	** p<0.01
B vs C	0.387	0.9	insignificant
B vs D	2.578	0.369	insignificant
B vs E	0.769	0.9	insignificant
C vs D	2.965	0.232	insignificant
C vs E	1.156	0.9	insignificant
D vs E	1.809	0.681	insignificant

Scheffe Test Output Sheet

Treatments / Pair **A vs B**	**T-statistic** **39.05**	**p-value** **1.11E-16**	**inference** **p<0.01**
A vs C	38.78	1.11E-16	p<0.01
A vs D	40.87	1.11E-16	p<0.01
A vs E	39.6	1.11E-16	p<0.01
B vs C	0.274	0.999299	insignificant
B vs D	1.823	0.509676	insignificant
B vs E	0.544	0.989868	insignificant
C vs D	2.097	0.3633	insignificant
C vs E	0.818	0.954459	insignificant
D vs E	1.279	0.80153	insignificant

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Bonferroni and Holm Test

In the data there are five samples henceforth in Post-hoc analysis , Bonferroni–Holm method, is used for facilitating multiple comparisons and also controlling family-wise error rate (FWER) i.e. probability of making type I errors.

Bonferroni and Holm Test Output Sheet

Treatments / Pair	Bonferroni			Holm	
	T-statistic	p-value	inference	p-value	inference
A vs B	39.05	0.00E+00	** p<0.01	0.00E+00	** p<0.01
A vs C	38.78	0.00E+00	** p<0.01	0.00E+00	** p<0.01
A vs D	40.87	0.00E+00	** p<0.01	0.00E+00	** p<0.01
A vs E	39.6	0.00E+00	** p<0.01	0.00E+00	** p<0.01
B vs C	0.274	7.850778	insignificant	0.785078	insignificant
B vs D	1.823	0.72263	insignificant	0.361315	insignificant
B vs E	0.544	5.881177	insignificant	1.176236	insignificant
C vs D	2.097	0.39378	insignificant	0.236268	insignificant
C vs E	0.818	4.161783	insignificant	1.248535	insignificant
D vs E	1.279	2.0475	insignificant	0.819	insignificant

FINDINGS OF STUDY

For the government the digital money is cheaper, a great deal is going into making money, and the processing, maintenance and replacement of currency notes and coins is costly. In order to prevent situations such as theft or fraud, digital transactions take account of notification, tokenization and two-factor authorisation. The study alluded to above indicates that the turnover of NEFT with other digital modes has been significantly different. This indicates that most digital transactions are performed in NEFT mode. In UPI-based transactions there is a very good increase, however users still consider NEFT as a secured, transparent and rapid method of transfer of funds.

CONCLUSIONS

Electronic transactions are growing because of transparency, fastest safe funds transfer, electronic mode innovation, Internet penetration, increase in Smartphone users, cheap data packs and, above all, the increase in investments in Fintech. Among all digital funds transfer methods, the majority of digital transactions occur through NEFT transactions because nowadays, nearly all banks offer NEFT transactions via their payment gateways that permit customers to instantly transfer funds without any external wallet downloads or otherwise.

REFERENCES

1. https://media-publications.bcg.com/pdf/BCG-Google-Digital-Consumer-Spending-India-Feb-2018.pdf accessed on 19th December 2019
2. https://economictimes.indiatimes.com/tech/internet/internet-users-in-india-to-reach-627-million-in-2019-report/articleshow/68288868.cms accessed on 4thDecember 2019
3. https://www.business-standard.com/article/news-cm/number-of-smartphone-users-in-india-likely-to-double-to-859-million-by-2022-119051000458_1.html accessed on20 th December 2019
4. https://www.livemint.com/industry/telecom/india-s-data-usage-per-smartphone-highest-in-world-at-9-8gb-per-month-report-1560936943979.html accessed on 1st January 2020