Journal of Advances in Economics and Business Management
p-ISSN: 2394-1545; e-ISSN: 2394-1553; Volume-8, Issue-3; July-September, 2021; pp. 49-55

http://www.krishisanskriti.org/Publication.html

To what Extent have Digital Payment Methods Helped Promote Financial Inclusion?

A Case Study of Mumbai

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Abstract:** Financial Inclusion refers to providing affordable and quality financial services to everyone in a society regardless of their income or savings. Its importance cannot be underestimated given that it helps bridge the gender gap and also towards the economic development of the underprivileged population. Given that the world is moving towards a digitized society, digital payment methods have become increasingly vital in our day to day lives. Hence, this paper aims at identifying to what extent digital payment methods have helped promote financial inclusion in the city of Mumbai. A random sampling technique was implemented to collect data on 45 individuals through a survey for this study.Fisher's Exact Test along with results from the study suggest the association between digital payment methods and financial inclusion are statistically significant with a probability value less than 1%. Through an Odd's Ratio calculation, it could be further derived that individuals with a bank account are 49.3 times more likely to use digital payment options than those who do not have a bank account. Lastly, through the survey it was identified that even though the Demonetization Movement was implemented to move towards a cashless economy, there were no short-term changes in the payment habits of individuals.

1. SECTION I: INTRODUCTION

Over the past decade the Indian economy has grown at a rapid pace, hence providing the government with the opportunity to make society inclusive by introducing schemes that not only improve the livelihood of workforce but also benefit the nation.While, a majority of such schemes have been successful, one movement that has been highly criticized was the Demonetization movement, implemented by Narendra Modi on November 8th 2016, with the motive of curbing black money, which was understandable given that according to a study by the Finance Ministry in 2014, about 90 to 97 per cent of black money resided within India. The movement involved declaring INR 500 and INR 1000 notes to be illegal, hence causing nearly 86% of currency value in circulation to be withdrawn, without replacing a majority of it. While officially, demonetization can be considered a success, it should be remembered that demonetization targeted black money, not black wealth. Wealth refers to physical or monetary assets such as the value of stocks and shares, or housing prices. As black wealth constitutes only 1% of black money, with the rest either in the form of investments or purchases, a large proportion of black money wasn't initially captured. Since officially, removing black money was considered to be a success, in 2017 the focus was fixated on making India a cashless economy, with Modi himself stating "India is on its way to become a digital economy. The time is not far when every Indian, even the poorest, would say *'digi dhan, niji-dhan'* (digital money is my money)."

2. THE IMPORTANCE OF A CASHLESS ECONOMY IN INDIA

Talking from a national perspective, a cashless economy allows for transparency between members of a transaction. During a TEDx talk, the former CEO of MasterCard, Ajay Banga, explained that "Cash actually is the friend of the person who has something to hide." India has lost approximately $10 Billion due to tax evasion yearly and making the economy cashless would prevent this from occurring again.Further, this reduces the expenditure incurred due to printing and transporting currency notes. The cost of printing 3 new notes, INR 200, INR 500 and INR 2000 itself is estimated to cost upward of 6,500 crore in 2016-2017 and is only estimated to increase due to the growing population, unless the economy becomes cashless. Thus, the money that will no longer be spent on such factors can be used to better the socio-economic welfare through improvements in infrastructure, healthcare facilities, etc. Lastly, it also authenticates and formalizes transactions, thus curbing corruption and the flow of black money, which results in an increase in economic growth.

3. OPTIONS IN A CASHLESS ECONOMY: DIGITAL PAYMENT METHODS

With India moving towards a cashless economy, the government launched the Digital India Plan in 2015 in order to ensure government services are available to Indian citizens through an electronic platform. "Faceless, Paperless, Cashless" – one of the professed roles of Digital India, is centred on transforming India into a digitally powered economy and knowledge economy.

In order to make the economy cashless, the government has provided abundant modes of digital payment methods, i.e. payments that are conducted over the internet and mobile channels and hence involve no physical exchange. Below is a list of a few of the digital payment methods offered by the government.

1. Banking Cards: Involve credit and debit cards such as MasterCard, Visa, etc and provide consumers with more security, convenience and control than any other payment method.

2. Unified Payments Interreferences: UPI's allow for multiple bank accounts into a single mobile application and allows transfer funds from one UPI account to another through a smart phone connected to the internet.

3. Mobile Wallets: Include companies such as Paytm, Jio Money, Vodafone M-Pesa, etc. where users can make purchases with smartphones, tablets, etc. rather than a physical plastic card.

4. Aadhar Enabled Payment Schemes: A bank led model that allows online interposable financial transactions through Business Correspondent using Aadhar verification.

5. Point of Scale: These are places where sales are made, which require internet connectivity to take place.

6. Unstructured Supplementary Service Data: USSD provides the opportunity to transfer funds without the use of internet connectivity by simply dialling *99#,

4. SECTION II: GENERAL OVERVIEW OF FINANCIAL INCLUSION

According to the World Bank Group, "Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit and insurance – delivered in a responsible and sustainable way." The World Bank Group believes that Financial Inclusion plays a key role in reducing poverty and boosting shared prosperity and hence considers it to be an enabler of 7 out of the 17 Sustainable Development Goals.

The International Monetary Fund explains that financial inclusion involves "access to and use of formal financial services." This definitions suggests that the IMF believes that Financial Inclusion is a measurable concept, which is supported by the fact that it has a Financial Access Survey. The idea is that financial services should be made available to a majority of people for many purposes.

5. IMPORTANCE OF FINANCIAL INCLUSION IN INDIA

The importance of Financial Inclusion cannot be underestimated given that it is the key to achieving social inclusion. According to the United Nations, providing financial services to the younger generation can promote entrepreneurship and asset building, and even encourage sustainable livelihoods. Given that India is currently undergoing the demographic dividend, measures to improve financial inclusion should be made a priority.Further the UN also states that in low-income countries, financial inclusion can strengthen the financial sector and domestic resource mobilization, thus contributing to social and economic development. As financial inclusion involves the entire population and hence both genders, it can also bridge the gender inequality gap.Lastly, participating within the financial system provides individual benefits such as being able to start and grow a business and also the ability to handle uncertainties and unexpected payments or 'financial shocks'. India's Corporate Affairs Secretary, Rajesh Verma,further stressed that "financial inclusion will help the rural populace to understand the importance of basic concepts of budget, savings, various government and how to save themselves from Ponzi schemes."

6. BARRIERS TO ACHIEVING FINANCIAL INCLUSION IN INDIA

Even though the world is moving towards financial inclusion, with 69% of the population having a bank account in 2017, a majority of developing countries still remain unbanked or underbanked. While unbanked refers to not having a relation with any banking institute, underbanked is when people have a relation with a banking institute but predominately rely on cash, cheques and payday loans rather than traditional loans and credit cards. India ranks second lowest according to the World Bank, with approximately 190 Million citizens being unbanked.

India has an internet penetration rate of roughly 49% as of 2019 and smartphone penetration rate of 42% as of 2020.As a majority of schemes require access to such devices, it is difficult to improve financial inclusion. India's rural literacy rate is 69%,is likely to cause lack of trust in the financial system becausepeople living in rural areas have not been exposed to modern means but instead relied on using cash and cheques. Further, there is uneven progress made, leavingsome people disadvantaged. Taking Mumbai as an example, being a megacity it has the facilities provided to improve the situation regarding financial inclusion whereas asmaller city may not. Political scenarios should also be considered as political parties may have different perspectivesas to how to improve financial inclusion. For example in 2009, the Congress Party were accused of stalling a Financial Inclusion Project titled *'Bhamashah'* in the state of Rajasthan whereas financial inclusion is considered to be a priority for the Bhartya Janta Party. Lastly, even though there are many programmes introduced in India, most have had shortcomings such as the SHG-Bank Linkage Programme, where there was inadequate outreach and also delays in the opening of SHG accounts and disbursement of loans.

7. IMPORTANCE OF DIGITAL PAYMENT METHODS IN ACHIEVING FINANCIAL INCLUSION

While financial inclusion can be achieved by promoting financial literacy or implementing government schemes, arguably the most important is increasing the consumption of digital payment methods. In recent years, debit cards have overtaken cash as the most popular in-person form of payment. Further, the use of cards in remote payments where cash isn't an option is almost equal to their use for in-person transactions. Retailers have begun adopting a policy of refusing cash. Secondly, while this may not be happening in India, around the world governments are deploying no-cash parking meters and mass transit fare machines that do not accept cash.Lastly, with online shopping becoming more popular during COVID, there has been a reduction in physical stores and hence greater demand for paying by card. Digital Payment Methods also provide higher payment security in a world that is becoming more vulnerable to a lack of privacy and hence reduce the possibility of theft. Lastly, as globalisation improves at a rapid pace, one of the key methods of being able to cope up is through digital payments as it facilitates transactions from around the world.

8. SECTION III: PURPOSE OF THE STUDY AND RESEARCH QUESTION

With digital payment methods becoming more prominent in the modern age, this quantitative study aims at exploring whether digital payments have had any impact on financial inclusion in Mumbai. Given that a greater proportion of the developing world does not rely on digital payments, it becomes important to assessMumbai's situation in particular since it is the economic and financial hub of second biggest economy of Asia.

9. RESEARCH QUESTION

To what extent have Digital Payment Methods helped promote Financial Inclusion in Mumbai?

10. SECTIONIV: DATA COLLECTION AND ANALYSIS

A questionnaire survey was designed to collect primary data regarding the usage of digital payment methods among low-income individuals in Mumbai.A simple random sampling method was used to obtain a sample size of 45, in order to collect the required data.

11. OBJECTIVES OF THE SURVEY

1. To get an understanding of the proportion of the banked and unbanked sector in Mumbai.

2. To examine how dependent the low-income population of Mumbai are on Digital Payment Options in terms of –

   i. Extent of usage of accounts

   ii. Number of digital payment options used

   ii. Purpose for using digital payment methods

3. To identify the extent to which Demonetization was successful in improving financial inclusion.

12. ANALYSIS OF DATA AND FINDINGS

In order to understand whether digital payment methods can be associated with helping promote financial inclusion in Mumbai, Fisher's Exact Testhas been implemented. Bank accounts are taken as an indicator of being financially included. The categorical variables taken from the survey are mentioned below along with the question asked.

1. Do you have a Bank Account (Yes/No)

2. Do you use Digital Payment Options? (Yes/No)

For the second question, while it is possible to break up the question further by asking what type of option a person uses, this would result in individual values being repeated in rows and columns of the table constructed in the next section. This violates one of the assumptions of the Fisher Exact Test and hence a test of independence would not be possible.

Note: Only if individuals use bank accounts monthly or in a shorter time spam, will it be considered that they have a bank account. This is because a criterion of financial inclusion is the frequency of accessing a bank account.Hence, even if an individual has a bank account butdoes not use it regularly, then it will be considered as not having a bank account. The same goes for the Digital Payment Options.

13. HYPOTHESES

1. H_0 (Null Hypothesis): Digital Payments Methods are independent of Financial Inclusion in Mumbai.

2. H_1 (Alternative Hypothesis): Digital Payments Methodsare not independent of Financial Inclusion in Mumbai.

TABLE 1: Contingency Table for Observed Frequencies based of surveyresults

Do you use Digital Payment Options?	Do you have a bank account?	
	Yes	**No**
Yes	37	1
No	3	4

TABLE 2: Contingency Table for Expected Frequencies based of Observed Frequencies table

Do you use Digital Payment Options?	Do you have a bank account?	
	Yes	No
Yes	34	4
No	6	1

Values for the expected frequencies have been rounded to the nearest whole number.

Even though the number of observations are greater than 20, given that the expected cell count is 5 or greater in less than 80% of the cells, in order to identify an association between the two variables, we'd have to use Fisher's Exact Test.

14. ALPHA LEVEL

The alpha level, or the significance value, is the probability of a Type 1 Error (rejecting the null hypothesis when it is true). For this test the alpha value chosen is mentioned below.

$$\alpha = 0.01$$

Given that the alpha value is 1%, the Confidence Interval is estimated to be 99%.

Using hypergeometric distribution to determine the probability that the observed outcome occur by random change

From table 1, assume the corresponding variables for each cell.

1. Digital Payments 'Yes' and Bank Account 'Yes' – a

2. Digital Payments 'Yes' and Bank Account 'No' – b

3. Digital Payments 'No and Bank Account 'Yes' – c

4. Digital Payments 'No and Bank Account 'No – d

5. The summation of all values in each cell - N

$$p - value = \frac{\binom{a+b}{a}\binom{c+d}{c}}{\binom{N}{a+c}}$$

$$\binom{a+b}{a} = \binom{38}{37} = {}_{38}C_{37} = \frac{38!}{37!\,(38-37)!} = 38$$

$$\binom{c+d}{c} = \binom{7}{3} = {}_{7}C_{3} = \frac{7!}{3!\,(7-3)!} = 35$$

$$\binom{N}{a+c} = \binom{45}{40} = {}_{45}C_{40} = \frac{45!}{40!\,(45-40)!} = 1221759$$

$$p = \frac{\binom{a+b}{a}\binom{c+d}{c}}{\binom{N}{a+c}} = \frac{38 \times 35}{1221759} = 1.09 \times 10^{-3}$$

As $p < 0.01$(alpha level) we can state that the association between digital payment methods and financial inclusion in Mumbai is statistically significant.

15. VERIFYING STATISTICAL SIGNIFICANCE

TABLE 3: Calculating P-Value

Do you use Digital Payment Options?	Do you have a bank account?	
	Yes	**No**
Yes	37	1
No	3	4

Assume the above table be a 2×2 Matrix with two variables being X (Digital Payment) and Y (Bank Account).Let entry $a_{i,j}$ represent the number of observations where $x = i$ and $y = j$.

$$N = \sum_i R_i = \sum_j C_j = 45$$

Multivariate generalization of hypergeometric probability function:

$$P_{cutoff} = \frac{(R_1! \times R_2! \dots R_m!)(C_1! \times C_2! \dots C_m!)}{N! \times \prod i,j \ \times \ a_{i,j}!}$$

$$P_{cutoff} = \frac{(38! \times 7!)(40! \times 5!)}{45! \times (37! \times 1! \times 3! \times 4!)} = 0.00109$$

Other Possible Matrices with P-Values

$$\begin{pmatrix} 36 & 2 \\ 4 & 3 \end{pmatrix} with\ P\ value = 0.0201$$

$$\begin{pmatrix} 35 & 3 \\ 5 & 2 \end{pmatrix} with\ P\ value = 0.145$$

$$\begin{pmatrix} 36 & 4 \\ 4 & 1 \end{pmatrix} with\ P\ value = 0.423$$

$$\begin{pmatrix} 33 & 5 \\ 7 & 0 \end{pmatrix} with\ P\ value = 0.411$$

The sum of P-values that are less than or equal to P_{cutoff} *is* 0.00109, which is less than 0.01 and is thus significant. Hence, we can state that the null hypothesis is unlikely to occur and the outcome of the two variables is not random and hence not due to chance.

16. ODDS RATIO

TABLE 4: Contingency Table for Observed Frequencies to Calculate Odds Ratio

Do you use Digital Payment Options?	Do you have a bank account?	
	Yes	No
Yes	37	1
No	3	4

From table 4, assume the corresponding variables for each cell.

1. Digital Payments ‘Yes’ and Bank Account ‘Yes’ – a
2. Digital Payments ‘Yes’ and Bank Account ‘No’ – b
3. Digital Payments ‘No and Bank Account ‘Yes’ – c
4. Digital Payments ‘No and Bank Account ‘No – d

$$OR = \frac{(a \times d)}{(b \times c)} = \frac{(37 \times 4)}{(3 \times 1)} = 49.3$$

Given that the Odd’s Ratio is greater than 1, it can be interpreted that individuals with a bank account are 49.3 times more likely to use digital payment options than those who do not have a bank account.

17. SECTION V: RESULTS OF THE STUDY

All individuals who completed the survey do have a bank account however,88% of the sample size uses it on a regular basis (monthly). This can be seen irrespective of income and education degree as the income range is 2.8 lakh per annum to 6.5 lakh per annum and the education degree range is from graduating 6th grade to receiving a Bachelor’s degree.While a majority of the people do use Digital Payment Methods, there is a sharp contrast in the options that they select. Payment Options that are only available in India such as UPI’s,Aadhar Enabled Payments and USSDare used byonly 4 out of the 45 people surveyed, whereas other modes that are common throughout the world tended to be more popular, with 26 people using Debit Cards and 18 using Mobile Wallets respectively. The predominantreason why Digital Payment Methods are being used is due to convenience. This is in the sense that account details are automatically saved and transactions become quicker. 31 out of the 40 people who use digital pay gave convenience as the main attribute as to why they use such methods.Given that a greater proportion of the sample size said they use digital payment methods on a daily basis for groceries, medicines and electronics, it makes sense why they would agree that it is convenient to use. 9 people believed that along with convenience, another factor is cashbacks and other offers. Coincidentally, 8 out of the 9 people who chose this option are mostly reliant on Mobile Wallets including Google Pay and Paytm as their preferred digital payment method. Reasons for choosing digital pay that were chosen by less than 10% of the sample size included better user experience and multiple payment methods. Those who don’t use such methods have a range of reasons. They include not being able to use them correctly, not needing it as they’re reliant on cash and believing cash is a simpler, less time-consuming option. One individual who no longer uses digital payment methods stated that he’s used Google Pay 4 times in the past year but just did so since everyone around him began using it. Surprisingly, age was not a common factor among those who didn’t use such payment methods. 1 individual was under 30, 2 were under 40 and 1 was under 50. Further, the shops that they visit often are not compatible with such options and hence they believe it would be a waste of time to learn it. As mentioned in the introduction, the Demonetization Movement was officiallyconsidered to be a success. However, the survey results do not give a definitive answer. While over 95% stated that the shops that they visited frequently did accommodate by providing such payment methods, 44% of the individuals still did not use the methods given. The most common answer was that they’ve already been used to paying with cash and since they payed smaller amounts, it did not make a great difference. Further, while 1/5thof the sample size did try using online platforms, 1/3rd were already well-versed with such options and the remaining 45% did not see any immediate change in their purchasing behaviour.

18. SECTIONVI: LIMITATIONS OF THE STUDY

There are two main limitations of this study. The first one being that the sample size, while not too small to invalidate the results, could be greater in order to provide more convincing reasoning to answer the research question. Secondly, the results of the Fisher Exact Test say that the association is statistically significant. This means that while the null hypothesis is unlikely to occur, it does not give us concrete proof that digital payment methods have helped promote Financial Inclusion in Mumbai.

19. SECTION VII: CONCLUSIONAND RECOMMENDED FUTURE POLICIES

From Fisher's Exact Test, it can be concluded that the association between digital payment methods and financial inclusion isstatistically significant. Through the survey conducted, it can be seen that a majority have been using digital payment methods on a regular basis due to its convenience, cash back and offers and better user experience. Regardless of age, income bracket and education degree, digital payment methods have been used frequently and can be associated with promoting Financial Inclusion in Mumbai. However, while almost all individuals in the sample size did have a bank account, some prefer to not use it as they are still reliant on cash and are hence still considered to be underbanked. Even though the success of the Demonetization Movement can be argued, each individual who gave the survey said that the shops that they visited frequently did provide the option of digital payment methods to customers after the movement. Thus, as the financial services and means of paying digitallyhavebeen provided, the focus should now be on enhancing financial literacy and creating awareness about the benefits of consuming such products. Hence it is recommended that rather than the government itself, supporting the means to drive financial inclusion, private banks should do to as well. If private banks are willing to create awareness and provide platforms to enhance financial literacy, there will be much faster developments in the financial inclusion field in Mumbai.

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