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**Cashless Economy in the Making: A Deep Dive into UPI’s Evolution and Influence in India**

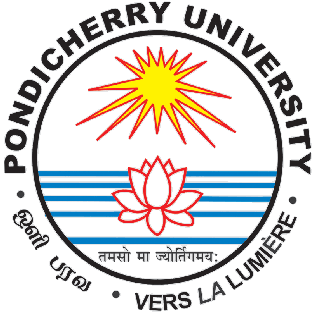
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# **Chapter 1**

## **1.1 Introduction to Digital Services in India**

India, in recent years has come across a wave of transformation with digital era. Witnessing the subjugation of traditional ways by the digital revolution, we try to study the factors contributing to the proliferation of online platforms such as ride sharing, food delivery, e-commerce etc. and their effects on traditional business ethics and consumer attitude towards the explosive growth and ease of availability of the online services.

The solid base as we are suspecting is with the launch of Reliance Jio network provision, which revolutionized the availability, and affordable mobile internet facility giving users with an overwhelming amount of data available to them each day with affordable data tariffs that can be made available to even the people of below poverty line.

Jio offered affordable 4G data and disrupted the market, leading to increased internet penetration and mobile internet usage. This in turn, boosted the usage of online services across various sectors including e-commerce, entertainment, and digital payments. We collected secondary data from the Open Government Data(OGD) Platform India (<https://data.gov.in/>) related to the number of telecom subscribers in India from 2008 to 2022, and we only considered the wireless telecom subscribers as, the wireless network availability is a major part of the digital disruption, aiding the exceptional growth of network usage across the nation from the margins to the mainstream.

## **1.2 Evolution of Digital India**

The internet has become an integral part of our daily lives, changing the way we communicate, access information, conduct business and even have fun. In India, the growth and impact of the internet has been particularly remarkable. Over the past two decades, the internet has grown exponentially and revolutionized various aspects of Indian society and economy. In this work, we explore the journey of the internet in India, its growth and its profound impact on the country.

The Internet debuted in India in the early 1990s and primarily served the academic and research communities. In 1995, Videsh Sanchar Nigam Limited (VSNL) launched the first public Internet service, connecting a select few Indians to the World Wide Web. These early years were marked by slow dial-up connections, high costs, and limited availability. But they laid the groundwork for what would become the digital revolution.

***Explosive growth:***

The turning point for internet growth in India was the early 2000s. Several factors contributed to this explosive growth:

1. *Telecom Liberalization:* The liberalization of the Indian telecom sector in the late 1990s opened the way for private players to enter the market. This has led to increased competition, better infrastructure and lower costs for internet services.

2. *The Mobile Revolution:* The advent of affordable mobile phones and data plans has democratized access to the Internet. Mobile internet has become the driving force behind internet adoption in India, enabling even remote villages to be connected.

3. *Government Initiatives:* Launched in 2015, the Government of India's *“Digital India program”* aimed to transform India into a digitally empowered society. Initiatives such as the *Bharat Net project*, which aimed to provide broadband to rural areas, and Digital India's push for e-governance further boosted internet adoption.

4. *Social-Media and Content:* The popularity of social media platforms such as Facebook, Twitter and Instagram along with the rise of streaming services such as Netflix and Amazon Prime have fuelled internet usage among India's youth and urban population.

The evolution of Digital India refers to the transformation and modernization of India's socio-economic and governance landscape through the adoption and integration of digital technologies. It is a multifaceted initiative aimed at leveraging digital tools and infrastructure to bring about significant changes in various sectors, including government services, education, healthcare, e-commerce, and more. The journey of Digital India has evolved over several phases and encompasses a range of key components, policies, and initiatives.Here's a detailed explanation of the evolution of Digital India:Inception:The idea was to empower citizens with technology and create a digitally inclusive society.Key Components:*Digital Infrastructure:* The first and foundational component involves the creation of digital infrastructure, including broadband connectivity and the National Optical Fiber Network (NOFN), which was later transformed into BharatNet. This infrastructure laid the groundwork for connecting even remote and rural areas to the digital ecosystem.*Digital Literacy*: To ensure that all citizens could participate in the digital economy, various digital literacy programs were launched to promote digital skills and awareness, particularly in rural areas.*Government Services Online:* The government aimed to make its services accessible to citizens online through portals like MyGov.in and the National e-Governance Plan (NeGP). This streamlined processes, reduced bureaucracy, and improved transparency.*Digital Governance:* Initiatives like Digital Locker, e-Sign, and the *“Unified Mobile App for New-age Governance”* (UMANG) were launched to provide secure digital storage and access to essential documents and government services.*e-Governance:* Several e-Governance projects were undertaken to automate government processes, such as Passport Seva Kendra, National Scholarship Portal, and more.*Digital India Phases:* The program evolved in phases, including Digital India 1.0, 2.0, and beyond. Each phase had a specific focus and goals. For example, Digital India 1.0 concentrated on providing government services, while 2.0 aimed to expand digital infrastructure, including the Digital Village program.*Digital Payments and Financial Inclusion:* The government encouraged digital payments through initiatives like the Pradhan Mantri Jan Dhan Yojana (PMJDY), promoting financial inclusion and the use of digital payment platforms like UPI (Unified Payments Interface).*Startup Ecosystem:* To promote entrepreneurship and innovation, the government launched the "Startup India" program, which provided various incentives and support to budding entrepreneurs.*Digital Education:* The COVID-19 pandemic accelerated the digitalization of education in India, with the launch of the PM e-VIDYA and SWAYAM online learning platforms.*Digital Health:* The pandemic also highlighted the need for digital health infrastructure. Initiatives like the National Digital Health Mission (NDHM) and telemedicine services were introduced.*Data Privacy and Security:* With the increasing digital footprint, concerns over data privacy and security have gained prominence. India has introduced data protection legislation in the form of the Personal Data Protection Bill.*Challenges and Concerns:* The Digital India initiative faces challenges like the digital divide, cybersecurity threats, and the need for robust digital infrastructure in remote areas.Future Prospects:The evolution of Digital India is ongoing, with a focus on emerging technologies like artificial intelligence, blockchain, and the Internet of Things (IoT). The goal is to make India a global hub for digital innovation.The evolution of Digital India is a complex, ongoing process with the potential to transform the country's economic, social, and governance landscape. It aims to empower citizens, improve government services, boost economic growth, and bridge the digital divide, ultimately contributing to India's development as a digitally inclusive nation.

## **1.3 Online services in India**

### **1.3.1 Ride Sharing/Sourcing**

The rise of ride-sharing and ride-sourcing services has played a significant role in the growth and impact of online services in India. Here's an overview of how these services have contributed to the growth of the broader online service industry in the country:

* *Enhanced Mobility and Connectivity:* Ride-sharing services have improved mobility and connectivity for individuals, making it easier for people to move around in congested urban areas. This has indirectly fuelled the use of other online services, such as food delivery, grocery delivery, and e-commerce, as people can now access these services more easily and efficiently.
* *Digital Payments and Financial Inclusion:* Ride-sharing apps have popularized digital payments in India. Many ride-sharing platforms offer digital wallets with popular payment services. This has contributed to greater financial inclusion by encouraging users to adopt digital payment methods, which they then often use for other online services.
* *Employment Opportunities*: The growth of the ride-sharing industry has created employment opportunities for drivers. Many people have turned to ride-sharing as a source of income. These drivers are also users of various online services for their daily needs, contributing to the overall growth of the digital economy.
* *Increased Smartphone Adoption*: The use of ride-sharing services has encouraged the adoption of smartphones in India. These services require users to have smartphones to access the apps and request rides. Once people have smartphones, they are more likely to explore other online services, such as messaging apps, social media, and e-commerce.
* *Safety and Trust Building:* Ride-sharing platforms often implement safety features, such as driver background checks and real-time tracking. These features have built trust among Indian users, making them more comfortable with using online services for various purposes.
* *Partnerships and Integrations*: Many ride-sharing platforms in India have formed partnerships with other businesses, including food delivery services and digital payment providers. This has created ecosystems where users can access multiple services through a single app, enhancing convenience and customer retention.

*Conclusion:* In conclusion, the emergence and growth of ride-sharing and ride-sourcing services in India have had a transformative impact on the broader online service industry. These services have not only revolutionized transportation and mobility but have also played a pivotal role in shaping India's digital economy. Their influence extends to improving connectivity, boosting digital paymentadoption, creating employment opportunities, enhancing safety and trust, and encouraging smartphone usage.

### **1.3.2 Food Delivery**

The role of food delivery services has been significant in the growth and impact of online services in India. Here are five key points highlighting this role:

* *Convenience and Accessibility*: Food delivery platforms have made it incredibly convenient for consumers to order meals from their favourite restaurants, all through a mobile app or website. This convenience has contributed to the rapid adoption of online services in India, as it simplifies the process of ordering and enjoying a wide variety of cuisines.
* *Job Creation***:** Food delivery platforms have generated employment opportunities for thousands of delivery personnel, often referred to as "delivery partners." This has had a positive impact on employment, especially in urban and semi-urban areas, where many people rely on such jobs for their livelihood.
* *Digital Payment Adoption***:** The food delivery industry has played a crucial role in driving the adoption of digital payment methods in India. These platforms usually offer multiple payment options, including credit/debit cards, digital wallets, and UPI, encouraging consumers to embrace cashless transactions.
* *Boost to Restaurants***:** Food delivery services have extended the reach of restaurants and eateries. Smaller and local restaurants that may not have the resources for in-house delivery have benefitted by partnering with these platforms, expanding their customer base and increasing revenue.
* *Economic Impact:* The food delivery sector contributes significantly to the Indian economy. It involves a vast network of restaurants, suppliers, and tech companies, resulting in a positive economic impact that ripples through various related industries.

*Conclusion:* The growth and impact of food delivery services in India are closely tied to the broader ecosystem of online services, as they have paved the way for increased digital adoption, improved customer convenience, and economic growth in the country.

### **1.3.3 Streaming Services**

Streaming services have played a significant role in the growth and impact of online services in India. Here are five key points highlighting their influence:

* *Digital Entertainment Transformation*: Streaming services, such as Netflix, Amazon Prime Video, Disney+ Hotstar, and local platforms like ZEE5 and MX Player, have revolutionized how Indians consume entertainment. They offer a vast library of content, including movies, TV shows, and original programming, which has shifted viewers away from traditional television and cinema.
* *Affordable and Convenient Access*: Streaming services provide an affordable and convenient way for consumers to access a wide range of content. With mobile data becoming more accessible and affordable, people can watch content on their smartphones and other devices, reducing the need for physical media or cable TV subscriptions.
* *Regional Content and Language Diversity***:** Streaming services in India have made a concerted effort to cater to the diverse linguistic and cultural needs of the country. They offer content in multiple regional languages, which has helped in reaching a broader audience and bridging language barriers.
* *Original Content Production*: Streaming platforms have invested heavily in producing original content in India. This has led to the creation of high-quality web series and movies, providing opportunities for Indian actors, directors, and writers, and contributing to the country's media industry.
* *Economic and Technological Impact***:** The success of streaming services has had a significant economic impact, creating jobs in content creation, distribution, and technology development. It has also driven technological advancements in content delivery and streaming infrastructure to handle the ever-growing demand.

*Conclusion:*In summary, streaming services have not only transformed the way Indians consume entertainment but have also had a broader economic and cultural impact. They have introduced convenience, affordability, and variety in content consumption, making them a pivotal element of the growth and impact of online services in India.

### **1.3.4 E-Commerce**

E-commerce has played a significant role in the growth and impact of online services in India in several ways:

* *E-commerce as a Catalyst***:** E-commerce platforms have acted as catalysts for the growth of online services. As consumers became comfortable making online purchases, they also became more open to using various online services, including ride-sharing, food delivery, and digital payment platforms.
* *Digital Payment Integration*: E-commerce platforms often integrate with digital payment services, making it easier for users to make payments for a wide range of services, from shopping to transportation. This has spurred the adoption of online payment methods and digital wallets, driving the growth of various online services.
* *Last-Mile Delivery and Logistics*: E-commerce companies have developed sophisticated last-mile delivery and logistics networks, which have been leveraged by other online services, such as food delivery and grocery delivery. This infrastructure has made it possible to offer quick and efficient delivery services across India.
* *Cross-Promotion and Integration*: Many e-commerce platforms have integrated or partnered with online service providers. For example, an e-commerce app might offer the option to book a ride or order food through affiliated services. This cross-promotion and integration have expanded the reach of various online services.
* *Data and User Insights*: E-commerce platforms collect a significant amount of data and user insights. This data can be valuable for tailoring and improving other online services. It enables better targeting of users and personalization of services, enhancing the overall customer experience.

*Conclusion***:** In summary, e-commerce has not only driven its industry's growth but has also had a profound impact on the wider online services sector in India. It has facilitated the adoption of digital payment methods, improved last-mile logistics, and opened doors for cross-promotion and integration, ultimately enhancing the overall online service ecosystem in the country.

## **1.4 About the study**

The UPI (Unified payment interface) as an online service has emerged into the financial sector to calibrate the growth of Indian Economy in 2016 by the National Payments Corporation of India (NPCI). The introduction of UPI has not only simplified the payment process but also enrolled millions of unbanked Indians in the formal banking system. We want to study the growth of this particular online payment method among students in India since they represent the future leaders and significant contributors in the years to come.

The data is collected from all the central universities across India by means of snowball sampling to study the growth and awareness on online payment services among students. The questionnaire\* is prepared mainly to focus on understanding the awareness, behaviour and the Implication of the novel corona virus on the growth of online payments services across all the demographic variables like Gender, Age, Place of residence, Monthly Income and Number of transactions. The Awareness factor is measured on Likert scale to quantify the awareness, we have four questions in measure the awareness factor which asks about the platforms which provide online services, software’ used for online payment services, Online services provided by Banks and the awareness about the security threats due to online payment services and the providing platforms.

The behaviour of the user is studied with 8 broad questions which covers all the related factors from willingness of using online payment services to their preference. The eight questions from the questionnaire asks about the willing of users to use online payment services, how much they take in paying money in online mode, how ease they find tracking their payments, how they see paying though online mode in small shops, their opinion on getting smaller receipts, giving priority to the shops where they provide online services and how ease they find using the online payment services.

During the Covid-19 phase the digital payments has a higher raise of volume as contact less payments has become fashion and safer than the traditional payments which are highly riskier and make the consumer prone to getting Covid-19. This factor is studied based on the score calculated based on 8 ordinal scale values which talks about, the opinion of the consumer about the increase n contactless payments, reduction in physical contact, how scared are consumers in opting for traditional cash payments, restrictions on ATM usage, how they treated the risks of visiting the Banks during the Covid-19, Bill payments in online modes due to fear of using traditional cash payments, reduction of holding cash with the individual as the digital payments methods has become more easier to handle and their willingness to use the digital payments in future.

The questionnaire used to conduct this study is placed in Annexure.

## **1.5 Objectives**

1. To know the awareness on digital payments among the students all over India from central universities.
2. To study the impact of demographic factors like Gender, Age, Number of UPI transactions per months, Residence on the UPI related awareness, understanding and clarity among the students.

\* We wish to acknowledge the support extended by Dr. Abdul Gafoor and Mr. Shamshad, Department of Banking technology, Pondicherry University in the preparation of questionnaire and data collection.

# **Chapter 2**

In analysing any data, the first and foremost step is to present the data using various graphs in a meaningful way. Such exploration will be quite helpful in understanding the hidden patterns that exist in the data. Int his chapter, we detail out some useful graphical tools that are used to present the collected information.

## **2.1 Boxplot**

A box plot is a standardized graphical representation that summarizes a dataset's distribution using its key statistics: the minimum value (lower whisker), the first quartile (Q1), the median, the third quartile (Q3), and the maximum value (higher whisker). It provides insights into various aspects of the data, such as the presence and values of outliers, the symmetry of the data, the degree of data clustering, and any skewness in the distribution.

The five-point summary comprises five crucial statistical measures employed to encapsulate the characteristics of a dataset's distribution. These statistics offer a succinct overview of both the data's typical value and its variability. The five elements in this summary include:

* *Minimum (Q1 - 1.5 \* IQR):* This represents the dataset's smallest value, signifying the lower end of the data range.
* *First Quartile (Q1):* Also referred to as the 25th percentile, this is the value below which 25% of the data points lie. It demarcates the lower boundary of the first quarter of the dataset when sorted in ascending order.
* *Median (Q2):* The median corresponds to the middle value in the sorted dataset. It signifies the 50th percentile, indicating the point below which 50% of the data values are situated.
* *Third Quartile (Q3)*: Commonly known as the 75th percentile, Q3 delineates the value beneath which 75% of the dataset falls. It establishes the lower boundary of the third quarter of the sorted dataset.
* *Maximum (Q3 + 1.5 \* IQR):* This represents the dataset's largest value, signifying the upper limit of the data range.

## **2.3 Kolmogorov Smirnov (K-S Test)**

The Kolmogorov-Smirnov test (Chakravart, Laha, and Roy, 1967) is used to decide if a sample comes from a population with a specific distribution.

The Kolmogorov Smirnov test is defined by -:

-: The data follows a specified distribution.

-: The data does not follow a specified distribution.

Test statistic is defined as –

where *F* is the theoretical cumulative distribution of the distribution being tested which must be a continuous distribution in our case it is the distribution being tested is *Normal Distribution.*

Critical Values: The hypothesis regarding the distributional form is rejected if the test statistic, D, is greater than the critical value obtained from a table.

*Characteristics -:* One notable advantage is that the distribution of the K-S test statistic remains independent of the specific cumulative distribution function under examination. Additionally, it offers the benefit of being an exact test, unlike the chi-square goodness-of-fit test, which requires a sufficiently large sample size for its approximations to hold.

*Limitations* -: It is exclusively applicable to continuous distributions and tends to exhibit higher sensitivity in the central part of the distribution, as opposed to the tails. Perhaps the most significant drawback is that the distribution must be fully defined. In other words, if parameters related to location, scale, or shape are estimated from the data, the critical region for the K-S test loses its validity. Typically, it must be determined through simulation.

## **2.4 Mann Whitney U test**

Mann-Whitney U test is the non-parametric alternative test to the independent sample t-test.  It is a non-parametric test that is used to compare two sample means of rank sums that come from the same population, and used to test whether two sample means of rank sums are equal or not.  Usually, the Mann-Whitney U test is used when the data is ordinal or when the assumptions of the t-test are not met.

Calculation of the Mann-Whitney U Test:

Where:   
= sample size one  
= Sample size two  
 = Rank of the sample size

The Hypothesis of Mann-Whitney U test is defined as,

-: There is no significant difference among the medians of the two groups in the population.

-: There is a significant difference among the medians of the two groups in the population.

Decision -: If the U-value is greater than the tabulated value, reject the null hypothesis. This indicates that there is a significant difference among the group medians. If the U-value is less than tabulated value, fail to reject the null hypothesis, suggesting no significant difference among the group medians.

What if there is a tie within the ranks:

*Assign Average Ranks*: When you encounter tied ranks, calculate the average rank for the tied values. For example, if three data points have the same value, assign them an average rank of (r1 + r2 + r3) / 3, where r1, r2, and r3 are their individual ranks.

*Calculate the U Statistic*: Calculate the U statistic for each group, using the average ranks instead of individual ranks. The U statistic is the sum of ranks for one group. It is used to determine whether one group's values tend to be higher or lower than the other group. Use the Smaller U as the Test Statistic. Compare the U statistics for both groups, and use the smaller one as the test statistic. This smaller U value is then used to look up the critical value from the Mann-Whitney U table or calculate the p-value.

*Adjust for Ties in Sample Size*: If there are significant ties in the data, you may need to adjust the U statistic for tied ranks. This adjustment is usually made for small to moderate sample sizes and involves using a correction factor.

## **2.5 Kruskal-Wallis H Test**

The Kruskal-Wallis H test, often referred to simply as the Kruskal-Walli’s test, is a non-parametric statistical test used to determine whether there are statistically significant differences among the medians of three or more independent groups. It is an extension of the Mann-Whitney U test, which compares two groups, to scenarios with multiple groups.

Calculation of Kruskal Wallis H Test:

n = sum of sample sizes for all samples,

c = number of samples,

 = sum of ranks in the jth sample,

 = size of the jth sample.

The hypotheses for the Kruskal-Walli’s test are as follows:

Null Hypothesis (): There are no significant differences among the medians of the groups being compared.

Alternative Hypothesis (): There are significant differences among the group medians.

Decision-: If the H-value is greater than the tabulated value, reject the null hypothesis. This indicates that there are significant differences among the group medians.

What if there is a tie within the ranks:

*Assign Average Ranks for Ties*: When you have tied data points within or across groups, calculate the average rank for each set of tied values. For example, if multiple data points share the same value, assign them the average rank of (r1 + r2 + ... + rn) / n, where r1, r2, ..., rn are the individual ranks for the tied values, and 'n' is the number of tied data points.

*Calculate the Adjusted Kruskal-Wallis H Statistic*: Use the average ranks to calculate the adjusted Kruskal-Wallis H statistic. This statistic considers the ranked data with tied ranks.

*Determine Degrees of Freedom*: Determine the degrees of freedom for the Kruskal-Wallis test, which is calculated based on the number of groups (k) and the number of tied ranks. The formula for degrees of freedom in this case is usually (k - 1) since tied ranks reduce the effective number of independent values.

*Critical Value or P-Value*: Compare the calculated H statistic to a chi-squared distribution with (k - 1) degrees of freedom or calculate the associated p-value to determine whether the result is statistically significant.

*Make a Decision:* If the p-value is less than the chosen significance level (alpha), reject the null hypothesis. This indicates that there are significant differences among the group medians.

## **2.6 Dunns Test**

If the results of a Kruskal-Walli’s test are statistically significant, then it’s appropriate to conduct **Dunn’s Test** to determine exactly which groups are different. Dunn’s Test performs pairwise comparisons between each independent group and tells you which groups are statistically significantly different at some level of α.

The hypotheses for Dunn's test can be framed as follows:

*Null Hypothesis (H0):* There is no significant difference in the population medians between those two groups.

Alternative Hypothesis (H1): There is a significant difference in the population medians between the two groups being compared.

To perform Dunn's test, follow these steps:

*Conduct the Kruskal-Wallis H Test:* Start by conducting the Kruskal-Walli’s test to determine whether there are significant differences among the groups. If the Kruskal-Walli’s test is significant (rejecting the null hypothesis), proceed to Dunn's test.

*Calculate ranks for all data points:* Rank all data points across all groups. If there are tied ranks, calculate average ranks as explained earlier.

*Calculate the H value:* For each pair of groups, calculate the H value using the formula:

Where:

is the sum of the ranks in the first group.

is the sum of the ranks in the second group.

is the number of observations in the smaller of the two groups being compared.

*Adjust for Multiple Comparisons*: Adjust the significance level (alpha) for multiple comparisons. This is often done using methods like the Bonferroni correction, Holm-Bonferroni method, or false discovery rate (FDR) correction.

*Compare H Values to Critical Values:* Compare the H values calculated for each pair of groups to the critical value obtained after adjusting for multiple comparisons. If H > critical value, you can conclude that there is a significant difference between the groups being compared.

*Repeat for Each Pair of Groups*: Repeat steps 3 to 5 for all possible pairs of groups. This will help you identify which specific pairs of groups have significant differences.

# **Chapter 3**

## **3.1 Frequency Tables**

Table 3.1

|  |  |  |  |
| --- | --- | --- | --- |
| Demographic Variables | Categories | Count | Percentage |
| Gender | Female | 414 | 37.19677 |
| Male | 699 | 62.80323 |
| Total | 1113 | 100 |
| Age | 15-25 | 368 | 33.06379 |
| 25-35 | 575 | 51.66217 |
| 35 Above | 170 | 15.27403 |
| Total | 1113 | 100 |
| Education | Above Graduation | 922 | 82.83917 |
| Graduation | 191 | 17.16083 |
| Total | 1113 | 100 |
| Monthly Income | 10000-25000 | 222 | 19.94609 |
| 25000-50000 | 334 | 30.00898 |
| Above 50000 | 231 | 20.75472 |
| Below 10000 | 326 | 29.29021 |
| Total | 1113 | 100 |
| Residence | City | 216 | 19.40701 |
| Metro | 109 | 9.793351 |
| Rural | 252 | 22.64151 |
| Semi-Urban | 269 | 24.16891 |
| Urban | 267 | 23.98922 |
| Total | 1113 | 100 |
| No of UPI Transactions | 10 – 15 | 281 | 25.24708 |
| 15 – 20 | 146 | 13.1177 |
| 20 – 25 | 78 | 7.008086 |
| Above 25 | 213 | 19.13747 |
| Below 10 | 395 | 35.48967 |
| Total | 1113 | 100 |

**Interpretation:**

* There are 1113 observations in our study on UPI Transactions.
* In Gender, out of 1113 respondents, there are 699(62.8%) ales and the rest of them are females 414(37.2 %).
* There is more no. of people in the age group of 25-35 and less in the age group 35 and above.
* The monthly income of the people is almost equally distributed.
* There is a greater number of people from Rural, Urban and Semi-Urban areas and less no. of people from city and metro areas.
* There are 395(35.4 %) members which is the most who are doing below 10 transactions per month and 78 members which is the least who are doing 20-25 transactions per month.

## **3.2 Density Plots**

Figure 3.1

|  |  |  |  |
| --- | --- | --- | --- |
| **Demographic Variables** | **Awareness on digital payment** | **Personal experience of digital payments.** | **Implications on digital payments during Covid’19 pandemic** |
| Gender |  |  |  |
| Age |  |  |  |
| Education |  |  |  |
| Monthly Income |  |  |  |
| Residence |  |  |  |
| No of UPI Transactions |  |  |  |

**Interpretation:**

* For gender as the demographic variable, we can see the kurtosis is high for males since they are more in numbers and also males are more experienced and has good awareness on digital payments.
* The age group of 25-35 are more aware and experienced compared to remaining age groups.
* Higher income groups are more aware but lower income groups are more experienced.
* People living in urban areas are into more digital payments the people living in other type of residences.
* People doing a smaller number of transactions are more aware and have good personal experience in digital payments.

## **3.3 Box Plots**

Figure 3.2

|  |  |  |  |
| --- | --- | --- | --- |
| **Demographic Variables** | **Awareness on digital payment** | **Personal experience of digital payments.** | **Implications on digital payments during Covid’19 pandemic** |
| Gender |  |  |  |
| Age |  |  |  |
| Education |  |  |  |
| Monthly Income |  |  |  |
| Residence |  |  |  |
| No of UPI Transactions |  |  |  |

Interpretation-:

* The Median Score of Males on Awareness and Personal Experience on Digital Payments is higher than Females, but by observing IQR the Awareness of most of females and males are same. But Females gave a higher median score than Males in Implication on digital payments during covid 19.
* The age group of 15 – 25 has median score lesser than the age groups 25 – 35 and 35 Above, which tells us that as the age increases awareness of people on digital payments also increases. And also, the median scores of all the age groups are almost equal with respect to Personal Experience and Implications on digital payments during covid 19 which tells us that there is no age factor affecting the opinion on digital payments during covid-19 that all of them pursued the digital payments positively throughout the quarantine period.
* We can observe from the box plots of the Monthly income categories and observe the pattern which says that as the income of the individual increase the more consistent their opinions and awareness about digital payments.
* In all the three dimensions the category of people who does digital payments less than 10 per month are less aware about the Digital payment methods and its security threat and also they have less likeliness on using digital payments methods.

## **3. 4 Comparative Analysis**

### Table 3.2: Gende wise comparison in three dimensions

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Gender** | **Scores** | | **Awareness on digital payments** | **Personal Experience of Digital payment** | **Implications on digital payments during Covid-19 pandemic** |
| **Male** | Md | 17.00 | 32.00 | 32.00 |
| IQR | 4.00 | 7.00 | 8.00 |
| Rank Sums | 393082.50 | 384824.5 | 363003.00 |
| Mean Rank Sums | 562.35 | 550.53 | 519.32 |
| **Female** | Md | 16.00 | 33.00 | 35.00 |
| IQR | 4.00 | 7.00 | 7.00 |
| Rank Sums | 226858.50 | 235116.50 | 256938.00 |
| Mean Rank Sums | 547.97 | 567.91 | 620.62 |
| **Mann-Whitney U test** | Statistics | 148432.50 | 140174.50 | 118353.00 |
| p-value | 0.47 | 0.38 | 0\* |

**Interpretation:**

* Since the p-value is 0.47 which is greater than the significance level 0.05, we accept the null hypothesis with 95% confidence, and state that there is no significant difference among median rank sums of males and females with respect to **Awareness on digital payments**.
* Since the p-value is 0.38 which is greater than the significance level 0.05, we accept the null hypothesis with 95% confidence, and state that there is no significant difference among median rank sums of males and females with respect to **Personal Experience on digital payments.**
* Since the p-value is “0” which is lesser than the significance level 0.05, we fail to accept the null hypothesis with 95% confidence, and state that there is a significant difference among median rank sums of males and females with respect to **Digital payments during covid-19 pandemic.**

### Table 3.3: **Age wise comparison in three dimensions**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Age** | **Scores** | | **Awareness on digital payments** | **Personal Experience of Digital payment** | **Implications on digital payments during Covid-19 pandemic** |
| **15-25** | Md | 16.00 | 32.00 | 33.00 |
| IQR | 5.00 | 8.00 | 7.00 |
| Rank Sums | 173458.50 | 198305.00 | 200534.50 |
| Mean Rank Sums | 471.35 | 538.87 | 544.93 |
| **25-35** | Md | 17.00 | 32.00 | 33.00 |
| IQR | 5.00 | 7.00 | 7.00 |
| Rank Sums | 343206.50 | 331495.50 | 325580.50 |
| Mean Rank Sums | 596.88 | 576.51 | 566.23 |
| **35 Above** | Md | 17.00 | 32.00 | 32.50 |
| IQR | 4.00 | 7.25 | 8.00 |
| Rank Sums | 103276.00 | 90140.50 | 93826.00 |
| Mean Rank Sums | 607.51 | 530.24 | 551.92 |
| **Kruskal Walli's Test** | Statistics | 39.66 | 4.49 | 1.04 |
| p-value | 0\* | 0.11 | 0.59 |

Interpretation-:

* Since the p-value is “0” which is lesser than the significance level 0.05, we fail to accept the null hypothesis with 95% confidence, and state that there is a significant difference among median rank sums of atleast one age group with respect to **Awareness on digital payments.**
* Since the p-value is 0.11 which is greater than the significance level 0.05, we accept the null hypothesis and state that, there is no significant difference among median rank sums of age groups with respect to **Personal Experience on digital payments.**
* Since the p-value is 0.59 which is greater than the significance level 0.05, we accept the null hypothesis and state that, there is no significant difference among median rank sums of age groups with respect to **Digital payments during covid-19 pandemic.**

Table 3.4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pairwise Comparisons of Age for Awareness on digital payments** | | | | | |
| Sample 1-Sample 2 | Test Statistic | Std. Error | Std. Test Statistic | Sig. | Adj. Sig.a |
| 15-25 - 25-35 | -125.526 | 21.327 | -5.886 | .000 | .000 |
| 15-25 - 35 Above | -136.151 | 29.627 | -4.596 | .000 | .000 |
| 25-35 - 35 Above | -10.625 | 27.891 | -.381 | .703 | 1.000 |
| Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.  Asymptotic significances (2-sided tests) are displayed. The significance level is .05. | | | | | |
| 1. Significance values have been adjusted by the Bonferroni correction for multiple tests.   **Interpretation -:**   * Since the p-value is less than 0.05, we fail to accept null hypothesis and conclude that there is a significant difference among median rank sums between 15-25 and 25-35, 15-25 and 35 Above of age groups with respect to **Awareness on digital payments**. | | | | | |

### Table 3.6: **Monthly Income category wise comparison in three dimensions**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Monthly Income** | **Scores** | | **Awareness on digital payments** | **Personal Experience of Digital payment** | **Implications on digital payments during Covid-19 pandemic** |
| **Below 10000** | Md | 16.00 | 32.00 | 33.00 |
| IQR | 4.25 | 7.00 | 7.00 |
| Rank Sums | 148460.50 | 168968.00 | 174299.50 |
| Mean Rank Sums | 455.40 | 518.31 | 534.66 |
| **10000-25000** | Md | 16.00 | 32.00 | 33.00 |
| IQR | 4.00 | 6.25 | 6.25 |
| Rank Sums | 110658.50 | 117375.50 | 126030.50 |
| Mean Rank Sums | 498.46 | 528.72 | 567.70 |
| **25000-50000** | Md | 17.00 | 33.00 | 33.00 |
| IQR | 4.00 | 7.25 | 8.00 |
| Rank Sums | 208969.50 | 196453.00 | 182724.00 |
| Mean Rank Sums | 625.66 | 588.18 | 547.08 |
| **Above 50000** | Md | 18.00 | 33.00 | 34.00 |
| IQR | 5.00 | 8.00 | 8.00 |
| Rank Sums | 151852.50 | 137144.50 | 136887.00 |
| Mean Rank Sums | 657.37 | 593.70 | 592.58 |
| **Kruskal Walli's Test** | Statistics | 78.65 | 12.65 | 5.00 |
| p-value | 0\* | 0.005\* | 0.17 |

**Interpretation:**

* Since the p-value is “0” which is lesser than the significance level 0.05, we fail to accept the null hypothesis with 95% confidence, and state that there is a significant difference among median rank sums of atleast one group with respect to **Awareness on digital payments.**
* Since the p-value is 0.005 which is lesser than the significance level 0.05, we fail to accept the null hypothesis with 95% confidence, and state that there is a significant difference among median rank sums of atleast one group with respect to **Personal Experience on digital payments.**
* Since the p-value is 0.17 which is lesser than the significance level 0.05, we fail to accept the null hypothesis with 95% confidence, and state that there is a significant difference among median rank sums of atleast one group with respect to **Digital payments during covid-19 pandemic.**

Table 3.7

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pairwise Comparisons of Monthly Income for Awareness on digital payments** | | | | | |
| Sample 1-Sample 2 | Test Statistic | Std. Error | Std. Test Statistic | Sig. | Adj. Sig.a |
| Below 10000 - 10000-25000 | 43.061 | 27.800 | 1.549 | .121 | .728 |
| Below 10000 - 25000-50000 | 170.257 | 24.873 | 6.845 | .000 | .000 |
| Below 10000 - Above 50000 | 201.970 | 27.476 | 7.351 | .000 | .000 |
| 10000-25000 - 25000-50000 | -127.195 | 27.665 | -4.598 | .000 | .000 |
| 10000-25000 - Above 50000 | -158.908 | 30.027 | -5.292 | .000 | .000 |
| 25000-50000 - Above 50000 | -31.713 | 27.339 | -1.160 | .246 | 1.000 |
| Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.  Asymptotic significances (2-sided tests) are displayed. The significance level is .05. | | | | | |
| a. Significance values have been adjusted by the Bonferroni correction for multiple tests. | | | | | |
| **Interpretation:**  Since there is a significant difference in atleast one of the income groups from Kruskal Wallis test, we can say that group which has income “Below 10000” and the group which has income “25000-50000” and also the income groups “Below 10000” and “Above 50000”,“10000-25000” and “25000-50000”,”10000-25000” and “Above 50000”has a significant difference among median rank sums with respect to **Awareness on Digital Payments.** | | | | | |

Table 3.8

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pairwise Comparisons of Monthly Income on Personal experience of digital payments** | | | | | |
| Sample 1-Sample 2 | Test Statistic | Std. Error | Std. Test Statistic | Sig. | Adj. Sig.a |
| Below 10000 - 10000-25000 | 10.412 | 27.917 | .373 | .709 | 1.000 |
| Below 10000 - 25000-50000 | 69.876 | 24.978 | 2.798 | .005 | .031 |
| Below 10000 - Above 50000 | 75.392 | 27.592 | 2.732 | .006 | .038 |
| 10000-25000 - 25000-50000 | -59.464 | 27.781 | -2.140 | .032 | .194 |
| 10000-25000 - Above 50000 | -64.981 | 30.153 | -2.155 | .031 | .187 |
| 25000-50000 - Above 50000 | -5.516 | 27.454 | -.201 | .841 | 1.000 |
| Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.  Asymptotic significances (2-sided tests) are displayed. The significance level is .05. | | | | | |
| a. Significance values have been adjusted by the Bonferroni correction for multiple tests. | | | | | |
| **Interpretation:**  Since there is a significant difference in atleast one of the income groups from Kruskal Wallis test, we can say that group which has income “Below 10000” and the group which has income “25000-50000” and also the income groups “Below 10000” and “Above 50000”,“10000-25000” and “25000-50000”,”10000-25000” and “Above 50000”has a significant difference among median rank sums with respect to **Personal Experience on Digital Payments.** | | | | | |

### Table 3.9: **Residence wise comparison in three dimensions**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Residence** | **Scores** | | **Awareness on digital payments** | **Personal Experience of Digital payment** | **Implications on digital payments during Covid-19 pandemic** |
| **City** | Md | 17.00 | 32.00 | 34.00 |
| IQR | 5.00 | 7.00 | 8.00 |
| Rank Sums | 122845.00 | 121657.00 | 126286.50 |
| Mean Rank Sums | 568.73 | 563.23 | 584.66 |
| **Metro** | Md | 18.00 | 34.00 | 34.00 |
| IQR | 4.00 | 8.50 | 8.00 |
| Rank Sums | 73458.00 | 66796.00 | 64198.50 |
| Mean Rank Sums | 673.93 | 612.81 | 588.98 |
| **Rural** | Md | 16.00 | 32.00 | 33.00 |
| IQR | 5.00 | 6.00 | 7.00 |
| Rank Sums | 121800.50 | 133616.00 | 131365.00 |
| Mean Rank Sums | 483.34 | 530.22 | 521.29 |
| **Semi-Urban** | Md | 16.00 | 32.00 | 33.00 |
| IQR | 4.00 | 6.00 | 7.00 |
| Rank Sums | 141689.00 | 144889.50 | 148264.00 |
| Mean Rank Sums | 526.72 | 538.62 | 551.17 |
| **Urban** | Md | 17.00 | 32.00 | 33.00 |
| IQR | 4.00 | 8.00 | 7.00 |
| Rank Sums | 160148.50 | 152982.50 | 149827.00 |
| Mean Rank Sums | 599.81 | 572.97 | 561.15 |
| **Kruskal Walli's Test** | Statistics | 35.50 | 6.68 | 5.95 |
| p-value | 0\* | 0.15 | 0.20 |

**Interpretation:**

* Since the p-value is “0” which is lesser than the significance level 0.05, we fail to accept the null hypothesis with 95% confidence, and state that there is a significant difference among median rank sums of atleast one residence with respect to **Awareness on digital payments.**
* Since the p-value is 0.15 which is greater than the significance level 0.05, we accept the null hypothesis and state that, there is no significant difference among median rank sums of residence with respect to **Personal Experience on digital payments.**
* Since the p-value is 0.20 which is greater than the significance level 0.05, we accept the null hypothesis and state that, there is no significant difference among median rank sums of residence with respect to **Digital payments during covid-19 pandemic.**

Table 3.10

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pairwise Comparisons of Residence on Awareness on digital payments** | | | | | |
| Sample 1-Sample 2 | Test Statistic | Std. Error | Std. Test Statistic | Sig. | Adj. Sig.a |
| Rural - Semi-Urban | -43.390 | 28.008 | -1.549 | .121 | 1.000 |
| Rural - City | 85.392 | 29.623 | 2.883 | .004 | .039 |
| Rural - Urban | -116.472 | 28.059 | -4.151 | .000 | .000 |
| Rural - Metro | 190.591 | 36.625 | 5.204 | .000 | .000 |
| Semi-Urban - City | 42.002 | 29.188 | 1.439 | .150 | 1.000 |
| Semi-Urban - Urban | -73.082 | 27.599 | -2.648 | .008 | .081 |
| Semi-Urban - Metro | 147.202 | 36.274 | 4.058 | .000 | .000 |
| City - Urban | -31.080 | 29.237 | -1.063 | .288 | 1.000 |
| City - Metro | -105.200 | 37.535 | -2.803 | .005 | .051 |
| Urban - Metro | 74.119 | 36.313 | 2.041 | .041 | .412 |
| Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.  Asymptotic significances (2-sided tests) are displayed. The significance level is .05. | | | | | |
| a. Significance values have been adjusted by the Bonferroni correction for multiple tests. | | | | | |
| **Interpretation -:**  Since the p value is less than 0.05 from the above table, we fail to accept the null hypothesis and conclude that there is significant difference between Rural-City, Rural-Urban, Rural-Metro, Semiurban-Urban, Semiurban-Metro, City-Metro, Urban-Metro Residencies with respect to **Awareness on Digital Payments** | | | | | |

### Table 3.12: **Number of UPI Transactions per month category wise comparison in three dimensions**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No. of UPI Transactions** | **Scores** | | **Awareness on digital payments** | **Personal Experience of Digital payment** | **Implications on digital payments during Covid-19 pandemic** |
| **Below 10** | Md | 15.00 | 34.00 | 32.00 |
| IQR | 4.00 | 7.00 | 7.00 |
| Rank Sums | 5867.00 | 11806.00 | 12444.00 |
| Mean Rank Sums | 14.85 | 29.89 | 31.50 |
| **10 to 15** | Md | 17.00 | 32.00 | 33.00 |
| IQR | 4.00 | 7.00 | 7.00 |
| Rank Sums | 4605.00 | 9098.00 | 9324.00 |
| Mean Rank Sums | 16.39 | 32.38 | 33.18 |
| **15 to 20** | Md | 17.00 | 34.00 | 34.00 |
| IQR | 3.00 | 6.00 | 7.00 |
| Rank Sums | 2395.00 | 4822.00 | 4942.00 |
| Mean Rank Sums | 16.40 | 33.03 | 33.85 |
| **20 to 25** | Md | 17.00 | 35.00 | 34.00 |
| IQR | 3.00 | 7.00 | 7.00 |
| Rank Sums | 1310.00 | 2604.00 | 2586.00 |
| Mean Rank Sums | 16.79 | 33.38 | 33.15 |
| **25 Above** | Md | 18.00 | 34.00 | 34.00 |
| IQR | 4.00 | 7.00 | 7.00 |
| Rank Sums | 3574.00 | 7035.00 | 7117.00 |
| Mean Rank Sums | 16.78 | 33.03 | 33.41 |
| **Kruskal Walli's Test** | Statistics | 70.92 | 73.31 | 28.89 |
| p-value | 0\* | 0\* | 0\* |

**Interpretation -**:

* Since the p value is “0” for **Awareness, Personal Experience and Digital Payments** **during covid 19**, we state that there is a significant difference among the median rank sums of atleast one group in the UPI transactions.

Table 3.13

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pairwise Comparisons of No. of Transactions on Awareness on digital payments** | | | | | |
| Sample 1-Sample 2 | Test Statistic | Std. Error | Std. Test Statistic | Sig. | Adj. Sig.a |
| Below 10 - 15 – 20 | 136.939 | 30.943 | 4.426 | .000 | .000 |
| Below 10 - 10 – 15 | 139.168 | 24.932 | 5.582 | .000 | .000 |
| Below 10 - 20 – 25 | 184.374 | 39.584 | 4.658 | .000 | .000 |
| Below 10 - Above 25 | 199.840 | 27.158 | 7.358 | .000 | .000 |
| 15 – 20 - 10 – 15 | 2.229 | 32.593 | .068 | .945 | 1.000 |
| 15 – 20 - 20 – 25 | -47.434 | 44.806 | -1.059 | .290 | 1.000 |
| 15 – 20 - Above 25 | -62.900 | 34.326 | -1.832 | .067 | .669 |
| 10 – 15 - 20 – 25 | -45.205 | 40.887 | -1.106 | .269 | 1.000 |
| 10 – 15 - Above 25 | -60.671 | 29.024 | -2.090 | .037 | .366 |
| 20 – 25 - Above 25 | -15.466 | 42.281 | -.366 | .715 | 1.000 |
| Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.  Asymptotic significances (2-sided tests) are displayed. The significance level is .05. | | | | | |
| a. Significance values have been adjusted by the Bonferroni correction for multiple tests. | | | | | |
| **Interpretation-:**  Since the p value is less than 0.05 from the above table, we fail to accept the null hypothesis and conclude that, there is a significant difference between Below 10 - 15-20, Below 10 - 10-15, Below 10 - 20-25, Below 10 - Above 25, 10–15 - Above 25, groups of No. of UPI transactions with respect to **Awareness** **on Digital Payments.** | | | | | |

Table 3.14

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pairwise Comparisons of No. of Transactions on Personal experience of digital payments** | | | | | |
| Sample 1-Sample 2 | Test Statistic | Std. Error | Std. Test Statistic | Sig. | Adj. Sig.a |
| Below 10 - 10 – 15 | 130.614 | 25.037 | 5.217 | .000 | .000 |
| Below 10 - 15 – 20 | 171.083 | 31.073 | 5.506 | .000 | .000 |
| Below 10 - Above 25 | 192.553 | 27.273 | 7.060 | .000 | .000 |
| Below 10 - 20 – 25 | 202.264 | 39.751 | 5.088 | .000 | .000 |
| 10 – 15 - 15 – 20 | -40.470 | 32.730 | -1.236 | .216 | 1.000 |
| 10 – 15 - Above 25 | -61.940 | 29.146 | -2.125 | .034 | .336 |
| 10 – 15 - 20 – 25 | -71.650 | 41.059 | -1.745 | .081 | .810 |
| 15 – 20 - Above 25 | -21.470 | 34.470 | -.623 | .533 | 1.000 |
| 15 – 20 - 20 – 25 | -31.180 | 44.995 | -.693 | .488 | 1.000 |
| Above 25 - 20 – 25 | 9.710 | 42.459 | .229 | .819 | 1.000 |
| Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.  Asymptotic significances (2-sided tests) are displayed. The significance level is .05. | | | | | |
| a. Significance values have been adjusted by the Bonferroni correction for multiple tests. | | | | | |
| **Interpretation:-**  Since the p-value is less than 0.05 from the above table, we fail to accept the null hypothesis and conclude that there is a significant difference between Below 10 - 10-15, Below 10 - 15-20, Below 10 – Above 25, Below 10 - 20-25, 10–15 - Above 25, groups of No. of UPI transactions with respect to **Personal Experience on Digital Payments.** | | | | | |

Table 3.15

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Pairwise Comparisons of No. of Transactions on Implication on digital payments during covid-19** | | | | | |
| Sample 1-Sample 2 | Test Statistic | Std. Error | Std. Test Statistic | Sig. | Adj. Sig.a |
| Below 10 - 20 – 25 | 84.137 | 39.726 | 2.118 | .034 | .342 |
| Below 10 - 10 – 15 | 86.341 | 25.021 | 3.451 | .001 | .006 |
| Below 10 - 15 – 20 | 120.129 | 31.054 | 3.868 | .000 | .001 |
| Below 10 - Above 25 | 122.517 | 27.256 | 4.495 | .000 | .000 |
| 20 – 25 - 10 – 15 | 2.204 | 41.033 | .054 | .957 | 1.000 |
| 20 – 25 - 15 – 20 | 35.992 | 44.967 | .800 | .423 | 1.000 |
| 20 – 25 - Above 25 | -38.380 | 42.433 | -.904 | .366 | 1.000 |
| 10 – 15 - 15 – 20 | -33.788 | 32.710 | -1.033 | .302 | 1.000 |
| 10 – 15 - Above 25 | -36.176 | 29.128 | -1.242 | .214 | 1.000 |
| 15 – 20 - Above 25 | -2.388 | 34.449 | -.069 | .945 | 1.000 |
| Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.  Asymptotic significances (2-sided tests) are displayed. The significance level is .05. | | | | | |
| a. Significance values have been adjusted by the Bonferroni correction for multiple tests. | | | | | |
| **Interpretation -:**  Since the p-value is less than 0.05 from the above table, we fail to accept the null hypothesis and conclude that there is significant difference between Below 10 - 20-25, Below 10 - 10-15, Below 10 - 15-20, Below 10 - Above 25, groups of No. of UPI transactions with respect to **Digital Payments during Covid 19 pandemic.** | | | | | |

***Note*: Education is not used in comparative analysis as the sample size proportions are highly varying.**

# **Conclusions:**

In this comprehensive UPI data analysis project, we embarked on a journey to explore, dissect, and draw meaningful insights from the vast expanse of transaction data generated through the Unified Payments Interface (UPI) ecosystem. Our endeavour sought to unearth the hidden gems of knowledge within this data, shedding light on the transformative impact of digital payments in the financial landscape, and guiding future decision-making processes in the ever-evolving realm of financial technology.Throughout our analysis, we delved into a multitude of facets within the UPI dataset, examining transaction volumes, frequencies, trends, and demographics. We scrutinized transaction types, user behaviour, and regional disparities. We employed data visualization techniques and statistical analysis to decipher the wealth of information that UPI data presents. Our findings, summarized here, underscore the profound implications and potential of UPI in reshaping the financial ecosystem.

First and foremost, the exponential growth in UPI transactions over the years has been nothing short of remarkable. The data clearly showed a steep upward trajectory, indicative of an increasingly digital-savvy populace. The convenience and accessibility of UPI have made it the go-to choice for millions of individuals and businesses. This not only signifies the paradigm shift in the way we transact but also presents a strong case for further investments in enhancing UPI infrastructure and services.

Demographic information analysis unveiled notable patterns. Understanding the age distribution of UPI users and their preferred transaction categories allows for tailored marketing campaigns. Moreover, we noticed regional disparities in UPI adoption, highlighting the need for localized strategies to ensure more inclusive financial access.

In conclusion, this UPI data analysis project has provided a panoramic view of the UPI landscape, demonstrating its transformative potential and the scope for innovation in the fintech sector. Our findings offer valuable insights for businesses, policymakers, and researchers seeking to harness the power of UPI to foster financial inclusion, drive economic growth, and revolutionize the way we transact.

As we conclude our analysis, it is crucial to recognize that this is only the beginning of our journey with UPI data. The financial technology space is constantly evolving, and the insights we have gained thus far will serve as a foundation for further exploration and refinement of strategies. With the right application of data-driven decision-making, UPI has the potential to continue reshaping the future of finance, fostering financial inclusion, and enhancing the overall quality of life for people around the world.

This project has illuminated the potential of data analysis in the financial sector, serving as a testament to the profound influence that data-driven decision-making can have on the world of finance. In a rapidly evolving digital landscape, staying at the forefront of technology and data analysis will be the key to unlocking the immense potential of UPI and ensuring that it continues to be a powerful force in the financial world for years to come.

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# **Annexure: Questionnaire**

|  |  |  |
| --- | --- | --- |
| Constructs | Items | Descriptions |
| Demographic | Gender | Nominal |
| Age | Nominal |
| Education | Nominal |
| Place of Residence | Nominal |
| Awareness | Platforms | Ordinal |
| Software | Ordinal |
| Service Provided by Banks | Ordinal |
| Security threats | Ordinal |
| Behaviour | Willingness | Ordinal |
| Pride | Ordinal |
| Tracking of record | Ordinal |
| Acceptance in small shops | Ordinal |
| Small Size of receipt | Ordinal |
| Shop Priority | Ordinal |
| Insecurity in large cash transaction | Ordinal |
| Ease of use | Ordinal |
| Covid on Digital Payment | Increase in contactless payment | Ordinal |
| Reduction in physical contact | Ordinal |
| Fear of spread through cash | Ordinal |
| Restriction on ATM | Ordinal |
| Risks of visiting Branch | Ordinal |
| Bill Payments | Ordinal |
| Reduction in cash holdings | Ordinal |
| Continue with online payments | Ordinal |

|  |  |  |
| --- | --- | --- |
| **Gender** | Male | **1** |
| Female | **2** |
| Others | **3** |
| **Age** | 15-25 | **1** |
| 25-35 | **2** |
| 35-45 | **3** |
| 45-55 | **4** |
| 55 Above | **5** |
| **Education** | Primary | **1** |
| Secondary | **2** |
| Graduation | **3** |
| Above Graduation | **4** |
| **Income (Monthly Average)** | Below 10000 | **1** |
| 10000-25000 | **2** |
| 25000-50000 | **3** |
| Above 50000 | **4** |
| **Place of residence** | Rural | **1** |
| Semi-Urban | **2** |
| Urban | **3** |
| Metro | **4** |
| City | **5** |
| **Average Monthly Digital Transaction** | Below 10 | **1** |
| 10 – 15 | **2** |
| 15 – 20 | **3** |
| 20 – 25 | **4** |
| Above 25 | **5** |

**I. Tick the best description of your state of awareness.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Awareness on digital payment | Not at all aware  **1** | Slightly aware  **2** | Somewhat aware  **3** | Moderately aware  **4** | Extremely aware  **5** |
| Platforms like UPI, BHIM, NACH, IMPS, NETS, Bharat Billpay, \*99# etc., |  |  |  |  |  |
| Application software like Google Pay, PhonePe, Paytm Amazon Pay etc. |  |  |  |  |  |
| Services provided by bank |  |  |  |  |  |
| Security threats |  |  |  |  |  |

**II. Mark your personal experience of digital payments.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Strongly Disagree  **1** | Disagree  **2** | Neither Disagree nor Agree  **3** | Agree  **4** | Strongly Agree  **5** |
| I use digital payment if it is available |  |  |  |  |  |
| I take pride while making payments digitally |  |  |  |  |  |
| I prefer digital payment because I can track my transaction records |  |  |  |  |  |
| I feel helpful that even small shops are accepting these digital facilities |  |  |  |  |  |
| I feel helpful that I can use these facilities for small amount transactions |  |  |  |  |  |
| I give priority to shops where digital payment is accepted |  |  |  |  |  |
| I prefer digital payments because of insecurity in large cash transactions |  |  |  |  |  |
| I feel that digital payment transactions are easy in use |  |  |  |  |  |

**III. Mark your implications on digital payments during Covid’19 pandemic**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Strongly Disagree  **1** | Disagree  **2** | Neither Disagree nor Agree  **3** | Agree  **4** | Strongly Agree  **5** |
| Use of digital transactional facilities have increased during this Covid’19 Pandemic |  |  |  |  |  |
| I prefer digital payments to reduce physical contact with others there by spread of Covid’19 |  |  |  |  |  |
| I prefer digital payment to be safe from the transmission of Covid’19 through cash |  |  |  |  |  |
| I used digital payment transactions because of restrictions to visit ATMs during lockdown |  |  |  |  |  |
| I used online banking because risks of spreading virus through branch visits |  |  |  |  |  |
| It became a routine to pay my bills though digital mode during the lockdown |  |  |  |  |  |
| Use of digital payments have reduced my level of cash holdings during the lockdown |  |  |  |  |  |
| I wish to continue with digital payments in future. |  |  |  |  |  |