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Analytical Study of Value in Transaction of Selected UPI Apps (for the Period February 2023 to March 2024)

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Abstract

Unified Payments Interface (UPI) is a payment system that enables consumers to make money transactions instantly with ease. This system has fundamentally changed the digital payment scenario in India. It provides instant mobile money transfer services 365 days of the year around the clock. Customer initiated value in transactions for five UPI apps-Google Pay, PhonePe, Amazon Pay, Mobikwik, BHIM-is obtained from the NPCI website for the period February 2023-March 2024 and used in this study. The primary aim of the study is to test the hypothesis that the transaction values of the selected UPI apps vary significantly from each other. It also aims to forecast the value in transactions of the selected UPI apps for the period April 2024 to December 2024 through studying the customer initiated value in transactions for the selected period. Finally, it assesses whether the data satisfies the normality assumption and determines the coefficient of variation for the selected UPI apps. The statistical tools used in the study are-Analysis of Variance (One-Way ANOVA), trend analysis (and hence forecast for the period April 2024 to December 2024), coefficient of variation. The analysis shows that there is a significant variation in the customer initiated value in transaction of the five UPI apps that were selected. The findings of the Shapiro-Wilk tests show that the normality assumption is satisfied by the data of value in transaction of selected UPI apps.

Keywords: ANOVA, coefficient of variation, forecast, normality assumption, trend analysis, UPI

1. Introduction

Digital payments are those transactions that take place through online mode or through digital platforms. This implies that the digital payment system is being used by both the payer and payee to exchange money. This payment system can be made in-person as well as via the internet. Through "Digital India" campaign, the Indian government aspires to create a cashless and paperless digitally connected economy. Currently, the different types of digital payments system in India are Internet banking, Credit/Debit cards, unstructured supplementary service data (USSD), Aadhaar Enabled Payment System (AEPS), Unified Payments Interface (UPI), Mobile Wallets, Bank Prepaid cards, PoS Terminals, Mobile Banking, Micro ATMs.

A smartphone application called United Payments Interface (UPI) allows users to send money between bank accounts in just few clicks. The UPI integrates multiple banking operations, optimum fund routing and merchant payments in one platform by allowing multiple bank accounts into a single mobile application. With the goal to foster an effective digital payment infrastructure, UPI was created as an integral part of the Digital India program. UPI was launched by the National Payments Corporation of India (NPCI), which is the main organization responsible for administering India's retail payments and settlement systems. The aim of UPI was to streamline and integrate multiple bank account services into a single mobile application. April 11, 2016 marked the official launch of the system, during which 21 member banks participated. Since its inception, UPI has experienced significant advancements, incorporating advance security measures and widening its scope to incorporate an array of financial services. The data provided by the National Payments Corporation of India (NPCI) show that over 70 UPI apps are currently in use for online payments.

UPI stands apart from traditional payment methods and other digital payment system in several ways. The main features of UPI are real-time transactions, better security, affordability, interoperability and flexibility. India has seen a significant growth in use of UPI since its launch in 2016. As per the data in National Informatics Centre (NIC), UPI generated over 100 million transactions totaling INR 67 billion registering a YoY increase of 900% in 2017. In 2018, transactions worth INR 1.5 trillion were carried out, marking a 246% YoY growth. In 2019, transactions worth above INR 2.9 trillion occurred, indicating a 67% YoY growth. In 2020, transactions close to INR 4.3 trillion were completed. Showing a YoY increase of 63%.

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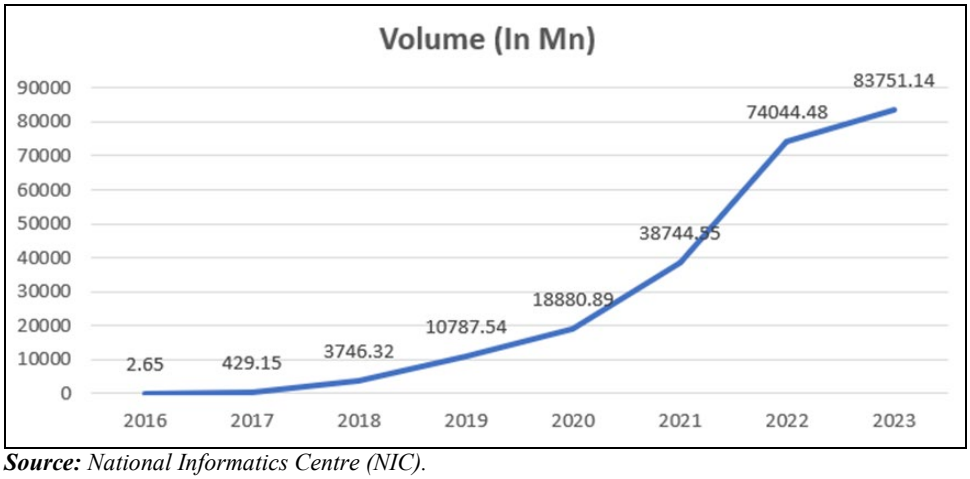


Source: *National Informatics Centre (NIC).*

Fig 1: Volume (In Mn)

2. Literature Review

Singh and Rana (2017) [2] paper on " Study of Consumer perception of Digital Payment mode" highlights how the adoption of mobile phones and the internet, along with the government programs like Digital India, affect the acceptance of digital payment systems.

Dr Shivane *et al*. (2020) [3] paper on "Analytical Study on Usage of UPI" talks about how UPI is outperforming other electronic fund transfer systems and influencing digital transactions. The paper comprehends the reasons why UPI is becoming increasingly convenient.

Manocha *et al*. (2019) [4] paper on "The impact of demonetization on digital payment transactions: a statistical study" talks about how demonetization in India affect the usage of digital payment methods. It also talks about the key benefits of digital payments and how they contribute to a cashless economy.

3. Objectives of the Study

- To find coefficient of variation of selected UPI apps.
- To test the null hypothesis (H_0) that there is no significant difference in customer initiated value in transaction of selected UPI apps for the selected period against the alternative hypothesis (H_1) that there is a significant difference in customer initiated value in transaction of selected UPI apps for the selected period.
- To study the pattern of transaction value of selected UPI apps and forecast the transaction value of the selected UPI apps from April 2024 to December 2024.
- To test whether the data satisfies normality assumption.

4. Research Methodology

The website of National Payments Corporation of India (NPCI) provides the required data used in the study. The study examines five UPI apps: Google Pay, PhonePe, Amazon Pay, Mobikwik and BHIM. The NPCI website gives the value-in-transaction data for the months of February 2023 to March 2024. This study adopts the convenience sampling technique.

Tools Used for the Study

i). **Coefficient of Variation:** In percentage terms, the coefficient of variation (CV) is the ratio of the standard deviation to the arithmetic mean. It is used to assess the consistency of the data. A distribution having lower CV than the other is more consistent. It is very helpful when two or more sets of data which are measured using various units of measurement are compared.

ii). **ANOVA:** Analysis of variance (ANOVA) is a statistical test which is used to compare group means. It shows how far a particular variable's numerical values vary from the overall mean. It is used to test the differences between the population means by comparing the degree of variance within each sample to the degree of variance between the samples. The hypothesis that the means of two or more populations are equal is tested through ANOVA. In regression analysis, this technique is used to investigate how independent factors affect the dependent factor.

iii). **Trend Analysis:** Collecting data and trying to identify patterns is the main purpose of trend analysis. A statistical and analytical technique for assessing and identifying patterns or changes in data across time is called trend analysis. It involves studying past data to gain insight of the path, trends associated with a specific phenomenon and forecast future developments.

iv). **Shapiro-Wilk Test:** A hypothesis test, called Shapiro-Wilk test, determines whether a set of data is normally distributed or not. In this case, the null hypothesis is that the data set follows normal distribution. If the p-value is high, then the null hypothesis is not rejected; else with low p-value, the null hypothesis is rejected.

5. Data Analysis and Findings

5.1. Find Coefficient of Variation of Selected UPI Apps

Table 1: Coefficient of variation of selected UPI apps

UPI apps	Google Pay	PhonePe	Amazon Pay	Mobikwik	BHIM
CV	14.62%	13.31%	8.77%	29.79%	8.32%

The coefficient of variation (CV) of the transaction value for the five chosen UPI apps is displayed in Table 1. Google Pay has the highest CV score of 14.62%, indicating greater variance or less consistent in Google Pay transaction values throughout the selected period. For BHIM, the CV value is the lowest at 8.32%, suggesting that BHIM's transaction value has been more stable over the chosen period.

Hypothesis Testing Using ANOVA

H_0: There is no significant difference in customer initiated value in transaction of selected UPI apps for the selected period

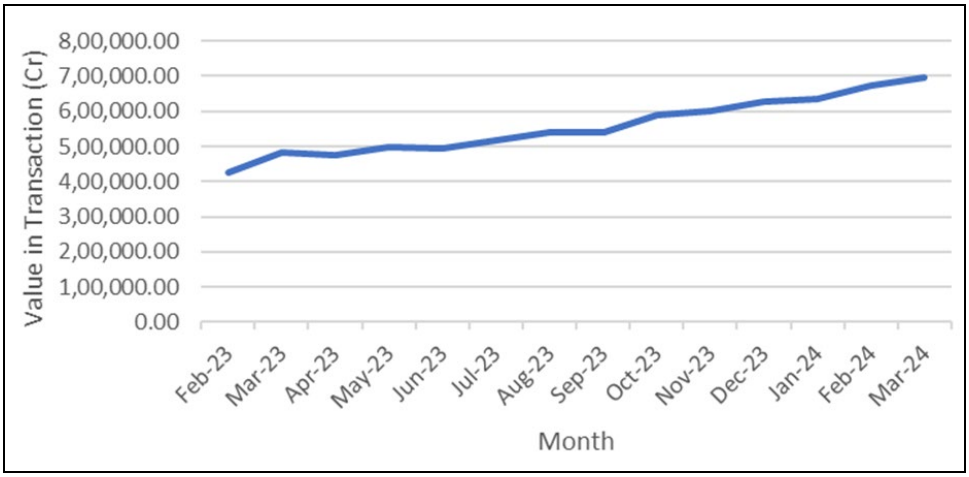
H_1: There is a significant difference in customer initiated value in transaction of selected UPI apps for the selected period.

Table 2: ANOVA summary result

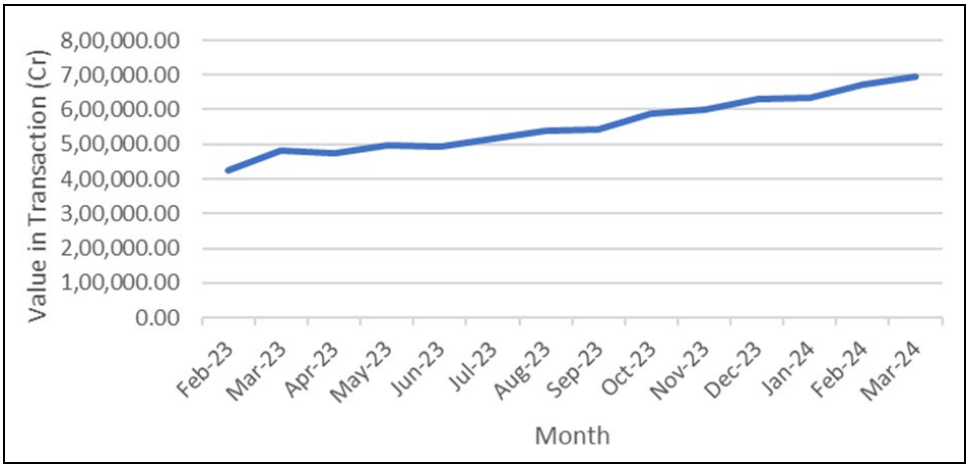
F value	P value	Significant difference among means
560.3	<0.0001	Yes

Table 2 indicates that the probability value (p-value) is less than 0.05, implying that H_0 should be rejected. This shows that there is a significant difference in customer initiated transaction value of the Google Pay, PhonePe, Amazon Pay, Mobikwik and BHIM during the specified period.

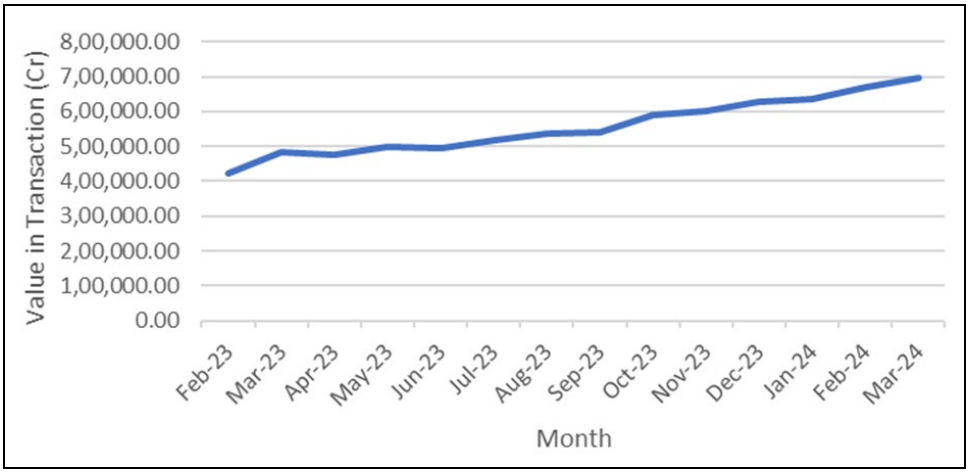
5.2. Trend Analysis of Customer Initiated Value in Transaction of Selected UPI apps



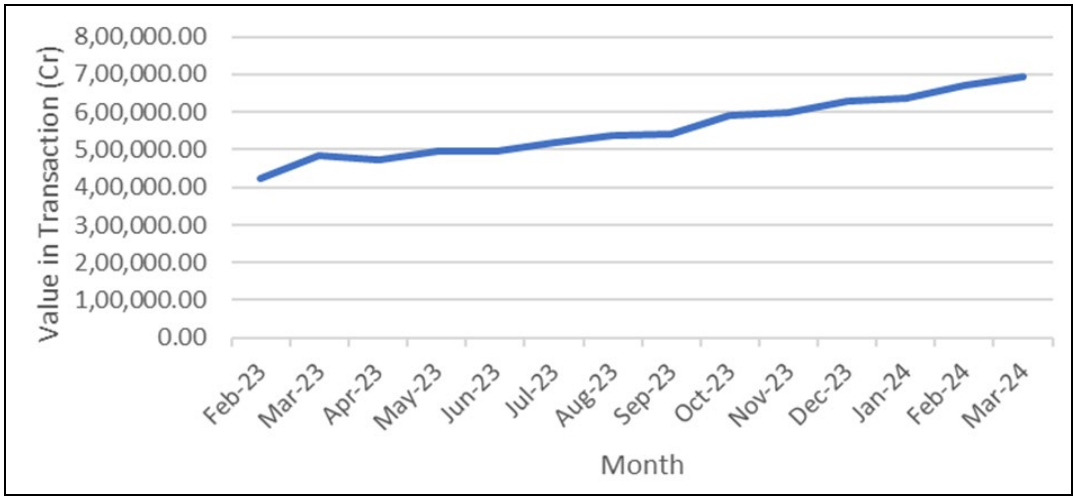
Graph 1: Google Pay: Value in Transaction from February 2023 to March 2024.



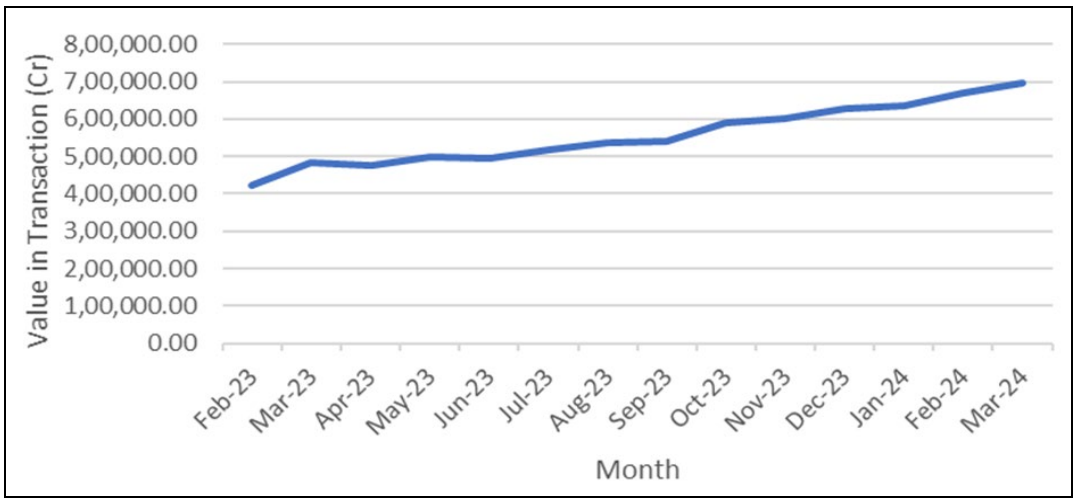
Graph 2: PhonePe: Value in Transaction from February 2023 to March 2024.



Graph 3: Amazon Pay: Value in Transaction from February 2023 to March 2024.



Graph 4: Mobikwik: Value in Transaction from February 2023 to March 2024.



Graph 5: BHIM: Value in Transaction from February 2023 to March 2024.

Graphs 1, 2, 3. 4 and 5 highlights the increasing trend in the transaction value of selected UPI apps during the specified time period.

5.3. Forecast Customer Initiated Value in Transaction

Table 3: Forecast values for value in transaction for the period April 2024 to December 2024

Month	Google Pay (Cr)	PhonePe (Cr)	Amazon Pay (Cr)	Mobikwik (Cr)	BHIM (Cr)
Apr-24	7,00,152.17	9,96,187.64	6,649.72	1,973.76	9,000.23
May-24	7,18,996.47	10,20,785.41	6,751.94	2,061.37	9,133.99
Jun-24	7,38,468.90	10,46,203.10	6,857.56	2,151.91	9,272.21
Jul-24	7,57,313.20	10,70,800.86	6,959.78	2,239.53	9,405.96
Aug-24	7,76,785.63	10,96,218.55	7,065.41	2,330.07	9,544.18
Sep-24	7,96,258.07	11,21,636.24	7,171.03	2,420.61	9,682.40
Oct-24	8,15,102.36	11,46,234.01	7,273.25	2,508.23	9,816.15
Nov-24	8,34,574.79	11,71,651.70	7,378.87	2,598.77	9,954.37
Dec-24	8,53,419.09	11,96,249.46	7,481.09	2,686.39	10,088.13

Using the software, customer initiated value in transaction of selected UPI apps for the period April 2024 to December 2024 are predicted. Table 3 gives the predicted values for customer initiated value in transaction from April 2024 to December 2024 for five UPI apps. For Google Pay, the predicted value in transaction for April 2024 to December 2024 is ranging from Rs. 7,00,512 Cr to Rs.8,53,419 Cr. For PhonePe, the predicted value in transaction for April 2024 to December 2024 is ranging from Rs. 9,96,187 Cr to 11,96,248 Cr. For Amazon Pay, the predicted value in transaction for April 2024 to December 2024 is ranging from Rs. 6,649 Cr to Rs.7,481 Cr. For Mobikwik, the predicted value in transaction for April 2024 to December 2024 is ranging from Rs. 1,973 Cr to Rs.2,686 Cr. For BHIM, the predicted value in transaction for April 2024 to December 2024 is ranging from Rs. 9,000 Cr to Rs. 10,088 Cr.

5.4. Test for Normality

Table 4: Result of Shapiro-Wilk test

Test	Google Pay	PhonePe	Amazon Pay	Mobikwik	BHIM
W	0.9647	0.9612	0.9757	0.9370	0.9387
P value	0.7991	0.7434	0.9428	0.3816	0.4021
Passes Normality test	Yes	Yes	Yes	Yes	Yes
P value summary	ns	ns	ns	ns	ns

Tables 4 shows that the normality assumption is being satisfied by the data. The results of Shapiro-Wilk test indicate that the value in transaction of Google Pay, PhonePe, Amazon Pay, Mobikwik and BHIM for the selected period satisfy the normality assumption.

6. Conclusion

In accordance with the hypothesis study, there exist considerable differences in the customer initiated value in transaction of selected UPI apps for the period February 2023 to March 2024. The trend graph of the selected apps reveals that digital payment systems in India are getting prominent in India. The transaction value data for the chosen period fulfills the normality assumption.

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